As confidentially submitted to the Securities and Exchange Commission on April 6, 2018. This draft registration statement has not been publicly filed with the Securities and Exchange Commission and all information herein remains confidential.

Registration No. 333-

UNITED STATES
SECURITIES AND EXCHANGE COMMISSION

Washington, D.C. 20549

FORM S-1
REGISTRATION STATEMENT

Under

The Securities Act of 1933

AVROBIO, INC.

(Exact name of registrant as specified in its charter)

Delaware	**2836**	**81-0710585**
(State or other jurisdiction of incorporation or organization)	**(Primary Standard Industrial Classification Code Number)**	**(I.R.S. Employer Identification Number)**

One Kendall Square
Building 300, Suite 201
Cambridge, MA 02139
(617) 914-8420

(Address, including zip code, and telephone number, including area code, of registrant's principal executive offices)

Geoff MacKay
President and Chief Executive Officer
One Kendall Square
Building 300, Suite 201
Cambridge, MA 02139
(617) 914-8420

(Name, address, including zip code, and telephone number, including area code, of agent for service)

Copies to:

Arthur McGivern, Esq. **James Xu, Esq.** **Goodwin Procter LLP** **100 Northern Avenue** **Boston, Massachusetts 02210** **(617) 570-1000**	**Katina Dorton** **AVROBIO, Inc.** **One Kendall Square** **Building 300, Suite 201** **Cambridge, Massachusetts 02139** **(617) 914-8420**	**Patrick O'Brien, Esq.** **Ropes & Gray LLP** **Prudential Tower** **800 Boylston Street** **Boston, Massachusetts 02199** **(617) 951-7000**

Approximate date of commencement of proposed sale to the public: As soon as practicable after the effective date of this registration statement.

If any of the securities being registered on this Form are to be offered on a delayed or continuous basis pursuant to Rule 415 under the Securities Act of 1933, as amended, check the following box. ☐

If this Form is filed to register additional securities for an offering pursuant to Rule 462(b) under the Securities Act, please check the following box and list the Securities Act registration statement number of the earlier effective registration statement for the same offering. ☐

If this Form is a post-effective amendment filed pursuant to Rule 462(c) under the Securities Act, check the following box and list the Securities Act registration statement number of the earlier effective registration statement for the same offering. ☐

If this form is a post-effective amendment filed pursuant to Rule 462(d) under the Securities Act, check the following box and list the Securities Act registration statement number of the earlier effective registration statement for the same offering. ☐

Indicate by check mark whether the registrant is a large accelerated filer, an accelerated filer, a non-accelerated filer, a smaller reporting company or an emerging growth company. See the definitions of "large accelerated filer," "accelerated filer," "smaller reporting company" and "emerging growth company" in Rule 12b-2 of the Exchange Act.

Large Accelerated Filer	☐	Accelerated Filer	☐
Non-Accelerated Filer	☒ (Do not check if a smaller reporting company)	Smaller Reporting Company	☐
		Emerging Growth Company	☒

If an emerging growth company, indicate by check mark if the registrant has elected not to use the extended transition period for complying with any new or revised financial accounting standards provided pursuant to Section 13(a) of the Exchange Act. ☐

CALCULATION OF REGISTRATION FEE

TITLE OF EACH CLASS OF SECURITIES TO BE REGISTERED	**PROPOSED MAXIMUM AGGREGATE OFFERING PRICE(1)(2)**	**AMOUNT OF REGISTRATION FEE**
Common Stock, par value $0.0001 per share		

(1) Estimated solely for the purpose of calculating the registration fee pursuant to Rule 457(o) under the Securities Act of 1933, as amended.
(2) Includes the offering price of shares that the underwriters may purchase pursuant to an option to purchase additional shares.

The registrant hereby amends this registration statement on such date or dates as may be necessary to delay its effective date until the registrant shall file a further amendment that specifically states that this registration statement shall thereafter become effective in accordance with Section 8(a) of the Securities Act of 1933, as amended, or until this registration statement shall become effective on such date as the Commission, acting pursuant to said Section 8(a), may determine.

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The information in this preliminary prospectus is not complete and may be changed. We may not sell these securities until the registration statement filed with the Securities and Exchange Commission is effective. This preliminary prospectus is not an offer to sell these securities and we are not soliciting offers to buy these securities in any jurisdiction where the offer or sale is not permitted.

SUBJECT TO COMPLETION, , 2018
PRELIMINARY PROSPECTUS

Shares

Common Stock

We are offering shares of our common stock. This is our initial public offering and no public market currently exists for our common stock. We expect the initial public offering price to be between $ and $ per share. We intend to apply to list our common stock on The Nasdaq Global Market under the symbol "AVRO."

We are an "emerging growth company" as defined in Section 2(a) of the Securities Act of 1933 and will be subject to reduced public company reporting requirements. See "Prospectus Summary—Implications of Being an Emerging Growth Company."

Investing in our common stock involves a high degree of risk. Please read "Risk Factors" beginning on page 10 of this prospectus.

Neither the Securities and Exchange Commission nor any state securities commission has approved or disapproved of these securities or determined if this prospectus is truthful or complete. Any representation to the contrary is a criminal offense.

	PER SHARE	***TOTAL***
Public Offering Price	*$*	*$*
Underwriting Discounts and Commissions (1)		
Proceeds to us, before expenses		

(1) See "Underwriters" in this prospectus for a description of compensation payable to the underwriters.

We have granted the underwriters an option for a period of 30 days to purchase an additional shares of our common stock. If the underwriters exercise the option in full, the total underwriting discounts and commissions payable by us will be $, and the total proceeds to us, before expenses, will be $.

Delivery of the shares of common stock is expected to be made on or about , 2018.

MORGAN STANLEY *COWEN* *WELLS FARGO SECURITIES*

WEDBUSH PACGROW

Prospectus dated , 2018

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Through and including , 2018 (25 days after the date of this prospectus), all dealers effecting transactions in these securities, whether or not participating in this offering, may be required to deliver a prospectus. This delivery requirement is in addition to the obligation of dealers to deliver a prospectus when acting as underwriters and with respect to their unsold allotments or subscriptions.

You should rely only on the information contained in this prospectus or in any free writing prospectus we file with the Securities and Exchange Commission. Neither we nor the underwriters have authorized anyone to provide you with information other than that contained in this prospectus or any free writing prospectus prepared by or on behalf of us or to which we have referred you. We take no responsibility for, and can provide no assurance as to the reliability of, any other information that others may give you. We and the underwriters are offering to sell, and seeking offers to buy, common stock only in jurisdictions where offers and sales are permitted. The information contained in this prospectus is accurate only as of the date on the front cover page of this prospectus, or other earlier date stated in this prospectus, regardless of the time of delivery of this prospectus or of any sale of our common stock.

The market data and certain other statistical information used throughout this prospectus are based on independent industry publications, governmental publications, reports by market research firms, or other independent sources that we believe to be reliable sources. Although we believe that these sources are reliable, we have not independently verified the information contained in such publications. While we are not aware of any misstatements regarding any third-party information presented in this prospectus, their estimates, in particular, as they relate to projections, involve numerous assumptions, are subject to risks and uncertainties, and are subject to change based on various factors, including those discussed under the section titled "Risk Factors" and elsewhere in this prospectus. Some data are also based on our good faith estimates.

PROSPECTUS SUMMARY

This summary highlights information contained elsewhere in this prospectus and does not contain all of the information that you should consider in making your investment decision. Before investing in our common stock, you should carefully read this entire prospectus, including our consolidated financial statements and the related notes included elsewhere in this prospectus. You should also consider, among other things, the matters described under "Risk Factors" and "Management's Discussion and Analysis of Financial Condition and Results of Operations," in each case appearing elsewhere in this prospectus. As used in this prospectus, unless the context otherwise requires, references to the "company," "we," "us" and "our" refer to AVROBIO, Inc.

Overview

We are a clinical stage gene therapy company focused on developing potentially curative *ex vivo* lentiviral-based gene therapies to treat rare diseases following a single dose. Our gene therapies employ hematopoietic stem cells that are extracted from the patient and then modified with lentiviral vectors to insert a functional copy of the gene that is defective in the target disease. We believe that our approach, which transforms stem cells from patients into therapeutic products, has the potential to provide curative benefit for a range of diseases in an outpatient setting. Our initial focus is on a group of rare genetic diseases referred to as lysosomal storage diseases, which today are primarily managed with enzyme replacement therapies, or ERTs. These lysosomal storage diseases have well understood biologies, identified patient populations and represent large market opportunities with approximately $4.0 billion in worldwide net sales in 2017.

Our initial pipeline is comprised of four lentiviral-based gene therapies, including AVR-RD-01 for the treatment of Fabry disease, AVR-RD-02 for the treatment of Gaucher disease, AVR-RD-03 for the treatment of Pompe disease and AVR-RD-04 for the treatment of cystinosis. AVR-RD-01 is currently being evaluated in a Phase 1 clinical trial. We expect to initiate our Phase 2 clinical trial of AVR-RD-01 in mid-2018. In addition, Phase 1/2 clinical trials for both AVR-RD-02 and AVR-RD-04 are being planned and we expect patients will be dosed in 2019.

The first two patients in the ongoing clinical trial of AVR-RD-01 have been dosed and the treatment was well tolerated. In both patients, the plasma activity level of AGA, the enzyme that is deficient in patients with Fabry disease, began to rise within days of receiving AVR-RD-01 from nearly undetectable levels before treatment. Plasma AGA enzyme activity was then sustained above the range for males with classic Fabry disease including at the latest measurement dates, the longest of which to date has been 12 months after treatment. We believe these preliminary results support the potential of AVR-RD-01 to drive active enzyme production for long durations.

Lentiviral-based gene therapy has shown significant promise, demonstrating durable effects and safety in ongoing clinical trials for diseases such as beta thalassemia, ALD and ADA-SCID. Historically, the use of *ex vivo* lentiviral-based gene therapies has been restricted primarily to the most acutely severe diseases where risks of the typical requirement for heavily ablating the patients' bone marrow and thus significantly impairing these patients' immune systems had an acceptable risk/benefit profile. The ablation procedure, also known as the conditioning regimen, is administered prior to the gene therapy. The more intensive the conditioning regimen, the greater the risk of toxicity and thus the need for more intensive in-patient monitoring and potential for lengthy hospitalization.

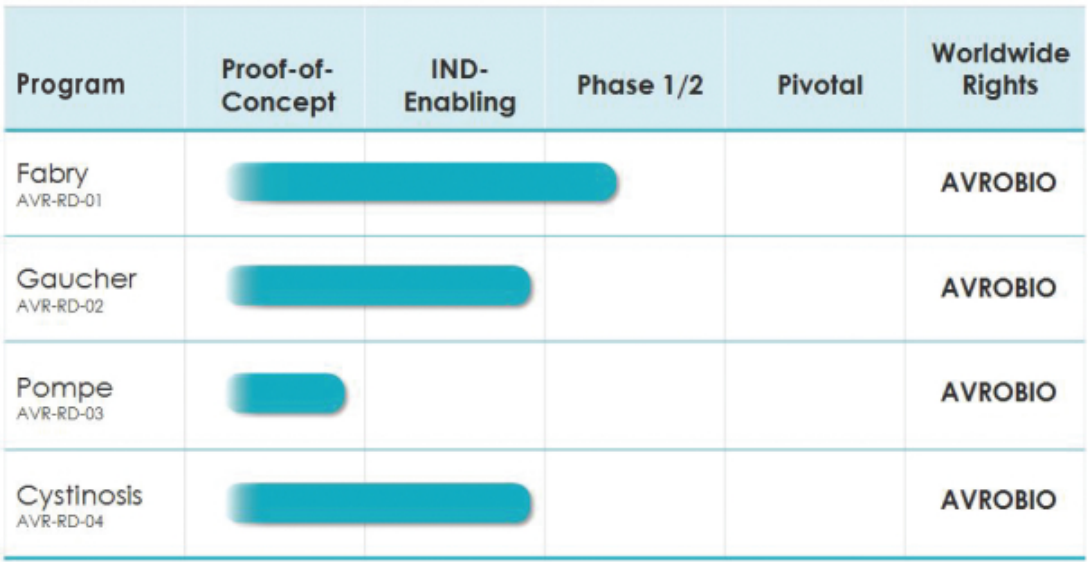
Our goal is to broaden the applicability of lentiviral-based gene therapy by initially targeting diseases where we generally believe durable effects can be achieved following a milder conditioning regimen that allows for outpatient treatment. We believe our approach of choosing diseases where the conditioning regimen can be milder, thus improving patient tolerability, will extend the reach of our gene therapies to a broad range of diseases as first-line therapies.

We are initially targeting rare diseases in which current standard of care provides the mechanistic proof that the enzymes or other proteins produced endogenously following treatment with our gene therapies can offer benefit to patients. Typically in lysosomal storage diseases, a gene mutation results in the deficiency or malfunction of an enzyme or other protein. This results in the inability of lysosomes to properly process cellular byproducts. As a result, these byproducts accumulate to toxic levels in the body's cells and, in turn, disrupt the function of multiple tissues and organs. Fabry disease, Gaucher disease and Pompe disease are primarily managed by bi-weekly, multi-hour infusions with ERTs that seek to exogenously replace the missing enzyme. However, given the characteristics of most ERTs, they typically only remain in the plasma for a short period of time and thus are not ideal because they are only dosed every two weeks. These existing therapies manage, rather than cure, the underlying diseases and, as a result, the diseases continue to progress. Further, the frequent, periodic and life-long dosing schedule required for ERTs results in significant costs for the healthcare system and is burdensome for the patient.

We believe our gene therapies leverage the well understood mechanism of ERTs by transforming a patient's own cells into a drug product that enables the patient to express functional enzyme or other protein and mirror the biology seen in an otherwise healthy individual. We believe that a single dose of our gene therapies may provide meaningful life-long benefit to these patients and potentially cure these diseases while also providing significant health economic advantages.

Our Pipeline

Our programs leverage years of extensive preclinical and early clinical research by leading researchers, as well as our internal research efforts. The status of our lentiviral-based gene therapy programs is reflected below.



AVR-RD-01. Our lead product candidate, AVR-RD-01 for the treatment of Fabry disease, is derived from hematopoietic stem cells to which the gene encoding the enzyme a-galactosidase A, or AGA, is added in an *ex vivo* process using a lentiviral vector. In an ongoing Phase 1 clinical trial of patients with Fabry disease, AVR-RD-01 has been well-tolerated and has led to the production of active AGA enzyme in the two patients treated to date. In both patients, within days of receiving AVR-RD-01, the level of AGA enzyme activity began

to rise from nearly undetectable levels before treatment to levels above the range for males with classic Fabry disease. As of twelve months after receiving AVR-RD-01, the first patient's plasma AGA enzyme activity levels continued to be above the range for males with classic Fabry disease. Plasma AGA enzyme activity levels in the second patient remained above the range for males with classic Fabry disease as of one month after treatment.

Plasma AGA Activity (nmol/hr/ml) Following Treatment with AVR-RD-01

	Day 0 (Infusion of AVR-RD-01)	1 Month	12 Months
Patient 1	0.1	5.1	5.8
Patient 2	0.2	4.4	N/A

We believe these preliminary results support the potential of AVR-RD-01 to drive active enzyme production for long durations. We anticipate initiating our Phase 2 clinical trial of AVR-RD-01 in mid-2018.

AVR-RD-02. We are developing AVR-RD-02 for the treatment of Type 1 Gaucher disease. We will manufacture AVR-RD-02 from hematopoietic stem cells that are first extracted from the patient, modified to add the gene that encodes for glucocerebrosidase, or GCase, and then infused into the patient. We plan to initiate a Phase 1/2 clinical trial for AVR-RD-02 in patients with Type 1 Gaucher disease and expect to dose the first patient in this clinical trial in 2019.

AVR-RD-03. We are developing AVR-RD-03 for the treatment of Pompe disease. We will manufacture AVR-RD-03 from hematopoietic stem cells that are first extracted from the patient, modified to add the gene that encodes for acid alpha glucosidase A, or GAA, attached to a peptide sequence known as a glycosylation-independent lysosomal targeting, or GILT, tag and then infused into the patient. AVR-RD-03 will incorporate a GILT tag because the addition of a GILT tag has been shown to increase the uptake of GAA into cells, especially in muscle cells, which is a particularly important target tissue for patients with Pompe disease.

AVR-RD-04. We are developing AVR-RD-04 for the treatment of patients with cystinosis. We will manufacture AVR-RD-04 from hematopoietic stem cells that are first extracted from the patient, modified to add the gene that encodes for cystinosin, and then infused into the patient. In a planned academic sponsored Phase 1/2 clinical trial, we expect the first patient will be dosed in 2019.

We continue to seek opportunities to expand our approach to other rare and non-rare diseases. We plan to identify and develop future product candidates through our own internal research efforts as well as through collaborations with leading researchers worldwide.

We have developed a detailed plan for the more cost efficient and scalable manufacturing of our product candidates. We are establishing global manufacturing capabilities to support all aspects of the development and, if approved, the eventual commercialization of our gene therapies, from lentiviral vector production to cell processing. We are currently executing on our plans to move to a closed, automated manufacturing system. We also utilize a cryopreservation process that we believe will allow for the global distribution and, if approved, commercialization of our gene therapies.

Our Expertise

We are led by biopharmaceutical experts with extensive experience in gene and cellular therapy and rare diseases. Our team has broad expertise in the clinical, regulatory and commercialization aspects of rare diseases as well as process development and manufacturing for cellular therapies. Members of our management team have held senior positions at Shire, Genzyme, Novartis, Lonza and other companies pursuing development, manufacturing and commercialization of gene and cellular therapies and therapies to treat rare diseases.

Our Strategy

Our goal is to develop and commercialize potentially curative lentiviral-based gene therapies for patients and expand the use of this approach to treat a number of diseases. Key elements of our strategy to achieve our goal include:

- Rapidly advance our initial gene therapies;
- Develop first-line gene therapies for lysosomal storage diseases;
- Globally develop, manufacture and commercialize our gene therapies;
- Industrialize lentiviral-based gene therapy; and
- Leverage our approach beyond our initial indications.

Risks Associated with Our Business

Our business is subject to a number of risks of which you should be aware before making an investment decision. These risks are discussed more fully in the "Risk Factors" section of this prospectus immediately following this prospectus summary. These risks include the following:

- We have incurred net losses since inception. We expect to incur net losses for the foreseeable future and may never achieve or maintain profitability.
- Our lentiviral-based gene therapy product candidates are based on a novel technology, which makes it difficult to predict the time and cost of product candidate development and of subsequently obtaining regulatory approval.
- Our product candidates and the process for administering our product candidates may cause undesirable side effects or have other properties that could delay or prevent their regulatory approval, limit their commercial potential or result in significant negative consequences following any potential marketing approval.
- AVR-RD-01 is being investigated in an ongoing Phase 1 clinical trial, in which two patients have been dosed to date, and we have not commenced clinical trials for any of our other product candidates. We have never conducted pivotal clinical trials, and may be unable to do so for any product candidates we may develop, including AVR-RD-01.
- We may find it difficult to enroll patients in our clinical trials, which could delay or prevent us from proceeding with clinical trials of our product candidates.
- While we intend to seek designations for our product candidates with the FDA and comparable foreign regulatory authorities that are intended to confer benefits such as a faster development process or an accelerated regulatory pathway, there can be no assurance that we will successfully obtain such designations. In addition, even if one or more of our product candidates are granted such designations, we may not be able to realize the intended benefits of such designations.
- We expect to rely on third parties to conduct some or all aspects of our vector production, product manufacturing, protocol development, research and preclinical and clinical testing, and these third parties may not perform satisfactorily.
- Gene therapies are novel, complex and difficult to manufacture. We could experience production problems that result in delays in our development or commercialization programs or otherwise adversely affect our business.
- Third-party claims of intellectual property infringement may prevent or delay our development and commercialization efforts.

- Our rights to develop and commercialize our product candidates are subject, in part, to the terms and conditions of licenses granted to us by others.
- We and our independent registered public accounting firm have identified material weaknesses in our internal control over financial reporting which will require remediation.

Corporate History

We were formed as a corporation under the laws of the State of Delaware in November 2015 under the name AvroBio, Inc. Our corporate name was changed to AVROBIO, Inc. in June 2017. Our executive offices are located at One Kendall Square, Building 300, Suite 201, Cambridge, MA 02139 and our telephone number is (617) 914-8420. Our website address is www.avrobio.com. We do not incorporate the information on or accessible through our website into this prospectus, and you should not consider any information on, or that can be accessed through, our website as part of this prospectus.

The trademarks, trade names and service marks appearing in this prospectus are the property of their respective owners. Solely for convenience, the trademarks and trade names in this prospectus are referred to without the symbols ® and ™, but such references should not be construed as any indicator that their respective owners will not assert, to the fullest extent under applicable law, their rights thereto.

Implications of Being an Emerging Growth Company

We qualify as an "emerging growth company" as defined in the Jumpstart Our Business Startups Act of 2012, as amended. As an emerging growth company, we may take advantage of specified reduced disclosure and other requirements that are otherwise applicable generally to public companies. These provisions include:

- Only two years of audited financial statements in addition to any required unaudited interim financial statements with correspondingly reduced "Management's Discussion and Analysis of Financial Condition and Results of Operations" disclosure;
- Reduced disclosure about our executive compensation arrangements;
- No advisory votes on executive compensation or golden parachute arrangements;
- Exemption from the auditor attestation requirement in the assessment of our internal control over financial reporting; and
- An exemption from new or revised financial accounting standards until they would apply to private companies and from compliance with any new requirements adopted by the Public Company Accounting Oversight Board requiring mandatory audit firm rotation.

We may take advantage of these exemptions for up to five years or such earlier time that we are no longer an emerging growth company. We would cease to be an emerging growth company on the date that is the earliest of (i) the last day of the fiscal year in which we have total annual gross revenues of $1.07 billion or more; (ii) the last day of our fiscal year following the fifth anniversary of the date of the completion of this offering; (iii) the date on which we have issued more than $1.0 billion in nonconvertible debt during the previous three years; or (iv) the date on which we are deemed to be a large accelerated filer under the rules of the Securities and Exchange Commission, or SEC. We may choose to take advantage of some but not all of these exemptions. We have taken advantage of reduced reporting requirements in this prospectus. Accordingly, the information contained herein may be different from the information you receive from other public companies in which you hold stock. We have elected to avail ourselves of the exemption for the delayed adoption of certain accounting standards and, therefore, will not be subject to the same new or revised accounting standards as other public companies that are not emerging growth companies.

THE OFFERING

Common stock offered by us	shares
Common stock to be outstanding immediately after this offering	shares (shares if the underwriters exercise their option to purchase additional shares in full)
Underwriters' option to purchase additional shares	We have granted a 30-day option to the underwriters to purchase up to an aggregate of additional shares of common stock from us at the public offering price, less underwriting discounts and commissions on the same terms as set forth in this prospectus.
Use of proceeds	We estimate that we will receive net proceeds from the sale of shares of our common stock in this offering of approximately $ million, or $ million if the underwriters exercise their option to purchase additional shares in full, assuming an initial public offering price of $ per share, the midpoint of the price range set forth on the cover page of this prospectus, and after deducting estimated underwriting discounts and commissions and estimated offering expenses payable by us. We intend to use the net proceeds from this offering, together with our existing cash and cash equivalents, to advance our lead product candidate AVR-RD-01; to advance our other product candidates and programs; for our external and internal manufacturing and process development activities; for research and development activities that relate to all of our clinical and preclinical activities; and the remainder for planned general and administrative expenses, the costs of operating as a public company, working capital and other general corporate purposes. For a more complete description of our intended use of the proceeds from this offering, see "Use of Proceeds."
Risk factors	You should carefully read the "Risk Factors" section of this prospectus for a discussion of factors that you should consider before deciding to invest in our common stock.
Proposed Nasdaq Global Market symbol	"AVRO"

The number of shares of our common stock to be outstanding after this offering is based on 10,666,667 shares of our common stock outstanding as of March 31, 2018, and gives effect to the conversion of all of our outstanding preferred stock into 63,303,154 shares of our common stock immediately prior to the closing of this offering, and excludes:

- 7,391,214 shares of common stock issuable upon the exercise of stock options outstanding as of March 31, 2018, with a weighted-average exercise price of $0.62 per share;
- 28,305 shares of common stock issuable upon the exercise of a warrant to purchase preferred stock outstanding as of March 31, 2018 that will automatically become a warrant to purchase common stock upon the completion of this offering, with an exercise price of $0.7949 per share;
- an additional 241,506 shares of common stock available for future issuance under our Amended and Restated 2015 Stock Option and Grant Plan as of March 31, 2018;
- an additional shares of common stock that will be made available for future issuance under our 2018 Stock Option and Grant Plan upon the effectiveness of the registration statement of which this prospectus forms a part; and
- an additional shares of common stock that will be made available for future issuance under our 2018 Employee Stock Purchase Plan upon the effectiveness of the registration statement of which this prospectus forms a part.

Unless otherwise indicated, all information in this prospectus reflects or assumes the following:

- the filing of our amended and restated certificate of incorporation and the effectiveness of our amended and restated by-laws upon the closing of this offering;
- the automatic conversion of all of our outstanding shares of preferred stock into an aggregate of 63,303,154 shares of common stock upon the closing of this offering;
- no issuance or exercise of outstanding options or warrants after March 31, 2018;
- a 1-for- reverse split of our common stock effected on ; and
- no exercise by the underwriters of their option to purchase up to additional shares of common stock in this offering.

SUMMARY CONSOLIDATED FINANCIAL DATA

The summary consolidated statements of operations data presented below for the years ended December 31, 2016 and 2017 and the summary consolidated balance sheet data as of December 31, 2017 are derived from our audited consolidated financial statements included elsewhere in this prospectus. Our historical results are not necessarily indicative of the results that may be expected in any future period. You should read the following summary consolidated financial data together with the information in the sections titled "Selected Consolidated Financial Data" and "Management's Discussion and Analysis of Financial Condition and Results of Operations" and our consolidated financial statements and related notes included elsewhere in this prospectus.

	Year Ended December 31,	
	2016	2017
Consolidated Statements of Operations Data:		
Operating expenses:		
Research and development	$ 2,663	$ 15,191
General and administrative	1,962	3,195
Total operating expenses	4,625	18,386
Loss from operations	(4,625)	(18,386)
Other income (expense):		
Interest income	6	57
Change in fair value of preferred stock warrant liability	—	(17)
Change in fair value of derivative liability	(39)	(283)
Other expense	(6)	(19)
Total other expense, net	(39)	(262)
Net loss	$ (4,664)	$ (18,648)
Reconciliation of net loss to net loss attributable to common stockholders:		
Net loss	$ (4,664)	$ (18,648)
Accretion of redeemable convertible preferred stock to redemption value	(305)	(85)
Net loss attributable to common stockholders	$ (4,969)	$ (18,733)
Net loss per share attributable to common stockholders—basic and diluted(1)	$ (0.59)	$ (2.03)
Weighted-average common shares outstanding—basic and diluted(1)	8,421,130	9,238,612
Pro forma net loss per share attributable to common stockholders—basic and diluted(1)		$ (0.65)
Pro forma weighted-average common shares outstanding—basic and diluted(1)		28,602,468

(1) See Notes 2 and 13 to our consolidated financial statements appearing elsewhere in this prospectus for further details on the calculation of basic and diluted net loss per share attributable to common stockholders and on the calculation of pro forma basic and diluted net loss per share attributable to common stockholders.

	As of December 31, 2017		
	Actual	Pro Forma(2)	Pro Forma As Adjusted(3)
	(in thousands)		
Consolidated Balance Sheet Data:			
Cash and cash equivalents	$ 5,963	$ 66,463	
Working capital(1)	3,683	64,183	
Total assets	7,022	67,522	
Warrant to purchase redeemable convertible preferred stock	35	—	
Derivative liability	371	371	
Redeemable convertible preferred stock	26,500	—	
Total stockholders' (deficit) equity	(23,135)	64,400	

(1) We define working capital as current assets less current liabilities.

(2) The pro forma balance sheet data gives effect to (i) our sale of 28,285,557 shares of Series B preferred stock in January 2018 for gross cash proceeds of $60.5 million; (ii) our issuance of 233,765 shares of Series B preferred stock in January 2018 to BioMarin pursuant to our license agreement with BioMarin; (iii) the conversion of all outstanding shares of redeemable convertible preferred stock into an aggregate of 63,303,154 shares of common stock upon the closing of this offering; and (iv) the outstanding warrant to purchase shares of our redeemable convertible preferred stock becoming a warrant to purchase shares of our common stock upon the closing of this offering.

(3) The pro forma as adjusted balance sheet data gives effect to the pro forma adjustments described in footnote (2) above, as well as (i) our issuance and sale of shares of common stock in this offering at an assumed initial public offering price of $ per share, the midpoint of the price range set forth on the cover page of this prospectus, after deducting estimated underwriting discounts and commissions and estimated offering expenses payable by us and (ii) the payment by us of an aggregate of $2.0 million to University Health Network pursuant to the Stock Purchase Agreement, dated as of January 27, 2016, between us and University Health Network, in connection with this offering. Each $1.00 increase (decrease) in the assumed initial public offering price of $ per share, the midpoint of the price range set forth on the cover page of this prospectus, would increase (decrease) the pro forma as adjusted amount of each of cash and cash equivalents, working capital, total assets and total stockholders' equity by $ million, assuming that the number of shares offered by us, as set forth on the cover page of this prospectus, remains the same and after deducting estimated underwriting discounts and commissions and estimated offering expenses payable by us. Each increase (decrease) of 1,000,000 shares in the number of shares offered by us, as set forth on the cover page of this prospectus, would increase (decrease) the pro forma as adjusted amount of each of cash and cash equivalents, working capital, total assets and total stockholders' equity by $ million, assuming no change in the assumed initial public offering price per share and after deducting estimated underwriting discounts and commissions and estimated offering expenses payable by us. This pro forma as adjusted information is illustrative only and will depend on the actual initial public offering price and other terms of this offering determined at pricing.

RISK FACTORS

Investing in our common stock involves a high degree of risk. You should carefully consider the following risks and uncertainties, together with all other information in this prospectus, including our consolidated financial statements and related notes and "Management's Discussion and Analysis of Financial Condition and Results of Operations," before investing in our common stock. Any of the risk factors we describe below could adversely affect our business, financial condition or results of operations. The market price of our common stock could decline if one or more of these risks or uncertainties were to occur, which may cause you to lose all or part of the money you paid to buy our common stock. Additional risks that are currently unknown to us or that we currently believe to be immaterial may also impair our business. Certain statements below are forward-looking statements. See "Special Note Regarding Forward-Looking Statements" in this prospectus.

Risks related to our financial position and need for additional capital

We have incurred net losses since inception. We expect to incur net losses for the foreseeable future and may never achieve or maintain profitability.

Since inception, we have incurred net losses. We incurred net losses of $4.7 million and $18.6 million for the years ended December 31, 2016 and 2017, respectively. We historically have financed our operations primarily through private placements of our preferred stock. We have devoted substantially all of our efforts to research and development, including clinical and preclinical development of our product candidates, as well as assembling our team. We expect that it will be several years, if ever, before we have commercialized any product candidates. We expect to continue to incur significant expenses and increasing operating losses for the foreseeable future. We anticipate that our expenses will increase substantially if, and as, we:

- continue our development of our product candidates, including initiating and conducting our planned Phase 2 clinical trial for AVR-RD-01;
- initiate additional clinical trials and preclinical studies for our other product candidates;
- seek to identify and develop or in-license additional product candidates;
- seek marketing approvals for our product candidates that successfully complete clinical trials, if any;
- establish a sales, marketing and distribution infrastructure to commercialize any product candidates for which we may obtain marketing approval;
- seek to industrialize our *ex vivo* lentiviral gene therapy approach into a robust, scalable and, if approved, commercially viable process;
- hire and retain additional personnel, such as clinical, quality control, commercial and scientific personnel;
- expand our infrastructure and facilities to accommodate our growing employee base, including adding equipment and physical infrastructure to support our research and development; and
- transition our organization to being a public company.

To become and remain profitable, we must develop and eventually commercialize product candidates with significant market potential. This will require us to be successful in a range of challenging activities, and our expenses will increase substantially as we seek to complete preclinical and clinical trials of our product candidates, and manufacture, market and sell these or any future product candidates for which we may obtain marketing approval, if any, and satisfy any post-marketing requirements. We may never succeed in any or all of these activities and, even if we do, we may never generate revenues that are significant or large enough to achieve profitability. If we do achieve profitability, we may not be able to sustain or increase profitability on a quarterly or annual basis. Our failure to become and remain profitable would decrease the value of our company and could impair our ability to raise capital, maintain our research and development efforts, expand our business or continue our operations. A decline in the value of our company also could cause you to lose all or part of your investment.

We have never generated revenue from product sales and do not expect to do so for the next several years, if ever.

Our ability to generate revenue from product sales and achieve profitability depends on our ability, alone or with collaborative partners, to successfully complete the development of, and obtain the regulatory approvals necessary to commercialize, our product candidates. We do not anticipate generating revenues from product sales for the next several years, if ever. Our ability to generate future revenues from product sales depends heavily on our, or our collaborators', success in:

- completing research and preclinical and clinical development of our product candidates and identifying new lentiviral-based gene therapy product candidates;
- seeking and obtaining regulatory and marketing approvals for product candidates for which we complete clinical trials;
- launching and commercializing product candidates for which we obtain regulatory and marketing approval by establishing a sales force, marketing and distribution infrastructure or, alternatively, collaborating with a commercialization partner;
- qualifying for adequate coverage and reimbursement by government and third-party payors for our product candidates;
- establishing and maintaining supply and manufacturing processes and relationships with third parties that can provide adequate, in both amount and quality, products and services to support clinical development and the market demand for our product candidates, if approved;
- obtaining market acceptance of our product candidates, if approved, as a viable treatment option;
- addressing any competing technological and market developments;
- negotiating favorable terms in any collaboration, licensing or other arrangements into which we may enter and performing our obligations under such arrangements; and
- attracting, hiring and retaining qualified personnel.

Even if one or more of the product candidates that we develop is approved for commercial sale, we anticipate incurring significant costs associated with commercializing any approved product candidate. Our expenses could increase beyond expectations if we are required by FDA or other foreign regulatory authorities to perform clinical and other studies in addition to those that we currently anticipate. Even if we are able to generate revenues from the sale of any approved products, we may not become profitable and may need to obtain additional funding to continue operations.

Even if this offering is successful, we will need additional funding, which may not be available on acceptable terms, or at all. Failure to obtain this necessary capital when needed may force us to delay, limit or terminate our product development efforts or other operations.

We expect our expenses to increase in connection with our ongoing activities, particularly as we continue the research and development of, initiate further clinical trials of and seek marketing approval for, our product candidates and continue to enhance and optimize our vector technology and manufacturing processes. In addition, if we obtain marketing approval for any of our product candidates, we expect to incur significant expenses related to product sales, medical affairs, marketing, manufacturing and distribution. Furthermore, upon the closing of this offering, we expect to incur additional costs associated with operating as a public company. Accordingly, we will need to obtain substantial additional funding in connection with our continuing operations. If we are unable to raise capital when needed or on reasonable terms, we would be forced to delay, reduce or eliminate certain of our research and development programs.

Our future capital requirements will depend on many factors, including:

- the scope, progress, results and costs of drug discovery, laboratory testing, preclinical development and clinical trials for our other product candidates;
- the costs, timing and outcome of regulatory review of our product candidates;
- the costs of future activities, including product sales, medical affairs, marketing, manufacturing and distribution, for any of our product candidates for which we receive marketing approval;
- the costs associated with our manufacturing process development and evaluation of third-party manufacturers
- revenue, if any, received from commercial sale of our products, should any of our product candidates receive marketing approval;
- the costs of preparing, filing and prosecuting patent applications, maintaining and enforcing our intellectual property rights and defending intellectual property-related claims;
- the terms of our current and any future license agreements and collaborations; and
- the extent to which we acquire or in-license other product candidates, technologies and intellectual property.

Identifying potential product candidates and conducting preclinical testing and clinical trials is a time-consuming, expensive and uncertain process that takes years to complete, and we may never generate the necessary data or results required to obtain marketing approval and achieve product sales. In addition, our product candidates, if approved, may not achieve commercial success. Our product revenues, if any, will be derived from or based on sales of products that may not be commercially available for many years, if at all. Accordingly, we will need to continue to rely on additional financing to achieve our business objectives. Adequate additional financing may not be available to us on acceptable terms, or at all.

Raising additional capital may cause dilution to our existing stockholders, restrict our operations or cause us to relinquish valuable rights.

We may seek additional capital through a combination of public and private equity offerings, debt financings, strategic partnerships and alliances and licensing arrangements. To the extent that we raise additional capital through the sale of equity, convertible debt securities or other equity-based derivative securities, your ownership interest will be diluted and the terms may include liquidation or other preferences that adversely affect your rights as a stockholder. Any additional indebtedness we incur would result in increased fixed payment obligations and could involve restrictive covenants, such as limitations on our ability to incur additional debt, limitations on our ability to acquire or license intellectual property rights and other operating restrictions that could adversely impact our ability to conduct our business. Furthermore, the issuance of additional securities, whether equity or debt, by us, or the possibility of such issuance, may cause the market price of our common stock to decline and existing stockholders may not agree with our financing plans or the terms of such financings. If we raise additional funds through strategic partnerships and alliances and licensing arrangements with third parties, we may have to relinquish valuable rights to our technologies, or our product candidates, or grant licenses on terms unfavorable to us. Adequate additional financing may not be available to us on acceptable terms, or at all.

Our limited operating history may make it difficult for you to evaluate the success of our business to date and to assess our future viability.

We are a development-stage company founded in November 2015. Our operations to date have been limited to corporate organization, recruiting key personnel, business planning, raising capital, acquiring rights to our technology, identifying potential product candidates, undertaking preclinical studies and planning and supporting

clinical trials of our product candidates and establishing research and development and manufacturing capabilities. We have not yet demonstrated the ability to complete clinical trials of our product candidates, obtain marketing approvals, manufacture products on a clinical or commercial scale or conduct sales and marketing activities necessary for successful commercialization. Consequently, any predictions you make about our future success or viability may not be as accurate as they could be if we had a longer operating history. In addition, as a new business, we may encounter unforeseen expenses, difficulties, complications, delays and other known and unknown factors.

Risks related to the discovery and development of our product candidates

Our lentiviral-based gene therapy product candidates are based on a novel technology, which makes it difficult to predict the time and cost of product candidate development and of subsequently obtaining regulatory approval.

We have concentrated our research and development efforts on our lentiviral-based gene therapy approach, and our future success depends on our successful development of viable gene therapy product candidates. There can be no assurance that we will not experience problems or delays in developing new product candidates and that such problems or delays will not cause unanticipated costs, or that any such development problems can be solved. We may also experience delays in developing a sustainable, reproducible and scalable manufacturing process or transferring that process to commercial partners, which may prevent us from completing our clinical studies or commercializing our products on a timely or profitable basis, if at all. For example, the transition to LV2 or of our cell processing to an industrialized, automated closed system using all disposable supplies may not be successful or may experience unforeseen delays, which may cause shortages or delays in the supply of our products available for clinical trials and future commercial sales, if any. In addition, there is no assurance that products using our proprietary LV2 or manufactured using this automated system will achieve the same favorable preliminary results observed to date in the Phase 1 clinical trial of AVR-RD-01.

In addition, the clinical trial requirements of the FDA and other foreign regulatory authorities and the criteria these regulators use to determine the safety and efficacy of a product candidate vary substantially according to the type, complexity, novelty and intended use and market of such product candidates. The regulatory approval process for novel product candidates such as ours can be more expensive and take longer than for other, better known or more extensively studied product candidates. To date, only a limited number of gene therapies have received marketing authorization from the FDA or foreign regulatory authorities. It is difficult to determine how long it will take or how much it will cost to obtain regulatory approvals for our product candidates in either the United States, Canada or other major markets or how long it will take to commercialize our product candidates, if any are approved. Approvals by foreign regulatory authorities may not be indicative of what the FDA may require for approval, and vice versa.

Regulatory requirements governing gene and cell therapy products have changed frequently and may continue to change in the future. The FDA has established the Office of Tissues and Advanced Therapies within its Center for Biologics Evaluation and Research, or CBER, to consolidate the review of gene therapy and related products, and has established the Cellular, Tissue and Gene Therapies Advisory Committee to advise the CBER in its review. Gene therapy clinical trials conducted at institutions that receive funding for recombinant DNA research from the United States National Institutes of Health, or NIH, also are potentially subject to review by the NIH Office of Science Policy's Recombinant DNA Advisory Committee, or the RAC, in limited circumstances. Although the FDA decides whether individual gene therapy protocols may proceed, the RAC public review process, if undertaken, can delay the initiation of a clinical trial, even if the FDA has reviewed the trial design and details and authorized its initiation. Conversely, the FDA can put an investigational new drug application, or IND, on clinical hold even if the RAC has provided a favorable review or an exemption from in-depth, public review. If we were to engage an NIH-funded institution, to conduct a clinical trial, that institution's institutional biosafety committee, or IBC, as well as its institutional review board, or IRB, would need to review the proposed clinical trial to assess the safety of the trial and may determine that RAC review is needed. In addition, adverse

developments in clinical trials of gene therapy products conducted by others may cause the FDA or other oversight bodies to change the requirements for approval of any of our product candidates. Similarly, foreign regulatory authorities may issue new guidelines concerning the development and marketing authorization for gene therapy medicinal products and require that we comply with these new guidelines.

The FDA, NIH and the European Medicines Agency, or EMA, have each expressed interest in further regulating biotechnology, including gene therapy and genetic testing. For example, the EMA advocates a risk-based approach to the development of a gene therapy product. Agencies at both the federal and state level in the United States, as well as the U.S. congressional committees and other governments or governing agencies, have also expressed interest in further regulating the biotechnology industry. Such action may delay or prevent commercialization of some or all of our product candidates.

These regulatory review committees and advisory groups and any new guidelines they promulgate may lengthen the regulatory review process, require us to perform additional studies, increase our development costs, lead to changes in regulatory positions and interpretations, delay or prevent approval and commercialization of these product candidates or lead to significant post-approval limitations or restrictions. As we advance our product candidates, we will be required to consult with these regulatory and advisory groups, and comply with applicable guidelines. If we fail to do so, we may be required to delay or discontinue development of certain of our product candidates. These additional processes may result in a review and approval process that is longer than we otherwise would have expected. Delay or failure to obtain, or unexpected costs in obtaining, the regulatory approval necessary to bring a potential product to market could decrease our ability to generate sufficient product revenue, and our business, financial condition, results of operations and prospects would be materially and adversely affected.

Our product candidates and the process for administering our product candidates may cause undesirable side effects or have other properties that could delay or prevent their regulatory approval, limit their commercial potential or result in significant negative consequences following any potential marketing approval.

During the conduct of clinical trials, patients may experience changes in their health, including illnesses, injuries, discomforts or a fatal outcome. It is possible that as we test AVR-RD-01 or other product candidates in larger, longer and more extensive clinical programs, or as use of our product candidates becomes more widespread if they receive regulatory approval, illnesses, injuries, discomforts and other adverse events that were observed in earlier clinical trials, as well as conditions that did not occur or went undetected in previous clinical trials, will be reported by subjects. Gene therapies are also subject to the potential risk that occurrence of adverse events will be delayed following administration of the gene therapy due to persistent biological activity of the genetic material or other components of the vectors used to carry the genetic material. Many times, side effects are only detectable after investigational products are tested in larger scale, pivotal clinical trials or, in some cases, after they are made available to patients on a commercial scale after approval. If additional clinical experience indicates that AVR-RD-01 or any other product candidate has side effects or causes serious or life-threatening side effects, the development of the product candidate may fail or be delayed, or, if the product candidate has received regulatory approval, such approval may be revoked or limited.

There have been several significant adverse side effects in gene therapy treatments in the past, including reported cases of leukemia and death seen in other clinical trials. Gene therapy is still a relatively new approach to disease treatment and additional adverse side effects could develop. Possible adverse side effects that may occur with treatment with gene therapy products include an immunologic reaction early after administration that could substantially limit the effectiveness of the treatment or represent safety risks for patients. Another traditional safety concern for gene therapies using viral vectors has been the possibility of insertional mutagenesis by the vectors, leading to malignant transformation of transduced cells. While our lentiviral gene therapy approach is designed to avoid immunogenicity after administration, there can be no assurance that patients would not create antibodies that may impair treatment. If any of our gene therapy product candidates

demonstrates adverse side effects, we may decide or be required to halt or delay clinical development of such product candidates.

In addition to side effects caused by our product candidates, the conditioning, administration process or related procedures also can cause adverse side effects. A gene therapy patient is generally administered cytotoxic drugs to remove stem cells from the bone marrow to create sufficient space in the bone marrow for the modified stem cells to engraft and produce their progeny. This procedure compromises the patient's immune system. While certain of our product candidates are designed to utilize outpatient, milder conditioning regimens that are intended to require only limited removal of a patient's bone marrow cells, our conditioning regimens may not be successful or may nevertheless result in adverse side effects. For example, in the ongoing Phase 1 clinical trial of AVR-RD-01, several adverse events, including where white blood cell and platelet counts were suppressed following the conditioning process, were observed. If in the future any such adverse events caused by the conditioning process or related procedures continue at unacceptable rates or degrees of severity, the FDA or other foreign regulatory authorities could order us to cease development of, or deny approval of, AVR-RD-01 or our other product candidates for any or all targeted indications. Even if we are able to demonstrate that adverse events are not product-related, such occurrences could affect patient recruitment or the ability of enrolled patients to complete the clinical trial.

Additionally, if any of our product candidates receives marketing approval, the FDA could require us to adopt a Risk Evaluation and Mitigation Strategy, or REMS, to ensure that the benefits outweigh its risks, which may include, among other things, a medication guide outlining the risks of the product for distribution to patients, a communication plan to health care practitioners, and restrictions on how or where the product can be distributed, dispensed or used. Furthermore, if we or others later identify undesirable side effects caused by AVR-RD-01 or our other product candidates, several potentially significant negative consequences could result, including:

- regulatory authorities may suspend or withdraw approvals of such a product candidate;
- regulatory authorities may require additional warnings on the label;
- we may be required to change the way a product candidate is distributed, dispensed, or administered or conduct additional clinical trials;
- we could be sued and held liable for harm caused to patients; and
- our reputation may suffer.

Any of these events could prevent us from achieving or maintaining market acceptance of our product candidates and could significantly harm our business, prospects, financial condition and results of operations.

AVR-RD-01 is being investigated in an ongoing Phase 1 clinical trial and we have not commenced clinical trials for any of our other product candidates. We have never conducted pivotal clinical trials, and may be unable to do so for any product candidates we may develop, including AVR-RD-01.

We are at a very early stage of development for all of our product candidates including AVR-RD-01. As of March 1, 2018, our product candidate AVR-RD-01 has been administered to only two patients. The ongoing Phase 1 clinical trial for AVR-RD-01 must be completed and we need to initiate and complete our planned Phase 2 clinical trial of AVR-RD-01, as well as potentially additional pivotal clinical trials in order to obtain FDA approval to market AVR-RD-01. Carrying out later-stage clinical trials is a complicated process. AVR-RD-01 is being evaluated in an investigator-sponsored Phase 1 clinical trial and, as an organization, we have not conducted any clinical trials, have limited experience in preparing, submitting and prosecuting regulatory filings, and have not previously submitted a biologics license application, or BLA, for any product candidate.

In addition, we have not yet conducted clinical trials of any our product candidates in the United States, our interactions with the FDA are expected to be limited for the near future, and we cannot be certain how many

additional clinical trials of AVR-RD-01 or any of our other product candidates will be required or how such trials should be designed. In order to commence a clinical trial in the United States, including our planned Phase 2 clinical trial for AVR-RD-01, we will be required to seek FDA acceptance of an IND for each of our product candidates. We cannot be sure any IND we submit to the FDA, or any similar clinical trial application we submit in other countries, will be accepted. We may also be required to conduct additional preclinical testing prior to filing an IND for any of our product candidates, and the results of any such testing may not be positive. Consequently, we may be unable to successfully and efficiently execute and complete necessary clinical trials in a way that leads to a BLA submission and approval of AVR-RD-01 or any of our other product candidates. We may require more time and incur greater costs than our competitors and may not succeed in obtaining regulatory approvals of product candidates that we develop. Failure to commence or complete, or delays in, our planned clinical trials, could prevent us from or delay us in commercializing AVR-RD-01.

The ongoing Phase 1 clinical trial of AVR-RD-01 is an investigator-sponsored trial being conducted by University Health Network. In addition, the planned Phase 1/2 clinical trial of AVR-RD-04 will be conducted by our collaborators at the University of California, San Diego. We do not control the design or administration of investigator-sponsored trials, nor the submission or approval of any IND or foreign equivalent required to conduct these trials, and the investigator-sponsored trials could, depending on the actions of such third parties, jeopardize the validity of the clinical data generated, identify significant concerns with respect to our product candidates that could impact our findings or clinical trials, and adversely affect our ability to obtain marketing approval from the FDA or other applicable regulatory authorities. To the extent the results of this or other investigator-sponsored trials are inconsistent with, or different from, the results of our planned company-sponsored trials or raise concerns regarding our product candidates, the FDA or a foreign regulatory authority may question the results of the company-sponsored trial, or subject such results to greater scrutiny than it otherwise would. In these circumstances, the FDA or such foreign regulatory authorities may require us to obtain and submit additional clinical data, which could delay clinical development or marketing approval of our product candidates. In addition, while investigator-sponsored trials could be useful to inform our own clinical development efforts, there is no guarantee that we will be able to use the data from these trials to form the basis for regulatory approval of our product candidates.

Success in preclinical studies or early clinical trials may not be indicative of results obtained in later trials.

Results from preclinical studies or early clinical trials are not necessarily predictive of future clinical trial results and are not necessarily indicative of final results. There is a high failure rate for gene therapy and biologic product candidates proceeding through clinical trials. Many companies in the pharmaceutical and biotechnology industries have suffered significant setbacks in late-stage clinical trials even after achieving promising results in preclinical testing and earlier-stage clinical trials. Data obtained from preclinical and clinical activities are subject to varying interpretations, which may delay, limit or prevent regulatory approval. In addition, the design of a pivotal clinical trial can determine whether its results will support approval of a product and flaws in the design of a clinical trial may not become apparent until the clinical trial is well advanced. Our company has limited experience in designing and conducting clinical trials and we may be unable to design and execute a clinical trial to support regulatory approval. To date, we have not received definitive guidance from the FDA or other foreign regulatory bodies regarding the necessary endpoints for approval of any of our product candidates, including AVR-RD-01. There are no assurances that the FDA or other foreign regulatory bodies will find the efficacy endpoints we propose in future pivotal trials to be sufficiently validated and clinically meaningful, or that our product candidates will achieve the pre-specified endpoints in future pivotal trials to a degree of statistical significance. We also may experience regulatory delays or rejections as a result of many factors, including due to changes in regulatory policy during the period of our product candidate development. Our AVR-RD-02, AVR-RD-03 and AVR-RD-04 product candidates have not yet been tested in humans. Any of our other product candidates may fail to show the desired safety and efficacy in clinical development despite positive results in preclinical studies. Any such failure would cause us to abandon the product candidate.

We may find it difficult to enroll patients in our clinical trials, which could delay or prevent us from proceeding with clinical trials of our product candidates.

Identifying and qualifying patients to participate in clinical trials of our product candidates is critical to our success. The timing of our clinical trials depends on our ability to recruit patients to participate as well as the completion of required follow-up periods. Patients may be unwilling to participate in our gene therapy clinical trials because of negative publicity from adverse events related to the biotechnology or gene therapy fields, competitive clinical trials for similar patient populations, clinical trials in product candidates employing our vectors, the existence of current treatments or for other reasons. In addition, the indications that we are currently targeting and may in the future target are rare diseases, which may limit the pool of patients that may be enrolled in our ongoing or planned clinical trials. The timeline for recruiting patients, conducting studies and obtaining regulatory approval of our product candidates may be delayed, which could result in increased costs, delays in advancing our product candidates, delays in testing the effectiveness of our product candidates or termination of the clinical trials altogether.

We may not be able to identify, recruit and enroll a sufficient number of patients, or those with required or desired characteristics, to complete our clinical trials in a timely manner. For example, in 2017, the ongoing investigator-sponsored Phase 1 clinical trial of AVR-RD-01 encountered delays in the enrollment of patients due to delays in identifying patients for enrollment and the evaluation of information from screened potential trial participants. Patient enrollment and trial completion is affected by factors including the:

- size of the patient population and process for identifying subjects;
- design of the trial protocol;
- eligibility and exclusion criteria;
- perceived risks and benefits of the product candidate under study;
- perceived risks and benefits of gene therapy-based approaches to treatment of diseases, including any required pretreatment conditioning regimens;
- availability of competing therapies and clinical trials;
- severity of the disease under investigation;
- availability of genetic testing for potential patients;
- proximity and availability of clinical trial sites for prospective subjects;
- ability to obtain and maintain subject consent;
- risk that enrolled subjects will drop out before completion of the trial;
- patient referral practices of physicians; and
- ability to monitor subjects adequately during and after treatment.

Our current product candidates are being developed to treat rare conditions. We plan to seek initial marketing approvals in the United States, Europe and certain other major markets, including Japan. We may not be able to initiate or continue clinical trials if we cannot enroll a sufficient number of eligible patients to participate in the clinical trials required by FDA or other foreign regulatory authorities. Our ability to successfully initiate, enroll and complete a clinical trial in any foreign country is subject to numerous risks unique to conducting business in foreign countries, including:

- difficulty in establishing or managing relationships with contract research organizations, or CROs, and physicians;
- different standards for the conduct of clinical trials;

- the absence in some countries of established groups with sufficient regulatory expertise for review of gene therapy protocols;
- our inability to locate qualified local consultants, physicians and partners; and
- the potential burden of complying with a variety of foreign laws, medical standards and regulatory requirements, including the regulation of pharmaceutical and biotechnology products and treatment.

If we have difficulty enrolling a sufficient number of patients to conduct our clinical trials as planned, we may need to delay, limit or terminate ongoing or planned clinical trials, any of which would have an adverse effect on our business, financial condition, results of operations and prospects.

We may encounter substantial delays in our clinical trials or we may fail to demonstrate safety and efficacy to the satisfaction of applicable regulatory authorities.

Before obtaining marketing approval from regulatory authorities for the sale of our product candidates, we must conduct extensive clinical studies to demonstrate the safety and efficacy of the product candidates in humans. Clinical testing is expensive, time-consuming and uncertain as to outcome. We cannot guarantee that any clinical studies will be conducted as planned or completed on schedule, if at all. A failure of one or more clinical studies can occur at any stage of testing. Events that may prevent successful or timely completion of clinical development include:

- delays in reaching a consensus with regulatory agencies on study design;
- delays in reaching agreement on acceptable terms with prospective CROs and clinical study sites;
- delays in obtaining required IRB approval at each clinical study site;
- delays in recruiting suitable patients to participate in our clinical studies;
- imposition of a clinical hold by regulatory agencies, after an inspection of our clinical study operations or study sites;
- failure by our CROs, other third parties or us to adhere to clinical study requirements;
- failure to perform in accordance with the FDA's good clinical practices, or GCP, or applicable regulatory guidelines in other countries;
- delays in the testing, validation, manufacturing and delivery of our product candidates to the clinical sites;
- delays in having patients complete participation in a study or return for post-treatment follow-up;
- clinical study sites or patients dropping out of a study;
- the occurrence of serious adverse events associated with the product candidate that are viewed to outweigh its potential benefits; or
- changes in regulatory requirements and guidance that require amending or submitting new clinical protocols.

Any inability to successfully complete preclinical and clinical development could result in additional costs to us or impair our ability to generate revenues. In addition, if we make changes to our product candidates, we may need to conduct additional studies to bridge our modified product candidates to earlier versions, which could delay our clinical development plan or marketing approval for our product candidates. For example, while we are currently utilizing the LV1 version of the lentiviral vector in the ongoing Phase 1 clinical trial of AVR-RD-01, we plan to transition our AVR-RD-01 lentiviral vectors to an LV2 version. While LV2 is intended to confer improvements in safety and efficiency in viral production, there is no guarantee that we can realize these intended benefits. In addition, the transition from LV1 to LV2 will likely require updates to our clinical trial

applications and INDs with the relevant regulatory authorities, which may result in delay, suspension or termination of ongoing or future clinical trials pending our submission, and the agencies' review, of such updates. Clinical study delays could also shorten any periods during which we may have the exclusive right to commercialize our product candidates or allow our competitors to bring products to market before we do, which could impair our ability to successfully commercialize our product candidates and may harm our business and results of operations.

If the results of our clinical studies are inconclusive or if there are safety concerns or adverse events associated with our product candidates, we may:

- be delayed in obtaining marketing approval for our product candidates, if at all;
- obtain approval for indications or patient populations that are not as broad as intended or desired;
- obtain approval with labeling or a REMS that includes significant use or distribution restrictions or safety warnings;
- be subject to changes with the way the product is administered;
- be required to perform additional clinical studies to support approval or be subject to additional post-marketing testing requirements;
- have regulatory authorities withdraw their approval of the product or impose restrictions on its distribution in the form of a REMS;
- be subject to the addition of labeling statements, such as warnings or contraindications;
- be sued; or
- experience damage to our reputation.

Any of these events could prevent us from achieving or maintaining market acceptance of our product candidates and impair our ability to commercialize our products.

Even if we complete the necessary preclinical and clinical studies, we cannot predict when or if we will obtain regulatory approval to commercialize a product candidate and the approval may be for a more narrow indication than we seek.

We cannot commercialize a product until the appropriate regulatory authorities have reviewed and approved the product candidate. Even if our product candidates demonstrate safety and efficacy in clinical studies, the regulatory agencies may not complete their review processes in a timely manner, or we may not be able to obtain regulatory approval. Additional delays may result if an FDA Advisory Committee or other regulatory authority recommends non-approval or restrictions on approval. In addition, we may experience delays or rejections based upon additional government regulation from future legislation or administrative action, or changes in regulatory agency policy during the period of product development, clinical studies and the review process. Regulatory agencies also may approve a treatment candidate for fewer or more limited indications than requested or may grant approval subject to the performance of post-marketing studies. In addition, regulatory agencies may not approve the labeling claims that are necessary or desirable for the successful commercialization of our product candidates. If we are unable to obtain necessary regulatory approvals, our business, prospects, financial condition and results of operations may suffer.

While we intend to seek designations for our product candidates with the FDA and comparable foreign regulatory authorities that are intended to confer benefits such as a faster development process or an accelerated regulatory pathway, there can be no assurance that we will successfully obtain such designations. In addition, even if one or more of our product candidates are granted such designations, we may not be able to realize the intended benefits of such designations.

The FDA and comparable foreign regulatory authorities offer certain designations for product candidates that are designed to encourage the research and development of product candidates that are intended to address

conditions with significant unmet medical need. These designations may confer benefits such as additional interaction with regulatory authorities, a potentially accelerated regulatory pathway and priority review. However, there can be no assurance that we will successfully obtain such designations for any of our product candidates. In addition, while such designations could expedite the development or approval process, they generally do not change the standards for approval. Even if we obtain such designations for one or more of our product candidates, there can be no assurance that we will realize their intended benefits.

For example, we may seek a Breakthrough Therapy Designation for some of our product candidates. A breakthrough therapy is defined as a therapy that is intended, alone or in combination with one or more other therapies, to treat a serious or life-threatening disease or condition, and preliminary clinical evidence indicates that the therapy may demonstrate substantial improvement over existing therapies on one or more clinically significant endpoints, such as substantial treatment effects observed early in clinical development. For therapies that have been designated as breakthrough therapies, interaction and communication between the FDA and the sponsor of the trial can help to identify the most efficient path for clinical development while minimizing the number of patients placed in ineffective control regimens. Therapies designated as breakthrough therapies by the FDA are also eligible for accelerated approval. Designation as a breakthrough therapy is within the discretion of the FDA. Accordingly, even if we believe one of our product candidates meets the criteria for designation as a breakthrough therapy, the FDA may disagree and instead determine not to make such designation. In any event, the receipt of a Breakthrough Therapy Designation for a product candidate may not result in a faster development process, review or approval compared to therapies considered for approval under conventional FDA procedures and does not assure ultimate approval by the FDA. In addition, even if one or more of our product candidates qualify as breakthrough therapies, the FDA may later decide that such product candidates no longer meet the conditions for qualification.

In addition, we may seek Fast Track Designation for some of our product candidates. If a therapy is intended for the treatment of a serious or life-threatening condition and the therapy demonstrates the potential to address unmet medical needs for this condition, the therapy sponsor may apply for Fast Track Designation. The FDA has broad discretion whether or not to grant this designation, so even if we believe a particular product candidate is eligible for this designation, there can be no assurance that the FDA would decide to grant it. Even if we do receive Fast Track Designation, we may not experience a faster development process, review or approval compared to conventional FDA procedures, and receiving a Fast Track Designation does not provide assurance of ultimate FDA approval. In addition, the FDA may withdraw Fast Track Designation if it believes that the designation is no longer supported by data from our clinical development program.

In addition, we may seek a regenerative medicine advanced therapy, or RMAT, designation for some of our product candidates. An RMAT is defined as cell therapies, therapeutic tissue engineering products, human cell and tissue products, and combination products using any such therapies or products. Gene therapies, including genetically modified cells that lead to a durable modification of cells or tissues may meet the definition of a regenerative medicine therapy. The RMAT program is intended to facilitate efficient development and expedite review of RMATs, which are intended to treat, modify, reverse, or cure a serious or life-threatening disease or condition. A new drug application or a BLA for an RMAT may be eligible for priority review or accelerated approval through (1) surrogate or intermediate endpoints reasonably likely to predict long-term clinical benefit or (2) reliance upon data obtained from a meaningful number of sites. Benefits of such designation also include early interactions with FDA to discuss any potential surrogate or intermediate endpoint to be used to support accelerated approval. A regenerative medicine therapy that is granted accelerated approval and is subject to post-approval requirements may fulfill such requirements through the submission of clinical evidence, clinical studies, patient registries, or other sources of real world evidence, such as electronic health records; the collection of larger confirmatory data sets; or post-approval monitoring of all patients treated with such therapy prior to its approval. RMAT designation is within the discretion of the FDA. Accordingly, even if we believe one of our product candidates meets the criteria for designation as a regenerative medicine advanced therapy, the FDA may disagree and instead determine not to make such designation. In any event, the receipt of RMAT designation for a product candidate may not result in a faster development process, review or approval compared to drugs

considered for approval under conventional FDA procedures and does not assure ultimate approval by the FDA. In addition, even if one or more of our product candidates qualify as for RMAT designation, the FDA may later decide that the biological products no longer meet the conditions for qualification.

Outside of the United States, we intend to develop AVR-RD-01 in Japan under the purview of the Japanese Pharmaceutical and Medical Device Agency, or PMDA. Pursuant to Japan's regenerative medicine law, an expedited path to conditional approval may exist for regenerative medicine products that show sufficient safety evidence and signals of efficacy in a Phase 2 clinical trial. However, there can be no assurance that the results of our planned Phase 2 clinical trial will demonstrate the safety evidence and efficacy signals required for such conditional approval. In addition, this conditional approval is time-limited, and there must be an agreement as to follow-up collection of information to confirm efficacy and safety, similar to a post-marketing commitment in the United States.

We may be unable to obtain orphan drug designation for our product candidates and, even if we obtain such designation, we may not be able to realize the benefits of such designation, including potential marketing exclusivity of our product candidates, if approved.

Regulatory authorities in some jurisdictions, including the United States and other major markets, may designate drugs intended to treat conditions or diseases affecting relatively small patient populations as orphan drugs. Under the Orphan Drug Act of 1983, the FDA may designate a product candidate as an orphan drug if it is intended to treat a rare disease or condition, which is generally defined as having a patient population of fewer than 200,000 individuals in the United States, or a patient population greater than 200,000 in the United States where there is no reasonable expectation that the cost of developing the drug will be recovered from sales in the United States. In the European Union, EMA's Committee for Orphan Medicinal Products grants orphan drug designation to promote the development of products that are intended for the diagnosis, prevention or treatment of a life-threatening or chronically debilitating condition affecting not more than 5 in 10,000 persons in the European Union. Additionally, orphan designation is granted for products intended for the diagnosis, prevention or treatment of a life-threatening, seriously debilitating or serious and chronic condition and when, without incentives, it is unlikely that sales of the drug in the European Union would be sufficient to justify the necessary investment in developing the drug or biologic product.

If we request orphan drug designation (or the foreign equivalent) for AVR-RD-01 or any of our other product candidates, there can be no assurances that the FDA or foreign regulatory authorities will grant any of our product candidates such designation. Additionally, the designation of any of our product candidates as an orphan product does not mean that any regulatory agency will accelerate regulatory review of, or ultimately approve, that product candidate, nor does it limit the ability of any regulatory agency to grant orphan drug designation to product candidates of other companies that treat the same indications as our product candidates prior to our product candidates receiving exclusive marketing approval.

Generally, if a product candidate with an orphan drug designation receives the first marketing approval for the indication for which it has such designation, the product is entitled to a period of marketing exclusivity, which precludes the FDA or foreign regulatory authorities from approving another marketing application for a product that constitutes the same drug treating the same indication for that marketing exclusivity period, except in limited circumstances. If another sponsor receives such approval before we do (regardless of our orphan drug designation), we will be precluded from receiving marketing approval for our product for the applicable exclusivity period. The applicable period is seven years in the United States and 10 years in the European Union. The exclusivity period in the European Union can be reduced to six years if a product no longer meets the criteria for orphan drug designation or if the product is sufficiently profitable so that market exclusivity is no longer justified. Orphan drug exclusivity may be revoked if any regulatory agency determines that the request for designation was materially defective or if the manufacturer is unable to assure sufficient quantity of the product to meet the needs of patients with the rare disease or condition.

Even if we obtain orphan drug exclusivity for a product candidate, that exclusivity may not effectively protect the product candidate from competition because different drugs can be approved for the same condition in the United States. Even after an orphan drug is approved, the FDA may subsequently approve another drug for the same condition if the FDA concludes that the latter drug is not the same drug or is clinically superior in that it is shown to be safer, more effective or makes a major contribution to patient care. In the European Union, marketing authorization may be granted to a similar medicinal product for the same orphan indication if:

- the second applicant can establish in its application that its medicinal product, although similar to the orphan medicinal product already authorized, is safer, more effective or otherwise clinically superior;
- the holder of the marketing authorization for the original orphan medicinal product consents to a second orphan medicinal product application; or
- the holder of the marketing authorization for the original orphan medicinal product cannot supply sufficient quantities of orphan medicinal product.

Even if we obtain regulatory approval for a product candidate, our products will remain subject to regulatory oversight.

Even if we obtain any regulatory approval for our product candidates, they will be subject to ongoing regulatory requirements for manufacturing, labeling, packaging, storage, advertising, promotion, sampling, record-keeping and submission of safety and other post-market information. Any regulatory approvals that we receive for our product candidates also may be subject to a REMS, limitations on the approved indicated uses for which the product may be marketed or to the conditions of approval, or contain requirements for potentially costly post-marketing testing, including Phase 4 clinical trials, and surveillance to monitor the quality, safety and efficacy of the product. For example, the holder of an approved BLA is obligated to monitor and report adverse events and any failure of a product to meet the specifications in the BLA. FDA guidance advises that patients treated with some types of gene therapy undergo follow-up observations for potential adverse events for as long as 15 years. The holder of an approved BLA also must submit new or supplemental applications and obtain FDA approval for certain changes to the approved product, product labeling or manufacturing process. Advertising and promotional materials must comply with FDA rules and are subject to FDA review, in addition to other potentially applicable federal and state laws.

In addition, product manufacturers and their facilities are subject to payment of user fees and continual review and periodic inspections by the FDA and other regulatory authorities for compliance with current good manufacturing practices, or cGMP, requirements and adherence to commitments made in the BLA or foreign marketing application. If we, or a regulatory authority, discover previously unknown problems with a product, such as adverse events of unanticipated severity or frequency, or problems with the facility where the product is manufactured or disagrees with the promotion, marketing or labeling of that product, a regulatory authority may impose restrictions relative to that product, the manufacturing facility or us, including requiring recall or withdrawal of the product from the market or suspension of manufacturing.

If we fail to comply with applicable regulatory requirements following approval of any of our product candidates, a regulatory authority may:

- issue a warning letter asserting that we are in violation of the law;
- seek an injunction or impose administrative, civil or criminal penalties or monetary fines;
- suspend or withdraw regulatory approval;
- suspend any ongoing clinical trials;
- refuse to approve a pending BLA or comparable foreign marketing application (or any supplements thereto) submitted by us or our strategic partners;
- restrict the marketing or manufacturing of the product;

- seize or detain the product or otherwise require the withdrawal of the product from the market;
- refuse to permit the import or export of products; or
- refuse to allow us to enter into supply contracts, including government contracts.

Any government investigation of alleged violations of law could require us to expend significant time and resources in response and could generate negative publicity. The occurrence of any event or penalty described above may inhibit our ability to commercialize our product candidates and adversely affect our business, financial condition, results of operations and prospects.

In addition, the FDA's policies, and those of equivalent foreign regulatory agencies, may change and additional government regulations may be enacted that could prevent, limit or delay regulatory approval of our product candidates. We cannot predict the likelihood, nature or extent of government regulation that may arise from future legislation or administrative action, either in the United States or abroad. If we are slow or unable to adapt to changes in existing requirements or the adoption of new requirements or policies, or if we are not able to maintain regulatory compliance, we may lose any marketing approval that we may have obtained and we may not achieve or sustain profitability, which would materially and adversely affect our business, financial condition, results of operations and prospects.

We face significant competition in our industry and there can be no assurance that our product candidates, if approved, will achieve acceptance in the market over existing established therapies. In addition, our competitors may develop therapies that are more advanced or effective than ours, which may adversely affect our ability to successfully market or commercialize any of our product candidates.

We operate in a highly competitive segment of the biopharmaceutical market. We face competition from many different sources, including larger pharmaceutical, specialty pharmaceutical and biotechnology companies, as well as from academic institutions, government agencies and private and public research institutions. Our product candidates, if successfully developed and approved, will compete with established therapies, some of which are being marketed by large and international companies. In addition, we expect to compete with new treatments that are under development or may be advanced into the clinic by our competitors. There are a variety of product candidates, including gene therapies, in development for the indications that we are targeting.

We anticipate competing with the largest pharmaceutical companies in the world. For example, Sanofi and Shire market the enzyme replacement therapies, or ERTs, that represent the standard of care for Fabry patients. Recently, Amicus secured regulatory approval in Europe for its oral therapy for Fabry disease. For Gaucher disease, we expect to compete with existing enzyme replacement therapies marketed by Sanofi, Shire, Protalix and Pfizer, as well as oral therapies marketed by Actelion and Sanofi. Sanofi also markets an enzyme replacement therapy for Pompe disease. Cystinosis is currently treated by therapies marketed by Horizon Orphan, Mylan and Sigma Tau Pharmaceuticals. In addition, we may compete with other gene therapy companies in our industry such as bluebird bio and Spark Therapeutics.

Many of our competitors have significantly greater financial, product candidate development, manufacturing and marketing resources than we do. Large pharmaceutical and biotechnology companies have extensive experience in clinical testing and obtaining regulatory approval for their products, and mergers and acquisitions within these industries may result in even more resources being concentrated among a smaller number of larger competitors. Established pharmaceutical companies may also invest heavily to accelerate discovery and development of novel therapeutics or to in-license novel therapeutics that could make the product candidates that we develop obsolete. Competition may increase further as a result of advances in the commercial applicability of technologies and greater availability of capital for investment in these industries. Our business would be materially and adversely affected if competitors develop and commercialize products that are safer, more effective, have fewer or less severe side effects, have broader market acceptance, are more convenient or are less expensive than any product candidate that we may develop.

Even if we obtain regulatory approval of our product candidates, the availability and price of our competitors' products could limit the demand and the price we are able to charge for our product candidates. We may not be able to implement our business plan if the acceptance of our product candidates is inhibited by price competition or the reluctance of physicians to switch from existing methods of treatment to our product candidates, or if physicians switch to other new drug or biologic products or choose to reserve our product candidates for use in limited circumstances.

Our focus on developing our current product candidates may not yield any commercially viable products, and our failure to successfully identify and develop additional product candidates could impair our ability to grow.

As part of our growth strategy, we intend to identify, develop and market additional product candidates beyond our existing product candidates for Fabry disease, Gaucher disease, Pompe disease and cystinosis. We may spend several years completing our development of any particular current or future product candidates, and failure can occur at any stage. The product candidates to which we allocate our resources may not end up being successful. Because we have limited resources, we may forego or delay pursuit of opportunities with certain programs or product candidates or for indications that later prove to have greater commercial potential than AVR-RD-01 or our other product candidates. Our spending on current and future research and development programs may not yield any commercially viable product candidates. If we do not accurately evaluate the commercial potential for a particular product candidate, we may relinquish valuable rights to that product candidate through strategic collaborations, licensing or other arrangements in cases in which it would have been more advantageous for us to retain sole development and commercialization rights to such product candidate. If any of these events occur, we may be forced to abandon our development efforts with respect to a particular product candidate or fail to develop a potentially successful product candidate.

Because our internal research capabilities are limited, we may be dependent upon biotechnology companies, academic scientists and other researchers to sell or license product candidates, approved products or the underlying technology to us. The success of this strategy depends partly upon our ability to identify, select, discover and acquire promising product candidates and products.

In addition, certain of our current or future product candidates may not demonstrate in patients any or all of the pharmacological benefits we believe they may possess or compare favorably to existing, approved therapies, such as ERT. We have not yet succeeded and may never succeed in demonstrating efficacy and safety of our product candidates or any future product candidates in clinical trials or in obtaining marketing approval thereafter. For example, although we have evaluated AVR-RD-02, AVR-RD-03 and AVR-RD-04 in preclinical studies and have evaluated AVR-RD-01 in an early-stage clinical trial, we have not yet advanced AVR-RD-02, AVR-RD-03 and AVR-RD-04 into clinical trials or AVR-RD-01 into Phase 2 clinical development, nor have we obtained regulatory approval to sell any product based on our therapeutic approaches. Accordingly, our focus on treating these diseases may not result in the discovery and development of commercially viable products.

If we are unsuccessful in our development efforts, we may not be able to advance the development of our product candidates, commercialize products, raise capital, expand our business or continue our operations.

Risks related to our reliance on third parties

We expect to rely on third parties to conduct some or all aspects of our vector production, product manufacturing, protocol development, research and preclinical and clinical testing, and these third parties may not perform satisfactorily.

We do not expect to independently conduct all aspects of our vector production, product manufacturing, protocol development, research and preclinical and clinical testing. We currently rely, and expect to continue to rely, on third parties with respect to these items. For example, we are moving our cell processing to an automated, closed system with a single third party supplier.

Any of these third parties may terminate their engagements with us at any time. If we need to enter into alternative arrangements, it could delay our product development activities. Our reliance on these third parties for research and development activities will reduce our control over these activities but will not relieve us of our responsibility to ensure compliance with all required regulations and study protocols. For example, for product candidates that we develop and commercialize on our own, we will remain responsible for ensuring that each of our preclinical and clinical studies are conducted in accordance with the study plan, protocols and regulatory requirements.

If our contract counterparties do not successfully carry out their contractual duties, meet expected deadlines or conduct our studies in accordance with regulatory requirements or our stated study plans and protocols, we will not be able to complete, or may be delayed in completing, the preclinical and clinical studies required to support approval of our product candidates or the FDA or other regulatory agencies may refuse to accept our clinical or preclinical data. For example, in 2017, the ongoing investigator-sponsored Phase 1 clinical trial of AVR-RD-01 encountered delays in the enrollment of patients due to delays in identifying patients for enrollment and the evaluation of information from screened potential trial participants.

Reliance on third-party manufacturers entails risks to which we would not be subject if we manufactured the product candidates ourselves, including:

- the inability to negotiate manufacturing agreements with third parties under commercially reasonable terms;
- reduced control as a result of using third-party manufacturers for all aspects of manufacturing activities;
- termination or nonrenewal of manufacturing agreements with third parties in a manner or at a time that is costly or damaging to us; and
- disruptions to the operations of our third-party manufacturers or suppliers caused by conditions unrelated to our business or operations, including the bankruptcy of the manufacturer or supplier.

Any of these events could lead to delays of our preclinical and clinical studies or failure to obtain regulatory approval, or impact our ability to successfully commercialize future products. Some of these events could be the basis for FDA action, including injunction, recall, seizure or total or partial suspension of production.

We and our contract manufacturers are subject to significant regulation with respect to manufacturing our products. The manufacturing facilities on which we rely may not continue to meet regulatory requirements and have limited capacity.

We currently have relationships with a limited number of suppliers for the manufacturing of our viral vectors and product candidates. Each supplier may require licenses to manufacture such components if such processes are not owned by the supplier or in the public domain and we may be unable to transfer or sublicense the intellectual property rights we may have with respect to such activities.

All entities involved in the preparation of therapeutics for clinical studies or commercial sale, including our existing contract manufacturers for our product candidates, are subject to extensive regulation. Components of a finished therapeutic product approved for commercial sale or used in clinical studies must be manufactured in accordance with good manufacturing practices, or GMP. These regulations govern manufacturing processes and procedures (including record keeping) and the implementation and operation of quality systems to control and assure the quality of investigational products and products approved for sale. Poor control of production processes can lead to the introduction of adventitious agents or other contaminants, or to inadvertent changes in the properties or stability of our product candidates that may not be detectable in final product testing. We or our contract manufacturers must supply all necessary documentation in support of a BLA on a timely basis and must adhere to the FDA's good laboratory practices, or GLP, and GMP regulations enforced by the FDA through its

facilities inspection program. Some of our contract manufacturers have not produced a commercially-approved product and have never been inspected by the FDA before. Our facilities and quality systems and the facilities and quality systems of some or all of our third-party contractors must pass a pre-approval inspection for compliance with the applicable regulations as a condition of regulatory approval of our product candidates or any of our other potential products. In addition, the regulatory authorities may, at any time, audit or inspect a manufacturing facility involved with the preparation of our product candidates or our other potential products or the associated quality systems for compliance with the regulations applicable to the activities being conducted. If these facilities do not pass a pre-approval plant inspection, FDA approval of the products will not be granted.

The regulatory authorities also may, at any time following approval of a product for sale, audit our manufacturing facilities or those of our third-party contractors. If any such inspection or audit identifies a failure to comply with applicable regulations or if a violation of our product specifications or applicable regulations occurs independent of such an inspection or audit, we or the relevant regulatory authority may require remedial measures that may be costly and/or time-consuming for us or a third party to implement and that may include the temporary or permanent suspension of a clinical study or commercial sales or the temporary or permanent closure of a facility. Any such remedial measures imposed upon us or third parties with whom we contract could materially harm our business.

If we or any of our third-party manufacturers fail to maintain regulatory compliance, the FDA can impose regulatory sanctions including, among other things, refusal to approve a pending application for a new drug product or biologic product, or revocation of a pre-existing approval. As a result, our business, financial condition and results of operations may be materially harmed.

These factors could cause the delay of clinical studies, regulatory submissions, required approvals or commercialization of our product candidates, cause us to incur higher costs and prevent us from commercializing our products successfully. Furthermore, if our suppliers fail to meet contractual requirements, and we are unable to secure one or more replacement suppliers capable of production at a substantially equivalent cost, our preclinical and clinical studies may be delayed.

We are dependent on a limited number of suppliers for some of our components and materials used in our product candidates.

We currently depend on a limited number of suppliers for some of the components necessary for our product candidates. We cannot be sure that these suppliers will remain in business, or that they will not be purchased by one of our competitors or another company that is not interested in continuing to produce these materials for our intended purpose. Our use of a limited number of suppliers of raw materials, components and finished goods exposes us to several risks, including disruptions in supply, price increases, late deliveries and an inability to meet customer demand. There are, in general, relatively few alternative sources of supply for these components. These vendors may be unable or unwilling to meet our future demands for our clinical trials or commercial sale. Establishing additional or replacement suppliers for these components could take a substantial amount of time and it may be difficult to establish replacement suppliers who meet regulatory requirements. Any disruption in supply from any supplier or manufacturing location could lead to supply delays or interruptions which would damage our business, financial condition, results of operations and prospects.

If we are required to switch to a replacement supplier, the manufacture and delivery of our product candidates could be interrupted for an extended period, adversely affecting our business. Establishing additional or replacement suppliers may not be accomplished quickly. If we are able to find a replacement supplier, the replacement supplier would need to be qualified and may require additional regulatory authority approval, which could result in further delay. For example, the FDA could require additional supplemental data and clinical trial data if we rely upon a new supplier. While we seek to maintain adequate inventory of the components and materials used in our product candidates, any interruption or delay in the supply of components or materials, or our inability to obtain components or materials from alternate sources at acceptable prices in a timely manner,

could impair our ability to conduct our clinical trials and, if our product candidates are approved, to meet the demand of our customers and cause them to cancel orders.

In addition, as part of the FDA's approval of our product candidates, the FDA must review and approve the individual components of our production process, which includes the manufacturing processes and facilities of our suppliers. Our current suppliers have not undergone this process nor have they had any components included in any product approved by the FDA.

Our reliance on these suppliers subjects us to a number of risks that could harm our reputation, business, and financial condition, including, among other things:

- the interruption of supply resulting from modifications to or discontinuation of a supplier's operations;
- delays in product shipments resulting from uncorrected defects, reliability issues, or a supplier's variation in a component;
- a lack of long-term supply arrangements for key components with our suppliers;
- the inability to obtain adequate supply in a timely manner, or to obtain adequate supply on commercially reasonable terms;
- difficulty and cost associated with locating and qualifying alternative suppliers for our components in a timely manner;
- production delays related to the evaluation and testing of products from alternative suppliers, and corresponding regulatory qualifications;
- a delay in delivery due to our suppliers prioritizing other customer orders over ours;
- damage to our reputation caused by defective components produced by our suppliers;
- increased cost of our warranty program due to product repair or replacement based upon defects in components produced by our suppliers; and
- fluctuation in delivery by our suppliers due to changes in demand from us or their other customers.

If any of these risks materialize, costs could significantly increase and our ability to conduct our clinical trials and, if our product candidates are approved, to meet demand for our products could be impacted.

Our reliance on third parties requires us to share our trade secrets, which increases the possibility that a competitor will discover them or that our trade secrets will be misappropriated or disclosed.

Because we rely on third parties to manufacture our vectors and our product candidates, and because we collaborate with various organizations and academic institutions on the advancement of our gene therapy approach, we must, at times, share trade secrets with them. We seek to protect our proprietary technology in part by entering into confidentiality agreements and, if applicable, material transfer agreements, collaborative research agreements, consulting agreements or other similar agreements with our collaborators, advisors, employees and consultants prior to beginning research or disclosing proprietary information. These agreements typically limit the rights of the third parties to use or disclose our confidential information, such as trade secrets. Despite the contractual provisions employed when working with third parties, the need to share trade secrets and other confidential information increases the risk that such trade secrets become known by our competitors, are inadvertently incorporated into the technology of others, or are disclosed or used in violation of these agreements. Given that our proprietary position is based, in part, on our know-how and trade secrets, a competitor's discovery of our trade secrets or other unauthorized use or disclosure would impair our competitive position and may have a material adverse effect on our business.

In addition, these agreements typically restrict the ability of our collaborators, advisors, employees and consultants to publish data potentially relating to our trade secrets. Our academic collaborators typically have

rights to publish data, provided that we are notified in advance and may delay publication for a specified time in order to secure our intellectual property rights arising from the collaboration. In other cases, publication rights are controlled exclusively by us, although in some cases we may share these rights with other parties. Despite our efforts to protect our trade secrets, our competitors may discover our trade secrets, either through breach of these agreements, independent development or publication of information including our trade secrets in cases where we do not have proprietary or otherwise protected rights at the time of publication. A competitor's discovery of our trade secrets would impair our competitive position and have an adverse impact on our business.

Risks related to commercialization of our product candidates

If we are unable to establish sales, distribution and marketing capabilities or enter into agreements with third parties to market and sell AVR-RD-01 and our other product candidates, we will be unable to generate any product revenue.

We currently have no sales, distribution or marketing organization. To successfully commercialize any of our current or future product candidates, if approved, we will need to develop these capabilities, either on our own or with others. The establishment and development of our own commercial team or the establishment of a contract sales force to market any product candidate we may develop will be expensive and time-consuming and could delay any product launch. Moreover, we cannot be certain that we will be able to successfully develop this capability. We may enter into collaborations regarding any approved product candidates with other entities to utilize their established marketing and distribution capabilities, but we may be unable to enter into such agreements on favorable terms, if at all. If any future collaborators do not commit sufficient resources to commercialize our product candidates, or we are unable to develop the necessary capabilities on our own, we will be unable to generate sufficient product revenue to sustain our business. We compete with many companies that currently have extensive, experienced and well-funded sales, distribution and marketing operations to recruit, hire, train and retain marketing and sales personnel. We also face competition in our search for third parties to assist us with the sales and marketing efforts of our product candidates, if approved. Without an internal team or the support of a third-party to perform marketing and sales functions, we may be unable to compete successfully against these more established companies.

If the market opportunities for our product candidates are smaller than we believe they are, our product revenues may be adversely affected and our business may suffer.

We focus our research and product development on treatments for serious lysosomal storage diseases. Our understanding of both the number of people who have these diseases, as well as the subset of people with these diseases who have the potential to benefit from treatment with our product candidates, are based on estimates. These estimates may prove to be incorrect and new studies may reduce the estimated incidence or prevalence of these diseases. The number of patients in the United States and elsewhere may turn out to be lower than expected, may not be otherwise amenable to treatment with our products or patients may become increasingly difficult to identify and access, all of which would adversely affect our business, financial condition, results of operations and prospects.

The commercial success of any current or future product candidate will depend upon the degree of market acceptance by physicians, patients, third-party payors and others in the medical community.

Even if we obtain any regulatory approval for our product candidates, the commercial success of our product candidates will depend in part on the medical community, patients, and third-party payors accepting gene therapy products in general, and our product candidates in particular, as effective, safe and cost-effective. Any product that we bring to the market may not gain market acceptance by physicians, patients, third-party payors and others in the medical community. The degree of market acceptance of these product candidates, if approved for commercial sale, will depend on a number of factors, including:

- the potential efficacy and potential advantages over alternative treatments;

- the prevalence and severity of any side effects, including any limitations or warnings contained in a product's approved labeling;
- the prevalence and severity of any side effects resulting from the conditioning regimen for the administration of our product candidates;
- the relative convenience and ease of administration;
- the willingness of the target patient population to try new therapies and of physicians to prescribe these therapies;
- the strength of marketing and distribution support and timing of market introduction of competitive products;
- publicity concerning our products or competing products and treatments; and
- sufficient third-party insurance coverage or reimbursement.

Even if a product candidate displays a favorable efficacy and safety profile in preclinical and clinical studies, market acceptance of the product, if approved for commercial sale, will not be known until after it is launched. Our efforts to educate the medical community and third-party payors on the benefits of our product candidates may require significant resources and may never be successful. Such efforts to educate the marketplace may require more resources than are required by the conventional technologies marketed by our competitors. If these products do not achieve an adequate level of acceptance, we may not generate significant product revenue and may not become profitable.

If we obtain approval to commercialize our product candidates outside of the United States, a variety of risks associated with international operations could materially adversely affect our business.

We plan to conduct clinical trials for our product candidates outside of the United States. If any of our product candidates are approved for commercialization, we may enter into agreements with third parties to market them on a worldwide basis or in more limited geographical regions. We expect that we will be subject to additional risks related to entering into international business relationships, including:

- different regulatory requirements for approval of drugs and biologics in foreign countries;
- reduced protection for intellectual property rights;
- unexpected changes in tariffs, trade barriers and regulatory requirements;
- economic weakness, including inflation, or political instability in particular foreign economies and markets;
- compliance with tax, employment, immigration and labor laws for employees living or traveling abroad;
- foreign currency fluctuations, which could result in increased operating expenses and reduced revenues, and other obligations incident to doing business in another country;
- workforce uncertainty in countries where labor unrest is more common than in the United States;
- production shortages resulting from any events affecting raw material supply or manufacturing capabilities abroad; and
- business interruptions resulting from geopolitical actions, including war and terrorism, or natural disasters including earthquakes, typhoons, floods and fires.

The insurance coverage and reimbursement status of newly-approved products is uncertain. Failure to obtain or maintain adequate coverage and reimbursement for any of our product candidates, if approved, could limit our ability to market those products and decrease our ability to generate revenue.

The availability and extent of reimbursement by governmental and private payors is essential for most patients to be able to afford expensive treatments, such as stem cell transplants. Sales of our product candidates will depend substantially, both domestically and abroad, on the extent to which the costs of our product candidates will be paid by health maintenance, managed care, pharmacy benefit and similar healthcare management organizations, or reimbursed by government health administration authorities, private health coverage insurers and other third-party payors. We may not be able to provide data sufficient to gain acceptance with respect to coverage and reimbursement. If reimbursement is not available, or is available only at limited levels, we may not be able to successfully commercialize our product candidates, if approved. Even if coverage is provided, the approved reimbursement amount may not be high enough to allow us to establish or maintain pricing sufficient to realize a sufficient return on our investment.

There is significant uncertainty related to the insurance coverage and reimbursement of newly approved products. In the United States, the principal decisions about reimbursement for new medicines are typically made by the Centers for Medicare & Medicaid Services, or CMS, an agency within the U.S. Department of Health and Human Services, as the CMS decides whether and to what extent a new medicine will be covered and reimbursed under Medicare. Private payors tend to follow the CMS to a substantial degree. It is difficult to predict what the CMS will decide with respect to reimbursement for fundamentally novel products such as ours, as there is no body of established practices and precedents for these new products.

Outside the United States, international operations are generally subject to extensive governmental price controls and other market regulations, and we believe the increasing emphasis on cost-containment initiatives in Europe and certain other major markets where we plan to commercialize may put pressure on the pricing and usage of our product candidates. In many countries, the prices of medical products are subject to varying price control mechanisms as part of national health systems. In general, the prices of medicines under such systems are substantially lower than in the United States. Other countries allow companies to fix their own prices for medicines, but monitor and control company profits. Additional foreign price controls or other changes in pricing regulation could restrict the amount that we are able to charge for our product candidates. Accordingly, in markets outside the United States, the reimbursement for our products may be reduced compared with the United States and may be insufficient to generate commercially reasonable revenues and profits.

Moreover, efforts by governmental and third-party payors, in the United States and abroad, to cap or reduce healthcare costs may cause such organizations to limit both coverage and level of reimbursement for new products approved and, as a result, they may not cover or provide adequate payment for our product candidates. We expect to experience pricing pressures in connection with the sale of any of our product candidates, due to the trend toward managed healthcare, the increasing influence of health maintenance organizations and additional legislative changes. The downward pressure on healthcare costs in general, particularly prescription drugs and surgical procedures and other treatments, has become very intense. As a result, increasingly high barriers are being erected to the entry of new products.

Due to the novel nature of our technology and the potential for our product candidates to offer therapeutic benefit in a single administration, we face uncertainty related to pricing and reimbursement for these product candidates.

Our target patient populations are relatively small, as a result of which the pricing and reimbursement of our product candidates, if approved, must be adequate to support commercial infrastructure. If we are unable to obtain adequate levels of reimbursement, our ability to successfully market and sell our product candidates will be adversely affected. The manner and level at which reimbursement is provided for services related to our product candidates (e.g., for administration of our product to patients) is also important. Inadequate

reimbursement for such services may lead to physician resistance and adversely affect our ability to market or sell our product candidates, if approved.

Gene therapies are novel, complex and difficult to manufacture. We could experience production problems that result in delays in our development or commercialization programs or otherwise adversely affect our business.

The manufacturing process we use to produce our product candidates is complex, novel and has not been validated for commercial use. Several factors could cause production interruptions, including equipment malfunctions, facility contamination, raw material shortages or contamination, natural disasters, disruption in utility services, human error or disruptions in the operations of our suppliers.

Our product candidates require processing steps that are more complex than those required for most chemical pharmaceuticals. Moreover, unlike chemical pharmaceuticals, the physical and chemical properties of a biologic such as ours generally cannot be fully characterized. As a result, assays of the finished product may not be sufficient to ensure that the product will perform in the intended manner. Accordingly, we and our manufacturing suppliers employ multiple steps to control the manufacturing process with the goal of ensuring that the product candidate is made strictly and consistently in compliance with the process. Problems with the manufacturing process, including even minor deviations from the intended process, could result in product defects or manufacturing failures that result in lot failures, product recalls, product liability claims or insufficient inventory. We may encounter problems achieving adequate quantities and quality of clinical-grade materials that meet FDA or other applicable regulatory standards or specifications with consistent and acceptable production yields and costs.

In addition, the FDA and other foreign regulatory authorities may require us to submit samples of any lot of any approved product together with the protocols showing the results of applicable tests at any time. Under some circumstances, the FDA or other foreign regulatory authorities may require that we not distribute a lot until the agency authorizes its release. Even slight deviations in the manufacturing process, including those affecting quality attributes and stability, may result in unacceptable changes in the product that could result in lot failures or product recalls. There is no assurance we will not experience lot failures in the future. Lot failures or product recalls could cause us to delay clinical trials, or, if approved, commercial product launches, which could be costly to us and otherwise harm our business, financial condition, results of operations and prospects.

Healthcare legislative reform measures and constraints on national budget social security systems may have a material adverse effect on our business and results of operations.

Third-party payors, whether domestic or foreign, or governmental or private, are developing increasingly sophisticated methods of controlling healthcare costs. In both the United States and certain foreign jurisdictions, there have been a number of legislative and regulatory changes to the health care system that could impact our ability to sell our products profitably. In particular, in 2010, the Patient Protection and Affordable Care Act or ACA or PPACA, as amended by the Health Care and Education Reconciliation Act of 2010, or the ACA, was enacted, which, among other things, subjected biologic products to potential competition by lower-cost biosimilars, addressed a new methodology by which rebates owed by manufacturers under the Medicaid Drug Rebate Program are calculated for drugs that are inhaled, infused, instilled, implanted or injected, increased the minimum Medicaid rebates owed by most manufacturers under the Medicaid Drug Rebate Program, extended the Medicaid Drug Rebate program to utilization of prescriptions of individuals enrolled in Medicaid managed care organizations, subjected manufacturers to new annual fees and taxes for certain branded prescription drugs, and provided incentives to programs that increase the federal government’s comparative effectiveness research. Some of the provisions of the ACA have yet to be fully implemented, while certain provisions have been subject to judicial and Congressional challenges. Further, on January 20, 2017, President Trump signed an Executive Order directing federal agencies with authorities and responsibilities under the ACA to waive, defer, grant exemptions from, or delay the implementation of any provision of the ACA that would impose a fiscal burden on states or a

cost, fee, tax, penalty or regulatory burden on individuals, healthcare providers, health insurers, or manufacturers of pharmaceuticals or medical devices. On October 13, 2017, President Trump signed an Executive Order terminating the cost-sharing subsidies that reimburse insurers under the ACA. Several state Attorneys General filed suit to stop the administration from terminating the subsidies, but their request for a restraining order was denied by a federal judge in California on October 25, 2017. In addition, the CMS has recently proposed regulations that would give states greater flexibility in setting benchmarks for insurers in the individual and small group marketplaces, which may have the effect of relaxing the essential health benefits required under the ACA for plans sold through such marketplaces. Congress may consider other legislation to replace elements of the ACA.

The Tax Cuts and Jobs Act of 2017, or TCJA, includes a provision repealing, effective January 1, 2019, the tax-based shared responsibility payment imposed by the ACA on certain individuals who fail to maintain qualifying health coverage for all or part of a year that is commonly referred to as the "individual mandate." Additionally, on January 22, 2018, President Trump signed a continuing resolution on appropriations for fiscal year 2018 that delayed the implementation of certain ACA-mandated fees, including the so-called "Cadillac" tax on certain high cost employer-sponsored insurance plans, the annual fee imposed on certain high cost employer-sponsored insurance plans, the annual fee imposed on certain health insurance providers based on market share, and the medical device exercise tax on non-exempt medical devices. Further, the Bipartisan Budget Act of 2018, or the BBA, among other things, amends the ACA, effective January 1, 2019, to reduce the coverage gap in most Medicare drug plans, commonly referred to as the "donut hole." Congress also could consider subsequent legislation to replace elements of the ACA that are repealed. Thus, the full impact of the ACA, any law replacing elements of it, and the political uncertainty surrounding any repeal or replacement legislation on our business remains unclear. In addition, other legislative changes have been proposed and adopted in the United States since the ACA was enacted. In August 2011, the Budget Control Act of 2011, among other things, created measures for spending reductions by Congress. A Joint Select Committee on Deficit Reduction, tasked with recommending a targeted deficit reduction of at least $1.2 trillion for the years 2013 through 2021, was unable to reach required goals, thereby triggering the legislation's automatic reduction to several government programs. This includes aggregate reductions of Medicare payments to providers of 2% per fiscal year, which went into effect in April 2013, and will remain in effect through 2027 unless additional Congressional action is taken. In January 2013, the American Taxpayer Relief Act of 2012, was signed into law, which, among other things, further reduced Medicare payments to several providers, including hospitals and cancer treatment centers, and increased the statute of limitations period for the government to recover overpayments to providers from three to five years.

There have been, and likely will continue to be, legislative and regulatory proposals at the foreign, federal and state levels directed at broadening the availability of healthcare and containing or lowering the cost of healthcare. We cannot predict the initiatives that may be adopted in the future. The continuing efforts of the government, insurance companies, managed care organizations and other payors of healthcare services to contain or reduce costs of healthcare and/or impose price controls may adversely affect:

- the demand for our drug product candidates, if we obtain regulatory approval;
- our ability to set a price that we believe is fair for our products;
- our ability to generate revenue and achieve or maintain profitability;
- the level of taxes that we are required to pay; and
- the availability of capital.

Any denial in coverage or reduction in reimbursement from Medicare or other government programs may result in a similar denial or reduction in payments from private payors, which may adversely affect our future profitability.

Any contamination in our manufacturing process, shortages of materials or failure of any of our key suppliers to deliver necessary components could result in interruption in the supply of our product candidates and delays in our clinical development or commercialization schedules.

Given the nature of biologics manufacturing, there is a risk of contamination in our manufacturing processes. Any contamination could materially adversely affect our ability to produce product candidates on schedule and could, therefore, harm our results of operations and cause reputational damage.

Some of the materials required in our manufacturing process are derived from biologic sources. Such materials are difficult to procure and may be subject to contamination or recall. A material shortage, contamination, recall or restriction on the use of biologically derived substances in the manufacture of our product candidates could adversely impact or disrupt the commercial manufacturing or the production of clinical material, which could materially and adversely affect our development timelines and our business, financial condition, results of operations and prospects.

Risks related to our business operations

Our gene therapy approach utilizes lentiviral vectors derived from viruses, which may be perceived as unsafe or may result in unforeseen adverse events. Negative public opinion and increased regulatory scrutiny of gene therapy and genetic research may damage public perception of our product candidates or adversely affect our ability to conduct our business or obtain regulatory approvals for our product candidates.

Gene therapy remains a novel technology, with only a limited number of gene therapy products approved to date. Public perception may be influenced by claims that gene therapy is unsafe, and gene therapy may not gain the acceptance of the public or the medical community. In particular, our success will depend upon physicians specializing in the treatment of those diseases that our product candidates target prescribing treatments that involve the use of our product candidates in lieu of, or in addition to, existing treatments they are already familiar with and for which greater clinical data may be available. More restrictive government regulations or negative public opinion would have a negative effect on our business or financial condition and may delay or impair the development and commercialization of our product candidates or demand for any products we may develop. For example, earlier gene therapy trials led to several well-publicized adverse events, including cases of leukemia and death seen in other trials using other vectors. Adverse events in our clinical studies, even if not ultimately attributable to our product candidates (such as the many adverse events that typically arise from the conditioning process), or adverse events in other lentiviral gene therapy trials, and the resulting publicity could result in increased governmental regulation, unfavorable public perception, potential regulatory delays in the testing or approval of our potential product candidates, stricter labeling requirements for those product candidates that are approved and a decrease in demand for any such product candidates.

Our future success depends on our ability to retain key employees, consultants and advisors and to attract, retain and motivate qualified personnel.

We are highly dependent on principal members of our executive team and key employees, including our Chief Executive Officer, Chief Financial Officer, Head of Operations, Chief Science Officer, Chief Business Officer, and Chief Medical Officer, the loss of whose services may adversely impact the achievement of our objectives. While we have entered into employment agreements with each of our executive officers, any of them could leave our employment at any time, as all of our employees are “at will” employees. We do not maintain “key person” insurance policies on the lives of these individuals or the lives of any of our other employees. The loss of the services of one or more of our current employees might impede the achievement of our research, development and commercialization objectives. Recruiting and retaining other qualified employees, consultants and advisors for our business, including scientific and technical personnel, will also be critical to our success. There is currently a shortage of skilled executives in our industry, which is likely to continue. As a result, competition for skilled personnel, including in gene therapy research and vector manufacturing, is intense and the

turnover rate can be high. We may not be able to attract and retain personnel on acceptable terms given the competition among numerous pharmaceutical and biotechnology companies for individuals with similar skill sets. In addition, failure to succeed in preclinical or clinical trials may make it more challenging to recruit and retain qualified personnel. The inability to recruit or the loss of the services of any executive, key employee, consultant or advisor may impede the progress of our research, development and commercialization objectives.

We will need to expand our operations and we may experience difficulties in managing this growth, which could disrupt our operations.

As of March 31, 2018, we had 24 full-time employees. As we mature, we expect to expand our full-time employee base and to hire more consultants and contractors. Our management may need to divert a disproportionate amount of its attention away from our day-to-day activities and devote a substantial amount of time to managing these growth activities. We may not be able to effectively manage the expansion of our operations, which may result in weaknesses in our infrastructure, operational mistakes, loss of business opportunities, loss of employees and reduced productivity among remaining employees. Our expected growth could require significant capital expenditures and may divert financial resources from other projects, such as the development of additional product candidates. If our management is unable to effectively manage our growth, our expenses may increase more than expected, our ability to generate and/or grow revenues could be reduced, and we may not be able to implement our business strategy. Our future financial performance and our ability to commercialize product candidates and compete effectively will depend, in part, on our ability to effectively manage any future growth.

If we are unable to manage expected growth in the scale and complexity of our operations, our performance may suffer.

If we are successful in executing our business strategy, we will need to expand our managerial, operational, financial and other systems and resources to manage our operations, continue our research and development activities and, in the longer term, build a commercial infrastructure to support commercialization of any of our product candidates that are approved for sale. Future growth would impose significant added responsibilities on members of management. It is likely that our management, finance, development personnel, systems and facilities currently in place may not be adequate to support this future growth. Our need to effectively manage our operations, growth and product candidates requires that we continue to develop more robust business processes and improve our systems and procedures in each of these areas and to attract and retain sufficient numbers of talented employees. We may be unable to successfully implement these tasks on a larger scale and, accordingly, may not achieve our research, development and growth goals.

Our employees, principal investigators, consultants and commercial partners may engage in misconduct or other improper activities, including non-compliance with regulatory standards and requirements and insider trading.

We are exposed to the risk of fraud or other misconduct by our employees, principal investigators, consultants and commercial partners. Misconduct by these parties could include intentional failures to comply with the regulations of the FDA or of other foreign regulatory authorities, provide accurate information to the FDA and other foreign regulatory authorities, comply with healthcare fraud and abuse laws and regulations in the United States and abroad, report financial information or data accurately or disclose unauthorized activities to us. In particular, sales, marketing and business arrangements in the healthcare industry are subject to extensive laws and regulations intended to prevent fraud, misconduct, kickbacks, self-dealing and other abusive practices. These laws and regulations may restrict or prohibit a wide range of pricing, discounting, marketing and promotion, sales commission, customer incentive programs and other business arrangements. Such misconduct could also involve the improper use of information obtained in the course of clinical studies, which could result in regulatory sanctions and cause serious harm to our reputation. We have adopted a code of conduct applicable to all of our employees, but it is not always possible to identify and deter employee misconduct, and the precautions

we take to detect and prevent this activity may not be effective in controlling unknown or unmanaged risks or losses or in protecting us from governmental investigations or other actions or lawsuits stemming from a failure to comply with these laws or regulations. If any such actions are instituted against us, and we are not successful in defending ourselves or asserting our rights, those actions could have a significant impact on our business, including the imposition of significant fines or other sanctions.

We are subject to certain U.S. and foreign anti-corruption, anti-money laundering, export control, sanctions, and other trade laws and regulations. We can face serious consequences for violations.

Among other matters, U.S. and foreign anti-corruption, anti-money laundering, export control, sanctions, and other trade laws and regulations, which are collectively referred to as Trade Laws, prohibit companies and their employees, agents, clinical research organizations, legal counsel, accountants, consultants, contractors, and other partners from authorizing, promising, offering, providing, soliciting, or receiving directly or indirectly, corrupt or improper payments or anything else of value to or from recipients in the public or private sector. Violations of Trade Laws can result in substantial criminal fines and civil penalties, imprisonment, the loss of trade privileges, debarment, tax reassessments, breach of contract and fraud litigation, reputational harm, and other consequences. We have direct or indirect interactions with officials and employees of government agencies or government-affiliated hospitals, universities, and other organizations. We also expect our non-U.S. activities to increase in time. We plan to engage third parties for clinical trials and/or to obtain necessary permits, licenses, patent registrations, and other regulatory approvals and we can be held liable for the corrupt or other illegal activities of our personnel, agents, or partners, even if we do not explicitly authorize or have prior knowledge of such activities. The failure to comply with laws governing international business practices may result in substantial civil and criminal penalties and suspension or debarment from government contracting. The Securities and Exchange Commission, or SEC, also may suspend or bar issuers from trading securities on U.S. exchanges for violations of the United States Foreign Corrupt Practices Act's accounting provisions.

We may be subject, directly or indirectly, to federal and state healthcare fraud and abuse laws, false claims laws health information privacy and security laws, and other health care laws and regulations. If we are unable to comply, or have not fully complied, with such laws, we could face substantial penalties.

If we obtain FDA approval for any of our product candidates and begin commercializing those products in the United States, our operations will be directly, or indirectly through our prescribers, customers and purchasers, subject to various federal and state fraud and abuse laws and regulations, including, without limitation, the federal Health Care Program Anti-Kickback Statute, the federal civil and criminal False Claims Act and Physician Payments Sunshine Act and regulations. These laws will impact, among other things, our proposed sales, marketing and educational programs. In addition, we may be subject to patient privacy laws by both the federal government and the states in which we conduct our business. The laws that will affect our operations include, but are not limited to:

- the federal Anti-Kickback Statute, which prohibits, among other things, persons or entities from knowingly and willfully soliciting, receiving, offering or paying any remuneration (including any kickback, bribe or rebate), directly or indirectly, overtly or covertly, in cash or in kind, to induce, or in return for, the purchase, lease, order, or recommendation of any good, facility, item or service for which payment may be made, in whole or in part, under a federal healthcare program, such as the Medicare and Medicaid programs. A person or entity does not need to have actual knowledge of the federal Anti-Kickback Statute or specific intent to violate it to have committed a violation. In addition, the government may assert that a claim including items or services resulting from a violation of the federal Anti-Kickback Statute constitutes a false or fraudulent claim for purposes of the federal False Claims Act or federal civil money penalties;
- federal civil and criminal false claims laws and civil monetary penalty laws, such as the federal False Claims Act, which impose criminal and civil penalties and authorize civil whistleblower or qui tam actions, against individuals or entities for, among other things: knowingly presenting, or causing to be

presented, to the federal government, claims for payment that are false or fraudulent; making, using or causing to be made or used, a false statement of record material to a false or fraudulent claim or obligation to pay or transmit money or property to the federal government; or knowingly concealing or knowingly and improperly avoiding or decreasing an obligation to pay money to the federal government;

- the anti-inducement law, which prohibits, among other things, the offering or giving of remuneration, which includes, without limitation, any transfer of items or services for free or for less than fair market value (with limited exceptions), to a Medicare or Medicaid beneficiary that the person knows or should know is likely to influence the beneficiary's selection of a particular supplier of items or services reimbursable by a federal or state governmental program;
- the federal Health Insurance Portability and Accountability Act of 1996, or HIPAA, which created new federal criminal statutes that prohibit a person from knowingly and willfully executing, or attempting to execute, a scheme to defraud any healthcare benefit program or obtain, by means of false or fraudulent pretenses, representations or promises, any of the money or property owned by, or under the custody or control of, any healthcare benefit program, regardless of the payor (e.g., public or private) and knowingly and willfully falsifying, concealing or covering up by any trick or device a material fact or making any materially false statements in connection with the delivery of, or payment for, healthcare benefits, items or services relating to healthcare matters; similar to the federal Anti-Kickback Statute, a person or entity does not need to have actual knowledge of the statute or specific intent to violate it in order to have committed a violation;
- HIPAA, as amended by the Health Information Technology for Economic and Clinical Health Act of 2009 and their respective implementing regulations, which impose requirements on certain covered healthcare providers, health plans, and healthcare clearinghouses as well as their respective business associates that perform services for them that involve the use, or disclosure of, individually identifiable health information relating to the privacy, security and transmission of individually identifiable health information;
- the federal transparency requirements under the Affordable Care Act, including the provision commonly referred to as the Physician Payments Sunshine Act, which requires manufacturers of drugs, devices, biologics and medical supplies for which payment is available under Medicare, Medicaid or the Children's Health Insurance Program to report annually to the U.S. Department of Health and Human Services information related to payments or other transfers of value made to physicians (defined to include doctors, dentists, optometrists, podiatrists and chiropractors) and teaching hospitals, as well as ownership and investment interests held by the physicians described above and their immediate family members;
- federal government price reporting laws, which require us to calculate and report complex pricing metrics in an accurate and timely manner to government programs; and
- federal consumer protection and unfair competition laws, which broadly regulate marketplace activities and activities that potentially harm consumers

Additionally, we are subject to state and foreign equivalents of each of the healthcare laws described above, among others, some of which may be broader in scope and may apply regardless of the payer. Many U.S. states have adopted laws similar to the federal Anti-Kickback Statute, some of which apply to the referral of patients for healthcare services reimbursed by any source, not just governmental payers, including private insurers. In addition, some states have passed laws that require pharmaceutical companies to comply with the April 2003 Office of Inspector General Compliance Program Guidance for Pharmaceutical Manufacturers and/or the Pharmaceutical Research and Manufacturers of America's Code on Interactions with Healthcare Professionals. Several states also impose other marketing restrictions or require pharmaceutical companies to make marketing or price disclosures to the state. There are ambiguities as to what is required to comply with these state requirements and if we fail to comply with an applicable state law requirement we could be subject to penalties.

Finally, there are state and foreign laws governing the privacy and security of health information, many of which differ from each other in significant ways and often are not preempted by HIPAA, thus complicating compliance efforts.

Because of the breadth of these laws and the narrowness of the statutory exceptions and safe harbors available, it is possible that some of our business activities could be subject to challenge under one or more of such laws. If our operations are found to be in violation of any of the laws described above or any other government regulations that apply to us, we may be subject to penalties, including civil and criminal penalties, damages, fines, exclusion from participation in government health care programs, such as Medicare and Medicaid, imprisonment and the curtailment or restructuring of our operations, any of which could adversely affect our ability to operate our business and our results of operations.

We face potential product liability, and, if successful claims are brought against us, we may incur substantial liability and costs. If the use of our product candidates harms patients, or is perceived to harm patients even when such harm is unrelated to our product candidates, our regulatory approvals could be revoked or otherwise negatively impacted and we could be subject to costly and damaging product liability claims.

The use of our product candidates in clinical studies and the sale of any products for which we obtain marketing approval exposes us to the risk of product liability claims. Product liability claims might be brought against us by consumers, healthcare providers, pharmaceutical companies or others selling or otherwise coming into contact with our products. There is a risk that our product candidates may induce adverse events. If we cannot successfully defend against product liability claims, we could incur substantial liability and costs. In addition, regardless of merit or eventual outcome, product liability claims may result in:

- the impairment of our business reputation;
- the withdrawal of clinical study participants;
- costs due to related litigation;
- the distraction of management’s attention from our primary business;
- substantial monetary awards to patients or other claimants;
- the inability to commercialize our product candidates; and
- decreased demand for our product candidates, if approved for commercial sale.

We carry product liability insurance of $5.0 million per occurrence and $5.0 million in the aggregate. We believe our product liability insurance coverage is sufficient in light of our current clinical programs; however, we may not be able to maintain insurance coverage at a reasonable cost or in sufficient amounts to protect us against losses due to liability. If and when we obtain marketing approval for product candidates, we intend to expand our insurance coverage to include the sale of commercial products; however, we may be unable to obtain product liability insurance on commercially reasonable terms or in adequate amounts. On occasion, large judgments have been awarded in class action lawsuits based on drugs or medical treatments that had unanticipated adverse effects. A successful product liability claim or series of claims brought against us could cause our stock price to decline and, if judgments exceed our insurance coverage, could adversely affect our results of operations and business.

Patients with the diseases targeted by certain of our product candidates are often already in severe and advanced stages of disease and have both known and unknown significant pre-existing and potentially life- threatening health risks. During the course of treatment, patients may suffer adverse events, including death, for reasons that may be related to our product candidates. Such events could subject us to costly litigation, require us to pay substantial amounts of money to injured patients, delay, negatively impact or end our opportunity to

receive or maintain regulatory approval to market our products, or require us to suspend or abandon our commercialization efforts. Even in a circumstance in which we do not believe that an adverse event is related to our products, the investigation into the circumstance may be time-consuming or inconclusive. These investigations may interrupt our sales efforts, delay our regulatory approval process in other countries, or impact and limit the type of regulatory approvals our product candidates receive or maintain. As a result of these factors, a product liability claim, even if successfully defended, could have a material adverse effect on our business, financial condition or results of operations.

If we fail to comply with environmental, health and safety laws and regulations, we could become subject to fines or penalties or incur costs that could have a material adverse effect on the success of our business.

We are subject to numerous environmental, health and safety laws and regulations, including those governing laboratory procedures and the handling, use, storage, treatment and disposal of hazardous materials and wastes. Our operations involve the use of hazardous and flammable materials, including chemicals and biological materials. Our operations also produce hazardous waste products. We generally contract with third parties for the disposal of these materials and wastes. We cannot eliminate the risk of contamination or injury from these materials. In the event of contamination or injury resulting from our use of hazardous materials, we could be held liable for any resulting damages, and any liability could exceed our resources. We also could incur significant costs associated with civil or criminal fines and penalties. Furthermore, environmental laws and regulations are complex, change frequently and have tended to become more stringent. We cannot predict the impact of such changes and cannot be certain of our future compliance. In addition, we may incur substantial costs in order to comply with current or future environmental, health and safety laws and regulations. These current or future laws and regulations may impair our research, development or production efforts. Failure to comply with these laws and regulations also may result in substantial fines, penalties or other sanctions.

Although we maintain workers' compensation insurance to cover us for costs and expenses we may incur due to injuries to our employees resulting from the use of hazardous materials or other work-related injuries, this insurance may not provide adequate coverage against potential liabilities. In addition, we may incur substantial costs in order to comply with current or future environmental, health and safety laws and regulations. These current or future laws and regulations may impair our research, development or production efforts. Failure to comply with these laws and regulations also may result in substantial fines, penalties or other sanctions or liabilities, which could materially adversely affect our business, financial condition, results of operations and prospects.

Unfavorable global economic conditions could adversely affect our business, financial condition or results of operations.

Our results of operations could be adversely affected by general conditions in the global economy and in the global financial markets. The recent global financial crisis caused extreme volatility and disruptions in the capital and credit markets. A severe or prolonged economic downturn, such as the recent global financial crisis, could result in a variety of risks to our business, including weakened demand for our product candidates and our ability to raise additional capital when needed on acceptable terms, if at all. A weak or declining economy could also strain our suppliers, possibly resulting in supply disruption, or cause delays in payments for our services by third-party payors or our collaborators. Any of the foregoing could harm our business and we cannot anticipate all of the ways in which the current economic climate and financial market conditions could adversely impact our business, financial condition, results of operations and prospects.

We or the third parties upon whom we depend may be adversely affected by earthquakes or other natural disasters and our business continuity and disaster recovery plans may not adequately protect us from a serious disaster.

Earthquakes or other natural disasters could severely disrupt our operations, and have a material adverse effect on our business, results of operations, financial condition and prospects. If a natural disaster, power outage or other event occurred that prevented us from using all or a significant portion of our headquarters, that damaged critical infrastructure, such as the manufacturing facilities of our third-party contract manufacturers, or that otherwise disrupted operations, it may be difficult or, in certain cases, impossible for us to continue our business for a substantial period of time. The disaster recovery and business continuity plans we have in place currently are limited and are unlikely to prove adequate in the event of a serious disaster or similar event. We may incur substantial expenses as a result of the limited nature of our disaster recovery and business continuity plans, which, particularly when taken together with our lack of earthquake insurance, could have a material adverse effect on our business, financial condition, results of operations and prospects.

Our internal computer systems, or those of our collaborators or other contractors or consultants, may fail or suffer security breaches, which could result in a material disruption of our product development programs.

Despite our security measures, our internal computer systems and those of our current and any future collaborators and other contractors or consultants are vulnerable to damage from computer viruses, unauthorized access, natural disasters, terrorism, war and telecommunication and electrical failures. For example, in 2017 we were subjected to a cyberattack by a third party, which led to the theft of a portion of our funds. We implemented remedial measures promptly following this breach and do not believe that this breach had a material adverse effect on our business. However, if any cyberattack or data breach were to occur in the future and cause interruptions in our or our collaborators', contractors' or consultants' operations, it could result in a material disruption of our development programs and our business operations, whether due to a loss of our trade secrets or other proprietary information or other similar disruptions. For example, the loss of clinical trial data from completed or future clinical trials could result in delays in our regulatory approval efforts and significantly increase our costs to recover or reproduce the data. To the extent that any disruption or security breach were to result in a loss of, or damage to, our data or applications, or inappropriate disclosure of confidential or proprietary information, we could incur liability, our competitive position could be harmed and the further development and commercialization of our product candidates could be delayed.

Comprehensive tax reform legislation could adversely affect our business and financial condition.

On December 22, 2017, President Trump signed into law the TCJA that significantly reforms the Internal Revenue Code of 1986, as amended, or the Code. The TCJA, among other things, contains significant changes to corporate taxation, including the reduction of the corporate tax rate from a top marginal rate of 35% to a flat rate of 21%, the limitation of the tax deduction for interest expense to 30% of adjusted earnings (except for certain small businesses), the limitation of the deduction for net operating losses to 80% of current year taxable income and the elimination of net operating loss carrybacks and modification or repeal of many business deductions and credits (including the reduction of the business tax credit for certain clinical testing expenses incurred in the testing of certain drugs for rare diseases or conditions generally referred to as "orphan drugs"). We continue to examine the impact this tax reform legislation may have on our business. However, the effect of the TCJA on our business, whether adverse or favorable, is uncertain, and may not become evident for some period of time. We urge investors to consult with their legal and tax advisers regarding the implications of the TCJA on an investment in our common stock.

We might not be able to utilize a significant portion of our net operating loss carryforwards and research and development tax credit carryforwards.

As of December 31, 2017, we had federal and state net operating loss carryforwards of $19.0 million and $18.9 million, respectively, and state research and development tax credit carryforwards of approximately

$119,000, respectively. If not utilized, the net operating loss carryforwards and research and development credits will generally expire at various dates through 2037. These net operating loss and tax credit carryforwards could expire unused and be unavailable to offset future income tax liabilities. In addition, under Section 382 of the Code, and corresponding provisions of state law, if a corporation undergoes an "ownership change," which is generally defined as a greater than 50% change, by value, in its equity ownership over a three-year period, the corporation's ability to use its pre-change net operating loss carryforwards and other pre-change tax attributes to offset its post-change income may be limited. We may have experienced ownership changes in the past. We may also experience ownership changes in the future as a result of subsequent shifts in our stock ownership, including this offering, some of which may be outside of our control. If an ownership change occurred or occurs and our ability to use our historical net operating loss and tax credit carryforwards is materially limited, or if our research and development carryforwards are adjusted, it would harm our future operating results by effectively increasing our future tax obligations. The reduction of the corporate tax rate under the TCJA may cause a reduction in the economic benefit of our net operating loss carryforwards and other deferred tax assets available to us. Under the TCJA, net operating losses generated after December 31, 2017 will not be subject to expiration.

Risks related to our intellectual property

Third-party claims of intellectual property infringement may prevent or delay our development and commercialization efforts.

Our commercial success depends in part on avoiding infringement of the patents and proprietary rights of third parties. There is a substantial amount of litigation, both within and outside the United States, involving patent and other intellectual property rights in the biotechnology and pharmaceutical industries, including patent infringement lawsuits, interferences, oppositions and *inter partes* reexamination proceedings before the U.S. Patent and Trademark Office, or U.S. PTO, and corresponding foreign patent offices. Numerous U.S. and foreign issued patents and pending patent applications, which are owned by third parties, exist in the fields in which we are pursuing development candidates. As the biotechnology and pharmaceutical industries expand and more patents are issued, the risk increases that our product candidates may be subject to claims of infringement of the patent rights of third parties.

Third parties may assert that we or our licensors are employing their proprietary technology without authorization. There may be third-party patents or patent applications with claims to materials, formulations, methods of manufacture or methods for treatment related to the use or manufacture of our product candidates. In particular, we are aware of issued patents in the United States that cover the lentiviral vectors used in the manufacture of our product candidates. While we believe that we have reasonable defenses against a claim of infringement, potentially including that certain of these patents are expected to expire prior to commercializing our product candidates, if approved, in the United States, there can be no assurance that we will prevail in any such action by the holder of these patents. In the event that the holder of these patents seeks to enforce its patent rights and our defenses against a claim of infringement are unsuccessful, we may not be able to commercialize our product candidates in the United States, if approved, without first obtaining a license to some or all of these patents, which may not be available on commercially reasonable terms or at all. In addition, the defense of any claim of infringement, even if successful, is time-consuming, expensive and diverts the attention of our management from our ongoing business operations.

Because patent applications can take many years to issue, there may be currently pending patent applications which may later result in issued patents that our product candidates may infringe or be alleged to infringe. In addition, third parties may obtain patents in the future and claim that use of our or our licensors' technologies infringes upon these patents. If any third-party patents were held by a court of competent jurisdiction to cover the manufacturing process of any of our product candidates, any molecules formed during the manufacturing process or any final product itself, the holders of any such patents may be able to block our ability to commercialize such product candidate unless we obtained a license under the applicable patents, or until such patents expire.

Similarly, if any third-party patents were held by a court of competent jurisdiction to cover aspects of our formulations, processes for manufacture or methods of use, including combination therapy, the holders of any such patents may be able to block our ability to develop and commercialize the applicable product candidate unless we obtained a license or until such patent expires. In either case, such a license may not be available on commercially reasonable terms or at all.

Parties making claims against us may obtain injunctive or other equitable relief, which could effectively block our ability to further develop and commercialize one or more of our product candidates. Defense of these claims, regardless of their merit, would involve substantial litigation expense and would be a substantial diversion of employee resources from our business. In the event of a successful claim of infringement against us, we may have to pay substantial damages, including treble damages and attorneys' fees for willful infringement, pay royalties, redesign our infringing products or obtain one or more licenses from third parties, which may be impossible or require substantial time and monetary expenditure. Even in the absence of a finding of infringement, we may choose to obtain a license, if such a license is available. A successful claim of patent or other intellectual property infringement against us could materially adversely affect our business, results of operations and financial condition.

Our rights to develop and commercialize our product candidates are subject, in part, to the terms and conditions of licenses granted to us by others.

We depend upon the intellectual property rights granted to us under licenses from third parties that are important or necessary to the development of our technology and products, including technology related to our manufacturing process and our gene therapy product candidates. In particular, we have in-licensed certain intellectual property rights and know-how from the University Health Network (relevant to AVR-RD-01 and our Fabry program) and affiliates of Lund University (relevant to AVR-RD-02 and our Gaucher program). In addition, we have in-licensed patents and patent applications from BioMarin Pharmaceutical Inc., or Biomarin (relevant to AVR-RD-03 and our Pompe program), and GenStem Therapeutics Inc., or GenStem (relevant to AVR-RD-04 and our cystinosis program), directed to compositions and methods related to the manufacture and use of AVR-RD-03 and AVR-RD-04, respectively. Any termination of these licenses could result in the loss of significant rights and could harm or prevent our ability to commercialize our product candidates.

Each of our existing licenses are exclusive but are limited to particular fields, such as Fabry disease, Gaucher disease, Pompe disease, or cystinosis, and are subject to certain retained rights. Absent an amendment or additional agreement, we may not have the right to use intellectual property in-licensed for one of our programs for another program. In addition, licenses that we may enter into in the future may not provide exclusive rights to use such intellectual property and technology in all relevant fields of use and in all territories in which we may wish to develop or commercialize our technology and products in the future. As a result, we may not be able to prevent competitors from developing and commercializing competitive products in territories included in all of our licenses. Licenses to additional third-party technology that may be required for our development programs may not be available in the future or may not be available on commercially reasonable terms, or at all, which could have a material adverse effect on our business and financial condition.

In some circumstances, we may not have the right to control the preparation, filing and prosecution of patent applications, or to maintain the patents, covering technology that we license from third parties. For example, pursuant to each of our intellectual property licenses with GenStem, BioMarin, and the rights holders associated with Lund University, our licensors retain control of such activities. Therefore, we cannot be certain that these patents and applications will be prosecuted, maintained and enforced in a manner consistent with the best interests of our business. If our licensors fail to maintain such patents, or lose rights to those patents or patent applications, the rights we have licensed may be reduced or eliminated and our right to develop and commercialize any of our products that are the subject of such licensed rights could be adversely affected.

Our current license agreements impose, and we expect that future license agreements that we may enter into will impose, various obligations, including diligence and certain payment obligations. If we fail to satisfy our

obligations, the licensor may have the right to terminate the agreement. Disputes may arise between us and any of our licensors regarding intellectual property subject to such agreements and other issues. Such disputes over intellectual property that we have licensed or the terms of our license agreements may prevent or impair our ability to maintain our current arrangements on acceptable terms, or at all, or may impair the value of the arrangement to us. Any such dispute could have a material adverse effect on our business. If we cannot maintain a necessary license agreement or if the agreement is terminated, we may be unable to successfully develop and commercialize the affected product candidates.

If we are unable to obtain and maintain patent protection for our product candidates, or if the scope of the patent protection obtained is not sufficiently broad, our competitors could develop and commercialize products similar or identical to ours, and our ability to successfully commercialize our product candidates may be adversely affected.

Our ability to compete effectively will depend, in part, on our ability to maintain the proprietary nature of our technology and manufacturing processes. We rely on manufacturing and other know-how, patents, trade secrets, trademarks, license agreements and contractual provisions to establish our intellectual property rights and protect our products. These legal means, however, afford only limited protection and may not adequately protect our rights. The failure to obtain, maintain, enforce or defend such intellectual property rights, for any reason, could allow third parties to make competing products or impact our ability to develop, manufacture and market our products, if approved, on a commercially viable basis, or at all, which could have a material adverse effect on our financial condition and results of operations.

In particular, we rely primarily on trade secrets, know-how and other unpatented technology, which are difficult to protect. Although we seek such protection in part by entering into confidentiality agreements with our vendors, employees, consultants and others who may have access to proprietary information, we cannot be certain that these agreements will not be breached, adequate remedies for any breach would be available or our trade secrets, know-how and other unpatented proprietary technology will not otherwise become known to or be independently developed by our competitors. If we are unsuccessful in protecting our intellectual property rights, sales of our products may suffer and our ability to generate revenue could be severely impacted.

Our licensors and we have sought, and we intend to continue to seek to protect our proprietary position by filing patent applications in the United States and, in at least some cases, one or more countries outside the United States related to current and future product candidates that are important to our business. However, we cannot predict whether the patent applications we and our licensors are currently pursuing will issue as patents, whether the claims of any issued patents will provide us with a competitive advantage, or whether we will be able to successfully pursue patent applications in the future related to our current or future product candidates. We currently have no owned or inlicensed patents or patent applications covering AVR-RD-01 or AVR-RD-02, and the patent application that we in-licensed related to AVR-RD-04 is at a very early stage. Many of our product candidates are in-licensed from third parties. Accordingly, in some cases, the availability and scope of potential patent protection is limited based on prior decisions by our licensors or the inventors, such as decisions on when to file patent applications or whether to file patent applications at all.

We may not be able to protect our intellectual property rights throughout the world.

Filing, prosecuting and defending patents on product candidates in all countries throughout the world would be prohibitively expensive, and our intellectual property rights in some countries outside the United States could be less extensive than those in the United States. Although our license agreements grant us worldwide rights, and our currently in-licensed U.S. patent rights have certain corresponding foreign patents or patent applications, there can be no assurance that we will obtain or maintain such corresponding patents or patent applications with respect to any future license agreements. In addition, the laws of some foreign countries do not protect intellectual property rights to the same extent as federal and state laws in the United States even in jurisdictions where we and our licensors pursue patent protection. Consequently, we and our licensors may not be able to

prevent third parties from practicing our inventions in all countries outside the United States, even in jurisdictions where we and our licensors pursue patent protection, or from selling or importing products made using our inventions in and into the United States or other jurisdictions. Competitors may use our technologies in jurisdictions where we and our licensors have not pursued and obtained patent protection to develop their own products and, further, may export otherwise infringing products to territories where we have patent protection, but enforcement is not as strong as that in the United States. These products may compete with our product candidates and our patents or other intellectual property rights may not be effective or sufficient to prevent them from competing.

Many companies have encountered significant problems in protecting and defending intellectual property rights in foreign jurisdictions. The legal systems of certain countries, particularly certain developing countries, do not favor the enforcement of patents, trade secrets and other intellectual property protection, particularly those relating to biotechnology products, which could make it difficult for us to stop the infringement of our patents or marketing of competing products in violation of our proprietary rights generally. Proceedings to enforce our patent rights, even if obtained, in foreign jurisdictions could result in substantial costs and divert our efforts and attention from other aspects of our business, could put our patents at risk of being invalidated or interpreted narrowly and our patent applications at risk of not issuing and could provoke third parties to assert claims against us. We may not prevail in any lawsuits that we initiate and the damages or other remedies awarded, if any, may not be commercially meaningful. Accordingly, our efforts to enforce our intellectual property rights around the world may be inadequate to obtain a significant commercial advantage from the intellectual property that we develop or license.

Issued patents covering our product candidates could be found invalid or unenforceable if challenged in court. We may not be able to protect our trade secrets in court.

If one of our licensing partners or we initiate legal proceedings against a third-party to enforce a patent covering one of our product candidates, should such a patent issue, the defendant could counterclaim that the patent covering our product candidate is invalid or unenforceable. In patent litigation in the United States, defendant counterclaims alleging invalidity or unenforceability are commonplace. Grounds for a validity challenge could be an alleged failure to meet any of several statutory requirements, including lack of novelty, obviousness, written description or non-enablement. Grounds for an unenforceability assertion could be an allegation that someone connected with prosecution of the patent withheld information material to patentability from the United States Patent and Trademark Office, or USPTO, or made a misleading statement, during prosecution. Third parties also may raise similar claims before administrative bodies in the United States or abroad, even outside the context of litigation. Such mechanisms include re-examination, post grant review, *inter partes* review and equivalent proceedings in foreign jurisdictions. Such proceedings could result in the revocation or cancellation of or amendment to our patents in such a way that they no longer cover our product candidates. The outcome following legal assertions of invalidity and unenforceability is unpredictable. With respect to the validity question, for example, we cannot be certain that there is no invalidating prior art, of which the patent examiner and we or our licensing partners were unaware during prosecution. If a defendant were to prevail on a legal assertion of invalidity or unenforceability, we could lose at least part, and perhaps all, of the patent protection on one or more of our product candidates. Such a loss of patent protection could have a material adverse impact on our business.

In addition to the protection afforded by patents, we rely on trade secret protection and confidentiality agreements to protect proprietary know-how that is not patentable or that we elect not to patent, processes for which patents are difficult to enforce and any other elements of our product candidate discovery and development processes that involve proprietary know-how, information or technology that is not covered by patents. However, trade secrets can be difficult to protect and some courts inside and outside the United States are less willing or unwilling to protect trade secrets. We seek to protect our proprietary technology and processes, in part, by entering into confidentiality agreements with our employees, consultants, scientific advisors and contractors. We cannot guarantee that we have entered into such agreements with each party that may have or

have had access to our trade secrets or proprietary technology and processes. We also seek to preserve the integrity and confidentiality of our data and trade secrets by maintaining physical security of our premises and physical and electronic security of our information technology systems. While we have confidence in these individuals, organizations and systems, agreements or security measures may be breached, and we may not have adequate remedies for any breach. In addition, our trade secrets may otherwise become known or be independently discovered by competitors.

We may be subject to claims asserting that our employees, consultants or advisors have wrongfully used or disclosed alleged trade secrets of their current or former employers or claims asserting ownership of what we regard as our own intellectual property.

Certain of our employees, consultants or advisors are currently, or were previously, employed at universities or other biotechnology or pharmaceutical companies, including our competitors or potential competitors. Although we try to ensure that our employees, consultants and advisors do not use the proprietary information or know-how of others in their work for us, we may be subject to claims that these individuals or we have used or disclosed intellectual property, including trade secrets or other proprietary information, of any such individual's current or former employer. Litigation may be necessary to defend against these claims. If we fail in defending any such claims, in addition to paying monetary damages, we may lose valuable intellectual property rights or personnel. Even if we are successful in defending against such claims, litigation could result in substantial costs and be a distraction to management. Our licensors may face similar risks, which could have an adverse impact on intellectual property that is licensed to us.

In addition, while it is our policy to require our employees and contractors who may be involved in the conception or development of intellectual property to execute agreements assigning such intellectual property to us, we may be unsuccessful in executing such an agreement with each party who, in fact, conceives or develops intellectual property that we regard as our own. The assignment of intellectual property rights may not be self-executing or the assignment agreements may be breached, and we may be forced to bring claims against third parties, or defend claims that they may bring against us, to determine the ownership of what we regard as our intellectual property.

We may be subject to claims challenging the inventorship or ownership of the patents and other intellectual property that we own or license.

We or our licensors may be subject to claims that former employees, collaborators or other third parties have an ownership interest in the patents and intellectual property that we own or license or that we may own or license in the future. While it is our policy to require our employees and contractors who may be involved in the development of intellectual property to execute agreements assigning such intellectual property to us, we may be unsuccessful in executing such an agreement with each party who in fact develops intellectual property that we regard as our own; our licensors may face similar obstacles. We could be subject to ownership disputes arising, for example, from conflicting obligations of consultants or others who are involved in developing our product candidates. Litigation may be necessary to defend against any claims challenging inventorship or ownership. If we or our licensors fail in defending any such claims, we may have to pay monetary damages and may lose valuable intellectual property rights, such as exclusive ownership of, or right to use, intellectual property, which could adversely impact our business, results of operations and financial condition.

Some intellectual property which we have in-licensed may have been discovered through government funded programs and thus may be subject to federal regulations such as "marchin" rights, certain reporting requirements, and a preference for U.S. industry. Compliance with such regulations may limit our exclusive rights, and limit our ability to contract with nonU.S. manufacturers.

Some of the intellectual property rights we have licensed, including rights licensed to us by GenStem, may have been generated through the use of U.S. government and California state funding and may therefore be

subject to certain federal and state laws and regulations. As a result, the U.S. government may have certain rights to intellectual property embodied in our current or future product candidates pursuant to the Bayh-Dole Act of 1980, or Bayh-Dole Act. These U.S. government rights in certain inventions developed under a government-funded program include a non-exclusive, non-transferable, irrevocable worldwide license to use inventions for any governmental purpose. In addition, the U.S. government has the right to require us to grant exclusive, partially exclusive, or non-exclusive licenses to any of these inventions to a third party if it determines that: (i) adequate steps have not been taken to commercialize the invention; (ii) government action is necessary to meet public health or safety needs; or (iii) government action is necessary to meet requirements for public use under federal regulations (also referred to as "march-in rights"). The U.S. government also has the right to take title to these inventions if we, or the applicable licensor, fail to disclose the invention to the government and fail to file an application to register the intellectual property within specified time limits. Intellectual property generated under a government funded program is also subject to certain reporting requirements, compliance with which may require us or the applicable licensor to expend substantial resources. In addition, the U.S. government requires that any products embodying the subject invention or produced through the use of the subject invention be manufactured substantially in the United States. The manufacturing preference requirement can be waived if the owner of the intellectual property can show that reasonable but unsuccessful efforts have been made to grant licenses on similar terms to potential licensees that would be likely to manufacture substantially in the United States or that under the circumstances domestic manufacture is not commercially feasible. This preference for U.S. manufacturers may limit our ability to contract with non-U.S. product manufacturers for products covered by such intellectual property. To the extent any of our current or future intellectual property is generated through the use of U.S. government funding, the provisions of the Bayh-Dole Act may similarly apply. Any exercise by the government of certain of its rights could harm our competitive position, business, financial condition, results of operations and prospects. With respect to state funding, specifically funding via the California Institute of Regenerative Medicine, or CIRM, the grantee has certain obligations and the state or CIRM has certain rights. For example, the grantee has an obligation to share intellectual property, including research results, generated by CIRM-funded research, for research use in California.

Changes in U.S. patent law could diminish the value of patents in general, thereby impairing our ability to protect our product candidates.

Changes in either the patent laws or the interpretation of the patent laws in the United States could increase the uncertainties and costs surrounding the prosecution of patent applications and the enforcement or defense of issued patents. On September 16, 2011, the Leahy-Smith America Invents Act, or the Leahy-Smith Act, was signed into law. The Leahy-Smith Act includes several significant changes to U.S. patent law. These include provisions that affect the way patent applications are prosecuted and also may affect patent litigation. These also include provisions that switched the United States from a "first-to-invent" system to a "first-to-file" system, allow third-party submission of prior art to the USPTO during patent prosecution and set forth additional procedures to attack the validity of a patent by the USPTO administered post grant proceedings. Under a first-to-file system, assuming the other requirements for patentability are met, the first inventor to file a patent application generally will be entitled to the patent on an invention regardless of whether another inventor had made the invention earlier. The USPTO developed new regulations and procedures to govern administration of the Leahy-Smith Act, and many of the substantive changes to patent law associated with the Leahy-Smith Act, and in particular, the first to file provisions, only became effective on March 16, 2013. Accordingly, it is not clear what, if any, impact the Leahy-Smith Act will have on the operation of our business. However, the Leahy-Smith Act and its implementation could increase the uncertainties and costs surrounding the prosecution of our patent applications and the enforcement or defense of our issued patents, all of which could have a material adverse effect on our business, financial condition, results of operations and prospects.

The patent positions of companies engaged in the development and commercialization of biologics and pharmaceuticals are particularly uncertain. Two cases involving diagnostic method claims and "gene patents" have recently been decided by the Supreme Court of the United States, or Supreme Court. On March 20, 2012, the Supreme Court issued a decision in Mayo Collaborative Services v. Prometheus Laboratories, Inc., or

Prometheus, a case involving patent claims directed to a process of measuring a metabolic product in a patient to optimize a drug dosage for the patient. According to the Supreme Court, the addition of well-understood, routine or conventional activity such as "administering" or "determining" steps was not enough to transform an otherwise patent-ineligible natural phenomenon into patent-eligible subject matter. On July 3, 2012, the USPTO issued a guidance memo to patent examiners indicating that process claims directed to a law of nature, a natural phenomenon or a naturally occurring relation or correlation that do not include additional elements or steps that integrate the natural principle into the claimed invention such that the natural principle is practically applied and the claim amounts to significantly more than the natural principle itself should be rejected as directed to not patent-eligible subject matter. On June 13, 2013, the Supreme Court issued its decision in Association for Molecular Pathology v. Myriad Genetics, Inc., or Myriad, a case involving patent claims held by Myriad Genetics, Inc. relating to the breast cancer susceptibility genes BRCA1 and BRCA2. Myriad held that an isolated segment of naturally occurring DNA, such as the DNA constituting the BRCA1 and BRCA2 genes, is not patent-eligible subject matter, but that complementary DNA, which is an artificial construct that may be created from RNA transcripts of genes, may be patent-eligible. On March 4, 2014, the USPTO issued a guidance memorandum to patent examiners entitled 2014 Procedure For Subject Matter Eligibility Analysis Of Claims Reciting Or Involving Laws Of Nature/Natural Principles, Natural Phenomena, And/Or Natural Products. These guidelines instruct USPTO examiners on the ramifications of the Prometheus and Myriad rulings and apply the Myriad ruling to natural products and principles including all naturally occurring nucleic acids.

Certain claims of our licensed patents and patent applications contain, and any future patents we may obtain may contain, claims that relate to specific recombinant DNA sequences that are naturally occurring at least in part and, therefore, could be the subject of future challenges made by third parties. In addition, the 2014 USPTO guidance could impact our ability to pursue similar patent claims in patent applications we may prosecute in the future.

We cannot assure you that our efforts to seek patent protection for our product candidates will not be negatively impacted by the decisions described above, rulings in other cases or changes in guidance or procedures issued by the USPTO. We cannot fully predict what impact the Supreme Court's decisions in Prometheus and Myriad may have on the ability of life science companies to obtain or enforce patents relating to their products in the future. These decisions, the guidance issued by the USPTO and rulings in other cases or changes in USPTO guidance or procedures could have a material adverse effect on our existing patent rights and our ability to protect and enforce our intellectual property in the future.

Moreover, although the Supreme Court has held in Myriad that isolated segments of naturally occurring DNA are not patent-eligible subject matter, certain third parties could allege that activities that we may undertake infringe other gene-related patent claims, and we may deem it necessary to defend ourselves against these claims by asserting non-infringement and/or invalidity positions, or paying to obtain a license to these claims. In any of the foregoing or in other situations involving third-party intellectual property rights, if we are unsuccessful in defending against claims of patent infringement, we could be forced to pay damages or be subjected to an injunction that would prevent us from utilizing the patented subject matter. Such outcomes could harm our business, financial condition, results of operations or prospects.

If we do not obtain patent term extension and data exclusivity for our product candidates, our business may be materially harmed.

Depending upon the timing, duration and specifics of any FDA marketing approval of our product candidates, one or more U.S. patents that we license or may own or license in the future, if any, may be eligible for limited patent term extension under the Drug Price Competition and Patent Term Restoration Act of 1984, or Hatch-Waxman Amendments. The Hatch-Waxman Amendments permit a patent extension term of up to five years as compensation for patent term lost during the FDA regulatory review process. A patent term extension cannot extend the remaining term of a patent beyond a total of 14 years from the date of product approval, only one patent may be extended and only those claims covering the approved drug, a method for using it or a method

for manufacturing it may be extended. A patent may only be extended once and only based on a single approved product. However, we may not be granted an extension because of, for example, failing to exercise due diligence during the testing phase or regulatory review process, failing to apply within applicable deadlines, failing to apply prior to expiration of relevant patents or otherwise failing to satisfy applicable requirements. Moreover, the applicable time period or the scope of patent protection afforded could be less than we request. If we are unable to obtain patent term extension or the term of any such extension is less than we request, our competitors may obtain approval of competing products following our patent expiration, and our revenue could be reduced, possibly materially. In addition, we do not control the efforts of our licensors to obtain a patent term extension, and there can be no assurance that they will pursue or obtain such extensions to the patents that we license from them.

If our trademarks and trade names are not adequately protected, then we may not be able to build name recognition in our markets of interest and our business may be adversely affected.

We currently do not have trademarks or trademark applications with the USPTO for the mark "AVRO" and the AVROBIO logo. In the future, even if we apply for registration of these marks, there can be no assurance that such registration will be approved. Once registered, our trademarks or trade names may be challenged, infringed, circumvented or declared generic or determined to be infringing on other marks. We may not be able to protect our rights to these trademarks and trade names, which we need to build name recognition among potential partners or customers in our markets of interest. At times, competitors may adopt trade names or trademarks similar to ours, thereby impeding our ability to build brand identity and possibly leading to market confusion. In addition, there could be potential trade name or trademark infringement claims brought by owners of other registered trademarks or trademarks that incorporate variations of our registered or unregistered trademarks or trade names. Over the long term, if we are unable to establish name recognition based on our trademarks and trade names, then we may not be able to compete effectively and our business may be adversely affected. Our efforts to enforce or protect our proprietary rights related to trademarks, trade secrets, domain names, copyrights or other intellectual property may be ineffective and could result in substantial costs and diversion of resources and could adversely impact our financial condition or results of operations.

Intellectual property rights and regulatory exclusivity rights do not necessarily address all potential threats.

The degree of future protection afforded by our intellectual property rights is uncertain because intellectual property rights have limitations, and may not adequately protect our business or permit us to maintain our competitive advantage. For example:

- others may be able to make gene therapy products that are similar to our product candidates but that are not covered by the claims of the patents that we license or may own or license in the future;
- we, our license partners or current or future collaborators, might not have been the first to make the inventions covered by the issued patents or pending patent applications that we license or may own or license in the future;
- we, our license partners or current or future collaborators, might not have been the first to file patent applications covering certain of our or their inventions;
- others may independently develop similar or alternative technologies or duplicate any of our technologies without infringing our owned or licensed intellectual property rights;
- it is possible that our pending licensed patent applications or those that we may own or license in the future will not lead to issued patents;
- issued patents that we hold rights to or may hold rights to in the future may be held invalid or unenforceable, including as a result of legal challenges by our competitors;
- one or more of our product candidates may never be protected by patents;

- our competitors might conduct research and development activities in countries where we do not have patent rights and then use the information learned from such activities to develop competitive products for sale in our major commercial markets;
- we may not develop additional proprietary technologies that are patentable;
- the patents of others may have an adverse effect on our business; and
- we may choose not to file a patent application for certain trade secrets or know-how, and a third party may subsequently file a patent application or obtain a patent covering such intellectual property.

Should any of these events occur, they could significantly harm our business, financial condition, results of operations and prospects.

Risks related to this offering and ownership of our common stock

The market price of our common stock may be highly volatile, and you may not be able to resell your shares at or above the initial public offering price.

Our stock price is likely to be volatile. The stock market in general, and the market for biopharmaceutical companies in particular, has experienced extreme volatility that has often been unrelated to the operating performance of particular companies. As a result of this volatility, you may not be able to sell your common stock at or above the initial public offering price. The market price for our common stock may be influenced by many factors, including:

- adverse results or delays in preclinical studies or clinical trials;
- reports of adverse events in other gene therapy products or clinical studies of such products;
- an inability to obtain additional funding;
- failure by us to successfully develop and commercialize our product candidates;
- failure by us to maintain our existing strategic collaborations or enter into new collaborations;
- failure by us or our licensors and strategic partners to prosecute, maintain or enforce our intellectual property rights;
- changes in laws or regulations applicable to future products;
- an inability to obtain adequate product supply for our product candidates or the inability to do so at acceptable prices;
- adverse regulatory decisions;
- the introduction of new products, services or technologies by our competitors;
- failure by us to meet or exceed financial projections we may provide to the public;
- failure by us to meet or exceed the financial projections of the investment community;
- the perception of the pharmaceutical industry by the public, legislatures, regulators and the investment community;
- announcements of significant acquisitions, strategic partnerships, joint ventures or capital commitments by us, our strategic partner or our competitors;
- disputes or other developments relating to proprietary rights, including patents, litigation matters and our ability to obtain patent protection for our technologies;
- additions or departures of key scientific or management personnel;
- significant lawsuits, including patent or stockholder litigation;

- changes in the market valuations of similar companies;
- sales of our common stock by us or our stockholders in the future; and
- the trading volume of our common stock.

In addition, companies trading in the stock market in general, and The Nasdaq Global Market in particular, have experienced extreme price and volume fluctuations that have often been unrelated or disproportionate to the operating performance of these companies. Broad market and industry factors may negatively affect the market price of our common stock, regardless of our actual operating performance.

We could be subject to securities class action litigation.

In the past, securities class action litigation has often been brought against a company following a decline in the market price of its securities. This risk is especially relevant for us because pharmaceutical companies have experienced significant stock price volatility in recent years. If we face such litigation, it could result in substantial costs and a diversion of management's attention and resources, which could harm our business.

An active trading market for our common stock may not develop.

Prior to this offering, there has been no public market for our common stock. The initial public offering price for our common stock will be determined through negotiations with the underwriters. Although we intend to apply to have our common stock listed on The Nasdaq Global Market, an active trading market for our shares may never develop or be sustained following this offering. If an active market for our common stock does not develop or is not sustained, it may be difficult for you to sell shares you purchase in this offering without depressing the market price for the shares, or at all.

An inactive trading market may also impair our ability to raise capital to continue to fund operations by selling additional shares and may impair our ability to acquire other companies or technologies by using our shares as consideration.

If securities or industry analysts do not publish research or publish inaccurate or unfavorable research about our business, our share price and trading volume could decline.

The trading market for our common stock will likely depend in part on the research and reports that securities or industry analysts publish about us or our business. We do not have any control over these analysts. We do not currently have research coverage, and there can be no assurance that analysts will cover us, or provide favorable coverage. Securities or industry analysts may elect not to provide research coverage of our common stock after this offering, and such lack of research coverage may negatively impact the market price of our common stock. In the event we do have analyst coverage, if one or more analysts downgrade our stock or change their opinion of our stock, our share price would likely decline. In addition, if one or more analysts cease coverage of our company or fail to regularly publish reports on us, we could lose visibility in the financial markets, which could cause our share price or trading volume to decline.

Concentration of ownership of our common stock among our existing executive officers, directors and principal stockholders may prevent new investors from influencing significant corporate decisions.

Our executive officers, directors, five percent stockholders and their affiliates beneficially own approximately % of our voting stock and, upon closing of this offering, that same group will beneficially own approximately % of our outstanding voting stock. As a result, if these stockholders were to act together, they would be able to control all matters submitted to our stockholders for approval, as well as our management and affair. For example, these stockholders, acting together, may be able to control elections of directors, amendments of our organizational documents, or approval of any merger, sale of assets, or other major corporate

transaction. This may prevent or discourage unsolicited acquisition proposals or offers for our common stock that you may believe are in your best interest as one of our stockholders. Some of these persons or entities may have interests different than yours. For example, because many of these stockholders purchased their shares at prices substantially below the price at which shares are being sold in this offering and have held their shares for a longer period, they may be more interested in selling our company to an acquirer than other investors or they may want us to pursue strategies that deviate from the interests of other stockholders.

We are an "emerging growth company," and the reduced disclosure requirements applicable to emerging growth companies may make our common stock less attractive to investors.

We are an "emerging growth company," or EGC, as defined in the JOBS Act. We will remain an EGC until the earliest of: (i) the last day of the fiscal year in which we have total annual gross revenues of $1.07 billion or more; (ii) the last day of the fiscal year following the fifth anniversary of the date of the completion of this offering; (iii) the date on which we have issued more than $1.0 billion in nonconvertible debt during the previous three years; or (iv) the date on which we are deemed to be a large accelerated filer under the rules of the SEC, which means the first day of the year following the first year in which the market value of our common stock that is held by non-affiliates exceeds $700 million as of June 30. For so long as we remain an EGC, we are permitted and intend to rely on exemptions from certain disclosure requirements that are applicable to other public companies that are not emerging growth companies. These exemptions include:

- not being required to comply with the auditor attestation requirements of Section 404 of the Sarbanes-Oxley Act, or Section 404;
- not being required to comply with any requirement that may be adopted by the Public Company Accounting Oversight Board regarding mandatory audit firm rotation or a supplement to the auditor's report providing additional information about the audit and the financial statements;
- being permitted to provide only two years of audited financial statements, in addition to any required unaudited interim financial statements, with correspondingly reduced "Management's discussion and analysis of financial condition and results of operations" disclosure;
- reduced disclosure obligations regarding executive compensation; and
- an exemption from the requirement to seek nonbinding advisory votes on executive compensation or golden parachute arrangements.

We may choose to take advantage of some, but not all, of the available exemptions. We have taken advantage of reduced reporting burdens in this prospectus. In particular, we have not included all of the executive compensation information that would be required if we were not an EGC. We cannot predict whether investors will find our common stock less attractive if we rely on certain or all of these exemptions. If some investors find our common stock less attractive as a result, there may be a less active trading market for our common stock and our stock price may be more volatile.

In addition, the JOBS Act provides that an EGC may take advantage of an extended transition period for complying with new or revised accounting standards. This allows an EGC to delay the adoption of certain accounting standards until those standards would otherwise apply to private companies. We have elected to avail ourselves of this exemption from new or revised accounting standards and, therefore, we will not be subject to the same new or revised accounting standards as other public companies that are not emerging growth companies.

We will incur increased costs as a result of operating as a public company, and our management will be required to devote substantial time to new compliance initiatives.

As a public company, and particularly after we are no longer an EGC, we will incur significant legal, accounting and other expenses that we did not incur as a private company. In addition, the Sarbanes-Oxley Act of

2002 and rules subsequently implemented by the SEC and Nasdaq have imposed various requirements on public companies, including establishment and maintenance of effective disclosure and financial controls and corporate governance practices. Our management and other personnel will need to devote a substantial amount of time to these compliance initiatives. Moreover, these rules and regulations will increase our legal and financial compliance costs and will make some activities more time-consuming and costly. For example, we expect that these rules and regulations may make it more difficult and more expensive for us to obtain director and officer liability insurance.

Pursuant to Section 404, we will be required to furnish a report by our management on our internal control over financial reporting, including an attestation report on internal control over financial reporting issued by our independent registered public accounting firm. However, while we remain an EGC, we will not be required to include an attestation report on internal control over financial reporting issued by our independent registered public accounting firm. To achieve compliance with Section 404 within the prescribed period, we will be engaged in a process to document and evaluate our internal control over financial reporting, which is both costly and challenging. In this regard, we will need to continue to dedicate internal resources, potentially engage outside consultants and adopt a detailed work plan to assess and document the adequacy of internal control over financial reporting, continue steps to improve control processes as appropriate, validate through testing that controls are functioning as documented and implement a continuous reporting and improvement process for internal control over financial reporting. Despite our efforts, there is a risk that neither we nor our independent registered public accounting firm will be able to conclude within the prescribed timeframe that our internal control over financial reporting is effective as required by Section 404. This could result in an adverse reaction in the financial markets due to a loss of confidence in the reliability of our financial statements.

If we fail to maintain an effective system of internal control over financial reporting, we may not be able to accurately report our financial results or prevent fraud. As a result, stockholders could lose confidence in our financial and other public reporting, which would harm our business and the trading price of our common stock.

Effective internal controls over financial reporting are necessary for us to provide reliable financial reports and, together with adequate disclosure controls and procedures, are designed to prevent fraud. Any failure to implement required new or improved controls, or difficulties encountered in their implementation could cause us to fail to meet our reporting obligations. In addition, any testing by us conducted in connection with Section 404, or any subsequent testing by our independent registered public accounting firm, may reveal deficiencies in our internal controls over financial reporting that are deemed to be material weaknesses or that may require prospective or retroactive changes to our financial statements or identify other areas for further attention or improvement. Inferior internal controls could also cause investors to lose confidence in our reported financial information, which could have a negative effect on the trading price of our stock.

We will be required to disclose changes made in our internal controls and procedures on a quarterly basis and our management will be required to assess the effectiveness of these controls annually. However, for as long as we are an EGC, our independent registered public accounting firm will not be required to attest to the effectiveness of our internal controls over financial reporting pursuant to Section 404. We could be an EGC for up to five years. An independent assessment of the effectiveness of our internal controls over financial reporting could detect problems that our management’s assessment might not. Undetected material weaknesses in our internal controls over financial reporting could lead to financial statement restatements and require us to incur the expense of remediation.

We and our independent registered public accounting firm have identified material weaknesses in our internal control over financial reporting. If we are unable to remedy these material weaknesses, or if we fail to establish and maintain effective internal controls, we may be unable to produce timely and accurate financial statements, and we may conclude that our internal control over financial reporting is not effective, which could adversely impact our investors' confidence and our stock price.

In connection with the audit of our consolidated financial statements for the years ended December 31, 2016 and 2017, we and our independent registered public accounting firm identified material weaknesses in our internal control over financial reporting related to deficiencies in our controls over the financial statement close and cash disbursement processes. Specifically, there was a lack of controls over the identification and review of complex accounting issues involving significant judgment or estimates as well as the cutoff and classification of certain expenses between general and administrative and research and development. In addition, our internal controls related to the cash disbursements process were not adequately designed to identify unauthorized payment requests. Specifically, in 2017 we were subject to a cyberattack by a third party. This deficiency in our controls resulted in the theft of a portion of our funds.

We are implementing measures designed to improve our internal control over financial reporting to remediate these material weaknesses, including formalizing our processes and internal control documentation and strengthening supervisory reviews by our financial management; hiring additional qualified accounting and finance personnel and engaging financial consultants to enable the implementation of internal control over financial reporting and segregating duties amongst accounting and finance personnel; and planning to implement certain accounting systems to automate manual processes, such as tracking and accounting for stock-based awards.

We expect to incur additional costs to remediate these control deficiencies, though there can be no assurance that our efforts will be successful or avoid potential future material weaknesses. If we are unable to successfully remediate our existing or any future material weaknesses in our internal control over financial reporting, or if we identify any additional material weaknesses, the accuracy and timing of our financial reporting may be adversely affected, we may be unable to maintain compliance with securities law requirements regarding timely filing of periodic reports in addition to applicable stock exchange listing requirements, investors may lose confidence in our financial reporting, and our stock price may decline as a result. We also could become subject to investigations by Nasdaq, the Securities and Exchange Commission, or SEC, or other regulatory authorities.

Our disclosure controls and procedures may not prevent or detect all errors or acts of fraud.

Upon completion of this offering, we will become subject to certain reporting requirements of the Exchange Act. Our disclosure controls and procedures are designed to reasonably assure that information required to be disclosed by us in reports we file or submit under the Exchange Act is accumulated and communicated to management, recorded, processed, summarized and reported within the time periods specified in the rules and forms of the SEC. We believe that any disclosure controls and procedures or internal controls and procedures, no matter how well conceived and operated, can provide only reasonable, not absolute, assurance that the objectives of the control system are met. These inherent limitations include the realities that judgments in decision-making can be faulty, and that breakdowns can occur because of simple error or mistake. Additionally, controls can be circumvented by the individual acts of some persons, by collusion of two or more people or by an unauthorized override of the controls. Accordingly, because of the inherent limitations in our control system, misstatements or insufficient disclosures due to error or fraud may occur and not be detected.

If you purchase our common stock in this offering, you will incur immediate and substantial dilution in the book value of your shares.

Investors purchasing shares of common stock in this offering will pay a price per share that substantially exceeds the pro forma book value per share of our tangible assets after subtracting our liabilities. As a result,

investors purchasing shares of common stock in this offering will incur immediate dilution of $ per share, based on the initial public offering price of $ per share and our pro forma net tangible book value as of , 2018. Further, based on these assumptions, investors purchasing shares of common stock in this offering will contribute approximately % of the total amount invested by stockholders since our inception, but will own only approximately % of the shares of common stock outstanding. For information on how the foregoing amounts were calculated, see "Dilution."

A significant portion of our total outstanding shares are restricted from immediate resale but may be sold into the market in the near future, which could cause the market price of our common stock to drop significantly.

Sales of a substantial number of shares of our common stock in the public market could occur at any time, subject to certain restrictions described below. These sales, or the perception in the market that holders of a large number of shares intend to sell shares, could reduce the market price of our common stock. After this offering, we will have outstanding shares of common stock based on the number of shares outstanding as of , 2018 assuming the conversion of our preferred stock upon the closing of this offering, (or shares if the underwriters exercise their option to purchase additional shares in full). This includes the shares that we are selling in this offering (or shares if the underwriters exercise their option to purchase additional shares in full), which may be resold in the public market immediately without restriction, unless purchased by our affiliates. The remaining shares currently are restricted as a result of securities laws or lock-up agreements but will be able to be sold after the offering as described in the "Shares eligible for future sale" and "Underwriters" sections of this prospectus. Moreover, after this offering, holders of an aggregate of approximately 63.3 million shares of our common stock will have rights, subject to certain conditions, to require us to file registration statements covering their shares or to include their shares in registration statements that we may file for ourselves or other stockholders. In addition, 7,391,214 shares reserved for issuance upon the exercise of existing stock options outstanding as of March 31, 2018 under our current equity incentive plan will become eligible for sale in the public market in the future, subject to certain legal and contractual limitations. We intend to register all shares of common stock that we may issue under our equity compensation plans. Once we register these shares, they can be freely sold in the public market upon issuance, subject to volume limitations applicable to affiliates and the lock-up agreements described in the "Underwriters" section of this prospectus.

In addition, Morgan Stanley & Co. LLC and Cowen and Company, LLC may, in their sole discretion, release all or some portion of the shares subject to lock-up agreements at any time and for any reason. Sales of a substantial number of such shares upon expiration of the lock-up agreements, the perception that such sales may occur, or early release of these agreements, could cause our market price to fall or make it more difficult for you to sell your common stock at a time and price that you deem appropriate.

We have broad discretion in the use of the net proceeds from this offering and may not use them effectively.

Our management will have broad discretion in the application of the net proceeds from this offering, including for any of the purposes described in the section entitled "Use of proceeds," and you will not have the opportunity as part of your investment decision to assess whether the net proceeds are being used appropriately. Because of the number and variability of factors that will determine our use of the net proceeds from this offering, their ultimate use may vary substantially from their currently intended use. The failure by our management to apply these funds effectively could harm our business. Pending their use, we may invest the net proceeds from this offering in short-term, investment-grade, interest-bearing securities. These investments may not yield a favorable return to our stockholders.

We do not intend to pay dividends on our common stock so any returns will be limited to the value of our stock.

We have never declared or paid any cash dividends on our common stock. We currently anticipate that we will retain future earnings for the development, operation and expansion of our business and do not anticipate declaring or paying any cash dividends for the foreseeable future. Any return to stockholders will therefore be limited to the appreciation of their stock. For example, our loan and security agreement with Silicon Valley Bank restricts our ability to pay any dividends or making any distributions on account of our capital stock. As a result, capital appreciation, if any, of our common stock will be your sole source of gain for the foreseeable future.

Provisions in our amended and restated certificate of incorporation and by-laws, as well as provisions of Delaware law, could make it more difficult for a third party to acquire us or increase the cost of acquiring us, even if doing so would benefit our stockholders or remove our current management.

Our amended and restated certificate of incorporation, amended and restated by-laws and Delaware law contain provisions that may have the effect of delaying or preventing a change in control of us or changes in our management. Our amended and restated certificate of incorporation and by-laws, which will become effective upon the closing of this offering, include provisions that:

- authorize “blank check” preferred stock, which could be issued by our board of directors without stockholder approval and may contain voting, liquidation, dividend and other rights superior to our common stock;
- create a classified board of directors whose members serve staggered three-year terms;
- specify that special meetings of our stockholders can be called only by our board of directors, the chairperson of our board of directors, our chief executive officer or our president;
- prohibit stockholder action by written consent;
- establish an advance notice procedure for stockholder approvals to be brought before an annual meeting of our stockholders, including proposed nominations of persons for election to our board of directors;
- provide that our directors may be removed only for cause;
- provide that vacancies on our board of directors may be filled only by a majority of directors then in office, even though less than a quorum;
- specify that no stockholder is permitted to cumulate votes at any election of directors;
- expressly authorize our board of directors to modify, alter or repeal our amended and restated by-laws; and
- require supermajority votes of the holders of our common stock to amend specified provisions of our amended and restated certificate of incorporation and amended and restated by-laws.

These provisions, alone or together, could delay or prevent hostile takeovers and changes in control or changes in our management.

In addition, because we are incorporated in Delaware, we are governed by the provisions of Section 203 of the Delaware General Corporation Law, which limits the ability of stockholders owning in excess of 15% of our outstanding voting stock to merge or combine with us.

Any provision of our amended and restated certificate of incorporation or amended and restated by-laws or Delaware law that has the effect of delaying or deterring a change in control could limit the opportunity for our stockholders to receive a premium for their shares of our common stock, and could also affect the price that some investors are willing to pay for our common stock.

Our restated certificate of incorporation and amended and restated bylaws limit the exclusive forum for certain litigation that may be initiated by our stockholders, which could limit our stockholders' ability to obtain a favorable judicial forum for disputes with us or our directors, officers or employees.

Our restated certificate of incorporation and amended and restated bylaws provide that the Court of Chancery of the State of Delaware is the exclusive forum for (i) any derivative action or proceeding brought on our behalf, (ii) any action asserting a claim for or based on a breach of a fiduciary duty owed by any of our current or former directors, officers or other employee to us or our stockholders, (iii) any action asserting a claim against us or any of our current or former directors, officers, employees or stockholders arising pursuant to any provision of the Delaware General Corporation Law, our restated certificate of incorporation or our amended and restated bylaws or (iv) any action asserting a claim governed by the internal affairs doctrine. The choice of forum provision may limit a stockholder's ability to bring a claim in a judicial forum that it finds favorable for disputes with us or our directors, officers or other employees, which may discourage such lawsuits against us and our directors, officers and other employees. Alternatively, if a court were to find the choice of forum provision contained in our restated certificate of incorporation and amended and restated bylaws to be inapplicable or unenforceable in an action, we may incur additional costs associated with resolving such action in other jurisdictions. In addition, our amended and restated certificate of incorporation contains a provision by virtue of which unless we consent in writing to the selection of an alternative forum, the United States District Court for the District of Massachusetts will be the exclusive forum for any complaint asserting a cause of action arising under the Securities Act. See "Description of Capital Stock—Choice of Forum."

SPECIAL NOTE REGARDING FORWARD-LOOKING STATEMENTS

This prospectus, including the sections entitled “Prospectus Summary,” “Risk Factors,” “Management’s Discussion and Analysis of Financial Condition and Results of Operations” and “Business,” contains express or implied forward-looking statements that are based on our management’s belief and assumptions and on information currently available to our management. Although we believe that the expectations reflected in these forward-looking statements are reasonable, these statements relate to future events or our future operational or financial performance, and involve known and unknown risks, uncertainties and other factors that may cause our actual results, performance or achievements to be materially different from any future results, performance or achievements expressed or implied by these forward-looking statements. Forward-looking statements in this prospectus include, but are not limited to, statements about:

- the timing, progress and results of preclinical studies and clinical trials for our programs and product candidates, including statements regarding the timing of initiation and completion of studies or trials and related preparatory work, the period during which the results of the trials will become available and our research and development programs;
- the timing, scope or likelihood of regulatory filings and approvals;
- our ability to develop and advance product candidates into, and successfully complete, clinical studies;
- our expectations regarding the size of the patient populations for our product candidates, if approved for commercial use;
- the implementation of our business model and our strategic plans for our business, product candidates and technology, including our transition to LV2 and our use of a milder conditioning regimen;
- our commercialization, marketing and manufacturing capabilities and strategy;
- the pricing and reimbursement of our product candidates, if approved;
- the scalability and commercial viability of our manufacturing methods and processes, including our plans to move to a closed, automated system;
- the rate and degree of market acceptance and clinical utility of our product candidates, in particular, and gene therapy, in general;
- our ability to establish or maintain collaborations or strategic relationships or obtain additional funding;
- our competitive position;
- the scope of protection we and/or our licensors are able to establish and maintain for intellectual property rights covering our product candidates;
- developments and projections relating to our competitors and our industry;
- our expectations related to the use of proceeds from this offering;
- our estimates regarding expenses, future revenue, capital requirements and needs for additional financing;
- our ability to remediate the material weaknesses that we and our independent registered public accounting firm identified and avoid any findings of material weaknesses or significant deficiencies in the future;
- the impact of laws and regulations;
- our expectations regarding the time during which we will be an emerging growth company under the JOBS Act; and
- other risks and uncertainties, including those listed under the caption “Risk Factors”

In some cases, forward-looking statements can be identified by terminology such as “may,” “should,” “expects,” “intends,” “plans,” “anticipates,” “believes,” “estimates,” “predicts,” “potential,” “continue” or the negative of these terms or other comparable terminology. These statements are only predictions. You should not place undue reliance on forward-looking statements because they involve known and unknown risks, uncertainties and other factors, which are, in some cases, beyond our control and which could materially affect results. Factors that may cause actual results to differ materially from current expectations include, among other things, those listed under the section entitled “Risk Factors” and elsewhere in this prospectus. If one or more of these risks or uncertainties occur, or if our underlying assumptions prove to be incorrect, actual events or results may vary significantly from those implied or projected by the forward-looking statements. No forward-looking statement is a guarantee of future performance. You should read this prospectus and the documents that we reference in this prospectus and have filed with the Securities and Exchange Commission as exhibits to the registration statement, of which this prospectus is a part, completely and with the understanding that our actual future results may be materially different from any future results expressed or implied by these forward-looking statements.

The forward-looking statements in this prospectus represent our views as of the date of this prospectus. We anticipate that subsequent events and developments will cause our views to change. However, while we may elect to update these forward-looking statements at some point in the future, we have no current intention of doing so except to the extent required by applicable law. You should therefore not rely on these forward-looking statements as representing our views as of any date subsequent to the date of this prospectus.

USE OF PROCEEDS

We estimate that the net proceeds from our issuance and sale of common stock in this offering will be approximately $ million, or approximately $ million if the underwriters exercise their over-allotment option in full, based upon the assumed initial public offering price of $ per share, the midpoint of the price range set forth on the cover page of this prospectus, after deducting estimated underwriting discounts and commissions and estimated offering expenses payable by us.

Each $1.00 increase (decrease) in the assumed initial public offering price of $ per share, the midpoint of the price range set forth on the cover page of this prospectus, would increase (decrease) the net proceeds to us from this offering by $ million, assuming the number of shares offered by us, as set forth on the cover page of this prospectus, remains the same and after deducting estimated underwriting discounts and commissions and estimated offering expenses payable by us. Each increase (decrease) of 1,000,000 shares in the number of shares offered by us, as set forth on the cover page of this prospectus, would increase (decrease) our net proceeds from this offering by $ million, assuming no change in the assumed initial public offering price per share and after deducting estimated underwriting discounts and commissions and estimated offering expenses payable by us. This information is illustrative only and will depend on the actual initial public offering price and other terms of this offering determined at pricing.

We currently estimate that we will use the net proceeds from this offering, together with our existing cash and cash equivalents, as follows:

- approximately $ million to fund expenses to advance our lead product candidate, AVR-RD-01, for the treatment of Fabry disease into Phase 2 clinical trials and to support the ongoing investigator-sponsored Phase 1 clinical trial;
- approximately $ million to fund expenses to advance AVR-RD-02 for the treatment of Gaucher disease into Phase 1/2 clinical trials;
- approximately $ million to fund expenses to advance AVR-RD-03 for Pompe disease further into preclinical development;
- approximately $ million to fund expenses to advance AVR-RD-04 for the treatment of cystinosis, including to support the planned initial investigator-sponsored Phase 1/2 clinical trial;
- approximately $ million to fund expenses for our external and internal manufacturing and process development activities related to the advancement of our product candidates;
- approximately $ million to fund research and development activities that relate to all of our clinical and preclinical activities, including the cost of research and development personnel; and
- the remainder for planned general and administrative expenses, the costs of operating as a public company, working capital and other general corporate purposes.

Based on our current plans, we believe our existing cash and cash equivalents, together with the net proceeds from this offering, will be sufficient to fund our operations through at least .

This expected use of the net proceeds from this offering represents our intentions based upon our current plans and business conditions. For example, we may use a portion of the net proceeds for the acquisition of businesses or technologies to continue to build our pipeline, our research and development capabilities and our intellectual property position, although we currently have no agreements, commitments or understandings with respect to any such transaction. We cannot predict with certainty all of the particular uses for the net proceeds to be received upon the completion of this offering or the amounts that we will actually spend on the uses set forth above. The amounts and timing of our actual expenditures may vary significantly depending on numerous factors, including the timing and plans for initiation of our planned clinical trials, the progress of our research and

development, the status of and results from non-clinical studies or clinical trials we may commence in the future, as well as any collaborations that we may enter into with third parties for our product candidates or strategic opportunities that become available to us, and any unforeseen cash needs.

Our management will have broad discretion in the application of the net proceeds from this offering, and investors will be relying on the judgment of our management regarding the application of the net proceeds from this offering. The timing and amount of our actual expenditures will be based on many factors, including cash flows from operations and the anticipated growth of our business. Pending these uses, we plan to hold these net proceeds in non-interest bearing accounts, with the goal of capital preservation and liquidity so that such funds are readily available to fund our operations.

DIVIDEND POLICY

We have never declared or paid any cash dividends on our capital stock. We currently intend to retain all available funds and any future earnings to support our operations and finance the growth and development of our business. We do not intend to pay cash dividends on our common stock for the foreseeable future. Any future determination related to dividend policy will be made at the discretion of our board of directors and will depend on, among other factors, our results of operations, financial condition, capital requirements, contractual restrictions, business prospects and other factors our board of directors may deem relevant. Investors should not purchase our common stock with the expectation of receiving cash dividends. In addition, under our loan and security agreement with Silicon Valley Bank, we are restricted from paying any dividends or making any distributions on account of our capital stock. Moreover, the terms of any future indebtedness that we may incur could restrict our ability to pay dividends. See “Management’s Discussion and Analysis of Financial Condition and Results of Operations—Liquidity and Capital Resources” for a description of the restrictions on our ability to pay dividends.

CAPITALIZATION

The following table sets forth our cash and cash equivalents and our capitalization as of December 31, 2017:

- on an actual basis;
- on a pro forma basis to give effect to:
  - our sale of 28,285,557 shares of Series B preferred stock in January 2018 for gross cash proceeds of $60.5 million;
  - our issuance of 233,765 shares of Series B preferred stock in January 2018 to BioMarin pursuant to our license agreement with BioMarin;
  - the conversion of all outstanding shares of preferred stock into an aggregate of 63,303,154 shares of common stock upon the closing of this offering;
  - the conversion of our warrant to purchase preferred stock into a warrant to purchase common stock upon the closing of this offering;
  - the filing and effectiveness of our amended and restated certificate of incorporation upon the closing of this offering; and
- on a pro forma as adjusted basis giving effect to the pro forma adjustments set forth above and to give further effect (i) to our issuance and sale of shares of common stock in this offering at the assumed initial public offering price of $ per share, the midpoint of the price range set forth on the cover page of this prospectus, after deducting estimated underwriting discounts and commissions and estimated offering expenses payable by us, and (ii) the payment by us of an aggregate of $2.0 million to University Health Network pursuant to the Stock Purchase Agreement, dated as of January 27, 2016, between us and University Health Network, in connection with this offering.

The pro forma as adjusted information below is illustrative only, and our capitalization following the closing of this offering will be adjusted based on the actual initial public offering price and other terms of this offering determined at pricing. You should read the following table in conjunction with our consolidated financial statements and the related notes appearing elsewhere in this prospectus, and the sections of this prospectus titled "Use of Proceeds," "Selected Consolidated Financial Data," "Management's Discussion and Analysis of Financial Condition and Results of Operations" and "Description of Share Capital."

	As of December 31, 2017		
	Actual	Pro Forma	Pro Forma As Adjusted(1)
	(in thousands, except share and per share data)		
Cash and cash equivalents	$ 5,963	$ 66,463	$
Warrant to purchase redeemable preferred stock	$ 35	$ —	$
Redeemable convertible preferred stock (Series Seed, A and B), $0.0001 par value; 34,972,535 shares authorized, 34,783,832 shares issued and outstanding, actual; no shares authorized, issued or outstanding, pro forma and pro forma as adjusted	26,500	—	
Stockholders' (deficit) equity:			
Preferred stock, $0.0001 par value; no shares authorized, issued or outstanding, actual; shares authorized and no shares issued or outstanding, pro forma and pro forma as adjusted	—	—	
Common stock, $0.0001 par value; 51,000,000 shares authorized, 10,666,667 shares issued and 9,524,999 shares outstanding, actual; shares authorized, 73,511,487 shares issued and 72,828,153 shares outstanding, pro forma; shares authorized, shares issued and outstanding, pro forma as adjusted	1	7	
Additional paid-in capital	339	87,868	
Accumulated deficit	(23,475)	(23,475)	
Total stockholders' (deficit) equity	(23,135)	64,400	
Total capitalization	$ 3,400	$ 64,400	$

(1) Each $1.00 increase (decrease) in the assumed initial public offering price of $ per share, the midpoint of the price range set forth on the cover page of this prospectus, would increase (decrease) the pro forma as adjusted amount of each of cash and cash equivalents and total stockholders' equity by $ million, assuming that the number of shares offered by us, as set forth on the cover page of this prospectus, remains the same and after deducting estimated underwriting discounts and commissions and estimated offering expenses payable by us. Each increase (decrease) of 1,000,000 shares in the number of shares offered by us, as set forth on the cover page of this prospectus, would increase (decrease) the pro forma as adjusted amount of each of cash and cash equivalents and total stockholders' equity by $ million, assuming no change in the assumed initial public offering price per share and after deducting estimated underwriting discounts and commissions and estimated offering expenses payable by us. This information is illustrative only and will depend on the actual initial public offering price and other terms of this offering determined at pricing.

The number of shares of common stock outstanding in the table above does not include:

- 4,276,504 shares of common stock issuable upon the exercise of stock options outstanding as of December 31, 2017, with a weighted average exercise price of $0.19 per share, and 3,114,710 shares of common stock issuable upon the exercise of stock options outstanding that were issued after December 31, 2017, with an exercise price of $1.21 per share;
- 28,305 shares of common stock issuable upon the exercise of a warrant to purchase preferred stock outstanding as of December 31, 2017 that will automatically become a warrant to purchase common stock upon the completion of this offering, with an exercise price of $0.7949 per share;

- an additional 593,795 shares of common stock available for future issuance under our Amended and Restated 2015 Stock Option and Grant Plan as of December 31, 2017, plus an additional 2,762,421 shares of common stock reserved under such plan in January 2018;
- an additional shares of common stock that will be made available for future issuance under our 2018 Stock Option and Grant Plan upon the effectiveness of the registration statement of which this prospectus forms a part; and
- an additional shares of common stock that will be made available for future issuance under our 2018 Employee Stock Purchase Plan upon the effectiveness of the registration statement of which this prospectus forms a part.

DILUTION

If you invest in our common stock in this offering, your ownership interest will be diluted immediately to the extent of the difference between the initial public offering price per share of our common stock and the pro forma as adjusted net tangible book value per common share immediately after this offering.

Our historical net tangible book (deficit) as of December 31, 2017 was $(23.1) million, or $(2.17) per share of common stock. Our historical net tangible book (deficit) is the amount of our total tangible assets less our total liabilities and the carrying value of redeemable convertible preferred stock, which is not included within shareholders' (deficit). Historical net tangible book (deficit) per share represents historical net tangible book (deficit) divided by the 10,666,667 shares of our common stock outstanding as of December 31, 2017.

Our pro forma net tangible book value as of December 31, 2017 was $64.4 million, or $0.87 per share of common stock. Pro forma net tangible book value represents the amount of our total tangible assets less our total liabilities, after giving effect to:

- our sale of 28,285,557 shares of Series B preferred stock in January 2018 for gross cash proceeds of $60.5 million;
- our issuance of 233,765 shares of Series B preferred stock in January 2018 to BioMarin pursuant to our license agreement with BioMarin;
- the conversion of all outstanding shares of redeemable convertible preferred stock into an aggregate of 63,303,154 shares of common stock upon the closing of this offering; and
- the conversion of our warrant to purchase preferred stock into a warrant to purchase common stock upon the closing of this offering.

Pro forma net tangible book value per share represents our pro forma net tangible book value divided by the total number of shares of our common stock outstanding as of December 31, 2017, after giving effect to the pro forma adjustments described above.

After giving further effect to (i) our issuance and sale of shares of common stock in this offering at the assumed initial public offering price of $ per share, the midpoint of the price range set forth on the cover page of this prospectus, after deducting estimated underwriting discounts and commissions and estimated offering expenses payable by us, and (ii) the payment by us of an aggregate of $2.0 million to University Health Network pursuant to the Stock Purchase Agreement, dated as of January 27, 2016, between us and University Health Network, in connection with this offering, our pro forma as adjusted net tangible book value as of December 31, 2017 would have been $ million, or $ per share. This represents an immediate increase in pro forma as adjusted net tangible book value per share of $ to existing shareholders and immediate dilution in pro forma as adjusted net tangible book value per share of $ to new investors purchasing common stock in this offering. Dilution per share to new investors is determined by subtracting pro forma as adjusted net tangible book value per share after this offering from the initial public offering price per share paid by new investors. The following table illustrates this dilution on a per share basis:

Assumed initial public offering price per share		$
Historical net tangible book value (deficit) per share as of December 31, 2017	$(2.17)	
Increase per share attributable to the pro forma adjustments described above	3.04	
Pro forma net tangible book value per share as of December 31, 2017	0.87	
Increase in pro forma as adjusted net tangible book value per share attributable to new investors purchasing common stock in this offering		
Pro forma as adjusted net tangible book value per share after this offering		
Dilution in pro forma as adjusted net tangible book value per share to new investors purchasing common stock in this offering		$

Each $1.00 increase (decrease) in the assumed initial public offering price of $ per share, the midpoint of the price range set forth on the cover page of this prospectus, would increase (decrease) the pro forma as adjusted net tangible book value per share after this offering by $ and dilution per share to new investors purchasing shares in this offering by $, assuming that the number of shares offered by us, as set forth on the cover page of this prospectus, remains the same and after deducting estimated underwriting discounts and commissions and estimated offering expenses payable by us. Each increase (decrease) of 1,000,000 shares in the number of shares offered by us, as set forth on the cover page of this prospectus, would increase (decrease) the pro forma as adjusted net tangible book value per share after this offering by $ and dilution per share to new investors purchasing shares in this offering by $, assuming no change in the assumed initial public offering price per share and after deducting estimated underwriting discounts and commissions and estimated offering expenses payable by us. This information is illustrative only and will depend on the actual initial public offering price and other terms of this offering determined at pricing.

If the underwriters exercise their over-allotment option in this offering in full, the pro forma as adjusted net tangible book value per share after this offering would be $ per share, and the dilution in pro forma as adjusted net tangible book value per share to new investors purchasing common shares in this offering would be $ per share, after deducting estimated underwriting discounts and commissions and estimated offering expenses payable by us.

The following table summarizes, on the pro forma as adjusted basis described above as of December 31, 2017, the total number of shares of common stock purchased from us, the total consideration paid or to be paid, and the average price per share paid or to be paid by existing shareholders and by new investors in this offering at the assumed initial public offering price of $ per share, the midpoint of the price range set forth on the cover page of this prospectus, before deducting estimated underwriting discounts and commissions and estimated offering expenses payable by us:

	Shares Purchased		Total Consideration		Average Price Per Share
	Number	Percentage	Amount	Percentage	
Existing shareholders	73,969,821	%	$88,183,696	%	$ 1.19
New investors					$
Total		100.0%		100.0%	

A $1.00 increase (decrease) in the assumed initial public offering price of $ per share, the midpoint of the price range set forth on the cover page of this prospectus, would increase (decrease) the total consideration paid by investors in this offering by approximately $ million, assuming the number of shares offered by us, as set forth on the cover page of this prospectus, remains the same and after deducting estimated underwriting discounts and commissions and estimated offering expenses payable by us. Similarly, each increase (decrease) of 1,000,000 shares in the number of shares offered by us in this offering would increase (decrease) the total consideration paid by investors in this offering by approximately $ million, assuming the assumed initial public offering price of $ per share, the midpoint of the price range set forth on the cover page of this prospectus, remains the same, and after deducting estimated underwriting discounts and commissions and estimated offering expenses payable by us. This information is illustrative only and will depend on the actual initial public offering price and other terms of this offering determined at pricing.

The table above assumes no exercise of the underwriters' over-allotment option in this offering. If the underwriters' over-allotment option is exercised in full, the number of shares of common stock held by new investors purchasing common stock in this offering would be increased to % of the total number of shares of common stock outstanding after this offering, and the number of shares held by existing shareholders would be reduced to % of the total number of shares of common stock outstanding after this offering.

The tables and discussion above do not include:

- 4,276,504 shares of common stock issuable upon the exercise of stock options outstanding as of December 31, 2017, with a weighted average exercise price of $0.19 per share, and 3,114,710 shares of common stock issuable upon the exercise of stock options that were issued after December 31, 2017, with an exercise price of $1.21 per share;
- 28,305 shares of common stock issuable upon the exercise of a warrant to purchase preferred stock outstanding as of December 31, 2017 that will automatically become a warrant to purchase common stock upon the completion of this offering, with an exercise price of $0.7949 per share;
- an additional 593,795 shares of common stock available for future issuance under our Amended and Restated 2015 Stock Option and Grant Plan as of December 31, 2017, plus an additional 2,762,421 shares of common stock reserved under such plan in January 2018;
- an additional shares of common stock that will be made available for future issuance under our 2018 Stock Option and Grant Plan upon the effectiveness of the registration statement of which this prospectus forms a part; and
- an additional shares of common stock that will be made available for future issuance under our 2018 Employee Stock Purchase Plan upon the effectiveness of the registration statement of which this prospectus forms a part.

To the extent that stock options or warrants are exercised, new stock options are issued under our equity incentive plans, or we issue additional shares of common stock in the future, there will be further dilution to investors participating in this offering. In addition, we may choose to raise additional capital because of market conditions or strategic considerations, even if we believe that we have sufficient funds for our current or future operating plans. If we raise additional capital through the sale of equity or convertible debt securities, the issuance of these securities could result in further dilution to our stockholders.

SELECTED CONSOLIDATED FINANCIAL DATA

The selected consolidated statements of operations data for the years ended December 31, 2016 and 2017 and the selected consolidated balance sheet data as of December 31, 2016 and 2017 are derived from our audited financial statements included elsewhere in this prospectus. Our historical results are not necessarily indicative of the results that may be expected in any future period. You should read the following selected financial data together with the information in the sections titled "Management's Discussion and Analysis of Financial Condition and Results of Operations" and our financial statements and related notes included elsewhere in this prospectus.

	Year Ended December 31,	
	2016	2017
Consolidated Statements of Operations Data:		
Operating expenses:		
Research and development	$ 2,663	$ 15,191
General and administrative	1,962	3,195
Total operating expenses	4,625	18,386
Loss from operations	(4,625)	(18,386)
Other income (expense):		
Interest income	6	57
Change in fair value of preferred stock warrant liability	—	(17)
Change in fair value of derivative liability	(39)	(283)
Other expense	(6)	(19)
Total other expense, net	(39)	(262)
Net loss	$ (4,664)	$ (18,648)
Reconciliation of net loss to net loss attributable to common stockholders:		
Net loss	$ (4,664)	$ (18,648)
Accretion of redeemable convertible preferred stock to redemption value	(305)	(85)
Net loss attributable to common stockholders	$ (4,969)	$ (18,733)
Net loss per share attributable to common stockholders—basic and diluted(1)	$ (0.59)	$ (2.03)
Weighted-average common shares outstanding—basic and diluted(1)	8,421,130	9,238,612
Pro forma net loss per share attributable to common stockholders—basic and diluted(1)		$ (0.65)
Pro forma weighted-average common shares outstanding—basic and diluted(1)		28,602,468

(1) See Notes 2 and 13 to our consolidated financial statements appearing elsewhere in this prospectus for further details on the calculation of basic and diluted net loss per share attributable to common stockholders and on the calculation of pro forma basic and diluted net loss per share attributable to common stockholders.

	As of December 31,	
	2016	2017
	(in thousands)	
Consolidated Balance Sheet Data:		
Cash and cash equivalents	$ 5,357	$ 5,963
Working capital(1)	4,485	3,683
Total assets	5,400	7,022
Warrant to purchase redeemable convertible preferred stock	—	35
Derivative liability	88	371
Redeemable convertible preferred stock	9,000	26,500
Total stockholders' deficit	(4,579)	(23,135)

(1) We define working capital as current assets less current liabilities.

MANAGEMENT'S DISCUSSION AND ANALYSIS OF FINANCIAL CONDITION AND RESULTS OF OPERATIONS

You should read the following discussion and analysis of our financial condition and results of operations together with our consolidated financial statements and the related notes appearing elsewhere in this prospectus. Some of the information contained in this discussion and analysis or set forth elsewhere in this prospectus, including information with respect to our plans and strategy for our business and related financing, includes forward-looking statements that involve risks, uncertainties and assumptions. You should read the "Special Note Regarding Forward-Looking Statements" and "Risk Factors" sections of this prospectus for a discussion of important factors that could cause actual results to differ materially from the results described in or implied by the forward-looking statements contained in the following discussion and analysis.

Overview

We are a clinical stage gene therapy company focused on developing potentially curative *ex vivo* lentiviral-based gene therapies to treat rare diseases following a single dose. Our gene therapies employ hematopoietic stem cells that are extracted from the patient and then modified with lentiviral vectors to insert a functional copy of the gene that is defective in the target disease. We believe that our approach has the potential to provide curative benefit in an outpatient setting for a range of diseases. Our initial focus is on a group of rare genetic diseases referred to as lysosomal storage diseases, which today are primarily managed with enzyme replacement therapies, or ERTs.

We are initially targeting rare diseases in which current standard of care provides the mechanistic proof that the enzymes or proteins produced endogenously following treatment with our gene therapies can offer benefit to patients. Typically in lysosomal storage diseases, a gene mutation results in the deficiency or malfunctioning of an enzyme or other protein. This results in the inability of lysosomes to properly process cellular byproducts. As a result, these byproducts accumulate to toxic levels in the body's cells and, in turn, disrupt the function of multiple tissues and organs. Fabry disease, Gaucher disease and Pompe disease are primarily managed by bi-weekly, multi-hour infusions with ERTs that seek to exogenously replace the missing enzyme. However, given the characteristics of most ERTs, they typically only remain in the plasma for a short period of time and thus, are not ideal because they are only dosed every two weeks. These existing therapies manage, rather than cure, the underlying diseases and, as a result, patients continue to have disease progression. Further, the frequent, periodic and life-long dosing schedule required for ERTs results in significant costs for the healthcare system and is burdensome for the patient.

We seek to develop promising gene therapy programs by applying our expertise in gene and cellular therapies and clinical and regulatory strategy and execution to efficiently bring these potentially curative therapies to patients. In our initial programs, we leverage years of extensive preclinical and early clinical research by leading researchers, as well as our internal research efforts, to advance potential therapies. We plan to identify and develop future product candidates through our own internal research efforts as well as through collaborations with leading academics.

Since our inception in 2015, we have devoted substantially all of our resources to organizing and staffing our company, business planning, raising capital, acquiring or discovering product candidates and securing related intellectual property rights, conducting discovery, research and development activities for our programs and planning for potential commercialization. We do not have any products approved for sale and have not generated any revenue from product sales. To date, we have funded our operations with proceeds from the sales of preferred stock. Through December 31, 2017, we had received gross proceeds of $26.5 million from the sales of our preferred stock. Since our inception, we have incurred significant operating losses. Our ability to generate product revenue sufficient to achieve profitability will depend heavily on the successful development and eventual commercialization of one or more of our current or future product candidates and programs. Our net losses were $4.7 million and $18.6 million for the years ended December 31, 2016 and 2017, respectively. As of

December 31, 2017 we had an accumulated deficit of $23.5 million. We expect to continue to incur significant expenses for at least the next several years as we advance our product candidates from discovery through preclinical development and clinical trials and seek regulatory approval of our product candidates. In addition, if we obtain marketing approval for any of our product candidates, we expect to incur significant commercialization expenses related to product manufacturing, marketing, sales and distribution. We may also incur expenses in connection with the in-licensing or acquisition of additional product candidates. Furthermore, upon the closing of this offering, we expect to incur additional costs associated with operating as a public company, including significant legal, accounting, investor relations and other expenses that we did not incur as a private company.

As a result, we will need substantial additional funding to support our continuing operations and pursue our growth strategy. Until such time as we can generate significant revenue from product sales, if ever, we expect to finance our operations with proceeds from outside sources, with a majority of such proceeds to be derived from sales of equity, including the anticipated net proceeds from this offering. We also plan to pursue additional funding from outside sources, including our expansion of, or our entry into, new borrowing arrangements; research and development incentive payments from the Australian government; and our entry into potential future collaboration agreements for one or more of our programs. We may be unable to raise additional funds or enter into such other agreements or arrangements when needed on favorable terms, or at all. If we fail to raise capital or enter into such agreements as, and when, needed, we may have to significantly delay, scale back or discontinue the development and commercialization of one or more of our product candidates or delay our pursuit of potential in-licenses or acquisitions.

Because of the numerous risks and uncertainties associated with product development, we are unable to predict the timing or amount of increased expenses or when or if we will be able to achieve or maintain profitability. Even if we are able to generate product sales, we may not become profitable. If we fail to become profitable or are unable to sustain profitability on a continuing basis, we may be unable to continue our operations at planned levels and be forced to reduce or terminate our operations.

As of December 31, 2017, we had cash and cash equivalents of $6.0 million. In January 2018, we received gross cash proceeds of $60.5 million from the sale of our Series B preferred stock. We believe that the anticipated net proceeds from this offering, together with our existing cash and cash equivalents, will enable us to fund our operating expenses and capital expenditure requirements into . We have based this estimate on assumptions that may prove to be wrong, and we could exhaust our available capital resources sooner than we expect. See "—Liquidity and Capital Resources."

Without giving effect to the anticipated net proceeds from this offering, we expect that our existing cash and cash equivalents, including the proceeds from our series B preferred stock financing, will be sufficient to fund our operating expenses and capital expenditure requirements until at least the middle of 2019. To finance our operations beyond that point, we will need to raise additional capital, which cannot be assured.

Components of Our Consolidated Results of Operations

Revenue

To date, we have not generated any revenue from product sales and do not expect to generate any revenue from the sale of products in the near future. If development efforts for our product candidates are successful and result in regulatory approval or additional license agreements with third parties, we may generate revenue in the future from product sales.

Operating Expenses

Research and Development Expenses

Research and development expenses consist primarily of costs incurred in connection with the discovery and development of our product candidates. We expense research and development costs as incurred. These expenses include:

- license maintenance fees and milestone fees incurred in connection with various license agreements;
- expenses incurred under agreements with contract research organizations, or CROs, contract manufacturing organizations, or CMOs, as well as investigative sites and consultants that conduct our clinical trials, preclinical studies and other scientific development services;
- manufacturing scale-up expenses and the cost of acquiring and manufacturing preclinical and clinical trial materials and commercial materials, including manufacturing validation batches;
- employee-related expenses, including salaries, related benefits, travel and stock-based compensation expense for employees engaged in research and development functions;
- costs related to compliance with regulatory requirements; and
- allocated facilities costs, depreciation and other expenses, which include rent and utilities.

We recognize external development costs based on an evaluation of the progress to completion of specific tasks using information provided to us by our service providers.

Our direct research and development expenses are tracked on a program-by-program basis for our product candidates and consist primarily of external costs, such as fees paid to outside consultants, CROs, CMOs, and central laboratories in connection with our preclinical development, process development, manufacturing and clinical development activities. Our direct research and development expenses by program also include fees incurred under license agreements. We do not allocate employee costs or facility expenses, including depreciation or other indirect costs, to specific programs because these costs are deployed across multiple programs and, as such, are not separately classified. We use internal resources primarily to oversee the research and discovery as well as for managing our preclinical development, process development, manufacturing and clinical development activities. These employees work across multiple programs and, therefore, we do not track their costs by program.

The table below summarizes our research and development expenses incurred by program:

	Year Ended December 31,	
	2016	2017
	(in thousands)	
Fabry	$ 105	$ 6,101
Gaucher	50	2,612
AML	785	180
Cystinosis	—	1,030
Pompe	—	1,010
Unallocated research and development expenses	1,723	4,258
Total research and development expenses	$2,663	$15,191

Research and development activities are central to our business model. Product candidates in later stages of clinical development generally have higher development costs than those in earlier stages of clinical development, primarily due to the increased size and duration of later-stage clinical trials. As a result, we expect that our research and development expenses will increase substantially over the next several years, particularly as we increase personnel costs, including stock-based compensation, contractor costs and facilities costs, as we

continue to advance the development of our product candidates. We also expect to incur additional expenses related to milestone and royalty payments payable to third parties with whom we have entered into license agreements to acquire the rights to our product candidates.

The successful development and commercialization of our product candidates is highly uncertain. At this time, we cannot reasonably estimate or know the nature, timing and costs of the efforts that will be necessary to complete the preclinical and clinical development of any of our product candidates or when, if ever, material net cash inflows may commence from any of our product candidates. This uncertainty is due to the numerous risks and uncertainties associated with product development and commercialization, including the uncertainty of:

- the scope, progress, outcome and costs of our preclinical development activities, clinical trials and other research and development activities;
- establishing an appropriate safety profile with IND-enabling studies;
- successful patient enrollment in, and the initiation and completion of, clinical trials;
- the timing, receipt and terms of any marketing approvals from applicable regulatory authorities;
- establishing commercial manufacturing capabilities or making arrangements with third-party manufacturers;
- development and timely delivery of commercial-grade drug formulations that can be used in our clinical trials and for commercial launch;
- obtaining, maintaining, defending and enforcing patent claims and other intellectual property rights;
- significant and changing government regulation;
- launching commercial sales of our product candidates, if and when approved, whether alone or in collaboration with others; and
- maintaining a continued acceptable safety profile of the product candidates following approval.

We may never succeed in achieving regulatory approval for any of our product candidates. We may obtain unexpected results from our clinical trials. We may elect to discontinue, delay or modify clinical trials of some product candidates or focus on others. Any changes in the outcome of any of these variables with respect to the development of our product candidates in preclinical and clinical development could mean a significant change in the costs and timing associated with the development of these product candidates. For example, if the U.S. Food and Drug Administration, or FDA, or another regulatory authority were to delay our planned start of clinical trials or require us to conduct clinical trials or other testing beyond those that we currently expect, or if we experience significant delays in enrollment in any of our planned clinical trials, we could be required to expend significant additional financial resources and time on the completion of clinical development of that product candidate. Identifying potential product candidates and conducting preclinical testing and clinical trials is a time-consuming, expensive and uncertain process that takes years to complete, and we may never generate the necessary data or results required to obtain marketing approval and achieve product sales. In addition, our product candidates, if approved, may not achieve commercial success.

General and Administrative Expenses

General and administrative expenses consist primarily of salaries, related benefits, travel and stock-based compensation expense for personnel in executive, finance and administrative functions. General and administrative expenses also include professional fees for legal, consulting, accounting and audit services.

We anticipate that our general and administrative expenses will increase in the future as we increase our headcount to support our continued research activities and development of our product candidates. We also anticipate that we will incur increased accounting, audit, legal, regulatory, compliance, director and officer

insurance costs as well as investor and public relations expenses associated with being a public company. We anticipate the additional costs for these services will substantially increase our general and administrative expenses. Additionally, if and when we believe a regulatory approval of a product candidate appears likely, we anticipate an increase in payroll and expense as a result of our preparation for commercial operations, especially as it relates to the sales and marketing of our product candidate.

Other Income (Expense)

Interest Income

Interest income consists of income from bank deposits.

Other Expense

Other expense consists of foreign exchange gain or loss.

Change in Fair Value of Preferred Stock Warrant Liability

In connection with entering into our loan agreement, we agreed to issue a warrant to purchase shares of our preferred stock to the lender. We classify the warrant as a liability on our consolidated balance sheet and we are required to remeasure to fair value at each reporting date. We recognize changes in the fair value of the warrant liability as a component of other income (expense), net in our consolidated statements of operations and comprehensive loss. We will continue to recognize changes in the fair value of the warrant liability until the warrants are exercised, expire or qualify for equity classification.

Change in Fair Value of Derivative Liability

Our stock purchase agreement with University Health Network, or UHN, provides for a payment to UHN upon completion of an initial public offering, or IPO, which includes this offering, if UHN's fully-diluted percentage ownership of our company is reduced within a range of specified percentages. We classify the IPO dilution payment obligation as a liability on our consolidated balance sheet and we are required to remeasure to fair value at each reporting date. We recognize changes in the fair value of the derivative liability as a component of other income (expense), net in our consolidated statements of operations and comprehensive loss. We will continue to recognize changes in the fair value of the derivative liability until an IPO occurs.

Consolidated Results of Operations

Comparison of the Years Ended December 31, 2016 and 2017

The following table summarizes our consolidated results of operations for the years ended December 31, 2016 and 2017:

	Year Ended December 31,		
	2016	2017	Change
	(in thousands)		
Operating expenses:			
Research and development	$ 2,663	$ 15,191	$ 12,528
General and administrative	1,962	3,195	1,233
Total operating expenses	4,625	18,386	13,761
Loss from operations	(4,625)	(18,386)	(13,761)
Other income (expense):			
Interest income	6	57	51
Change in fair value of preferred stock warrant liability	—	(17)	(17)
Change in fair value of derivative liability	(39)	(283)	(244)
Other expense	(6)	(19)	(13)
Total other expense, net	(39)	(262)	(223)
Net loss	$(4,664)	$(18,648)	$(13,984)

Research and Development Expenses

	Year Ended December 31,		
	2016	2017	Change
	(in thousands)		
Direct research and development expenses by program:			
Fabry	$ 105	$ 6,101	$ 5,996
Gaucher	50	2,612	2,562
AML	785	180	(605)
Cystinosis	—	1,030	1,030
Pompe	—	1,010	1,010
Unallocated research and development expenses:			
Personnel related (including stock-based compensation)	1,298	3,203	1,905
Other	425	1,055	630
Total research and development expenses	$2,663	$15,191	$12,528

Research and development expenses were $2.7 million for the year ended December 31, 2016, compared to $15.2 million for the year ended December 31, 2017. The increase of $12.5 million was primarily due to increases of $6.0 million in direct costs for our Fabry program, $2.6 million in direct costs connected with our Gaucher program, $1.0 million in direct costs related to our Cystinosis program, $1.0 million in direct costs connected with our Pompe program, and $2.5 million in research and discovery and unallocated costs, all partially offset by a decrease of $0.6 million in direct costs for our AML program as we shifted our focus onto developing our other programs.

The increase in direct costs for our Fabry program was primarily due to pre-clinical, clinical and process development cost of $3.1 million for our Fabry program, as well as CMO, CRO and consulting fees of $2.5 million for the Fabry program.

The increase in direct costs for our Gaucher program was primarily due to pre-clinical and process development cost of $1.2 million for our Gaucher program, as well as CMO fees of $1.0 million for Gaucher program.

The increase in direct costs for our Cystinosis program was primarily due to upfront license cost of $1.0 million paid to GenStem for our Cystinosis program.

The increase in direct costs for our Pompe program was primarily due to upfront license cost of $0.5 million paid and $0.5 million payable to BioMarin for our Pompe program.

The increase in research and discovery and unallocated costs was primarily due to an increase of $1.9 million in personnel-related costs, including stock-based compensation, as a result of hiring additional personnel in our research and development department and an increase of $0.6 million in unallocated consulting expenses and facility costs and rent expense. Personnel-related costs for the year ended December 31, 2016 and 2017 included stock-based compensation expense of less than $0.1 million and $0.1 million, respectively.

General and Administrative Expenses

General and administrative expenses were $2.0 million for the year ended December 31, 2016, compared to $3.2 million for the year ended December 31, 2017. The increase of $1.2 million was primarily due to increases of $0.4 million in personnel-related costs, including stock-based compensation, $0.3 million in consulting expense, $0.1 million in professional fees and $0.2 million in facility expense. The increase in personnel-related costs was due to the hiring of additional personnel in our general and administrative functions, including the hiring of our CFO in late 2017. Professional fees increased due to costs associated with the preparation of our financial statements as well as ongoing business operations. The increase in facility expense was primarily due to the addition of increased office space as a result of the continued growth of the employee headcount.

Other Income (Expense), net

Other income (expense), net was not significant during either of the years ended December 31, 2016 or 2017.

Liquidity and Capital Resources

Since our inception, we have not generated any revenue and have incurred significant operating losses and negative cash flows from our operations. We have funded our operations to date primarily with proceeds from the sale of preferred stock. Through December 31, 2017, we had received gross cash proceeds of $26.5 million from sales of our preferred stock. In January 2018, we received gross cash proceeds of $60.5 million from the sale of our Series B preferred stock.

Cash in excess of immediate requirements is invested primarily with a view to liquidity and capital preservation.

Cash Flows

The following table summarizes our cash flows for each of the periods presented:

	Year Ended December 31,	
	2016	2017
	(in thousands)	
Net cash used in operating activities	$(3,314)	$(16,382)
Net cash used in investing activities	(24)	(383)
Net cash provided by financing activities	8,695	17,371
Net increase in cash and cash equivalents	$ 5,357	$ 606

Operating Activities

During the year ended December 31, 2017, operating activities used $16.4 million of cash and cash equivalents, resulting from our net loss of $18.6 million, partially offset by non-cash charges of $0.7 million and net cash provided by changes in our operating assets and liabilities of $1.6 million. Net cash provided by changes in our operating assets and liabilities for the year ended December 31, 2017 consisted primarily of a $1.5 million increase in accrued expenses and other current liabilities, a $0.5 million increase in other long-term liability and a $0.2 million increase in accounts payable, partially offset by a $0.2 million increase in other assets and a $0.3 million increase in prepaid expenses and other current assets. The increases in accrued expenses and other current liabilities were primarily due to ongoing research, development, and clinical trial work, and an increase in the incentive bonus accrual as of December 31, 2017. The increase in prepaid expenses and other current assets was primarily due to a $0.1 million increase in prepaid development costs associated with our Gaucher program and a $0.1 million increase in prepaid rent upon commencement of two new leases during 2017.

During the year ended December 31, 2016, operating activities used $3.3 million of cash and cash equivalents, resulting from our net loss of $4.7 million, primarily offset by non-cash charges of $0.6 million and net cash provided by changes in our operating assets and liabilities of $0.8 million. Net cash provided by changes in our operating assets and liabilities for the year ended December 31, 2016 consisted primarily of a $0.6 million increase in accrued expenses and other current liabilities and $0.2 million increase in accounts payable. The increase in accrued expenses and other current liabilities was due to an increase in professional fees and personnel costs associated with establishing our Cambridge, Massachusetts operations.

Investing Activities

During the year ended December 31, 2017, we used $0.4 million of cash and cash equivalents in investing activities consisting of purchases of property and equipment. During the year ended December 31, 2016, we used an insignificant amount of cash and cash equivalents in investing activities consisting of payment of a leasing deposit.

Financing Activities

During the year ended December 31, 2017, net cash provided by financing activities was $17.4 million, primarily consisting of net cash proceeds of $17.4 million from our issuance of Series A preferred stock in March 2017 and October 2017.

During the year ended December 31, 2016, net cash provided by financing activities was $8.7 million, primarily consisting of net cash proceeds of $1.4 million from our issuance of Series Seed preferred stock in January 2016 and net proceeds of $7.3 million from our issuance of Series A preferred stock in July 2016.

Term Loan Agreement

In June 2017, we entered into a Loan and Security Agreement, which we refer to as the Loan Agreement, with Silicon Valley Bank, or SVB, providing a senior secured non-revolving loan facility of up to an aggregate principal amount of $10.0 million, available for us to draw down in three tranches until October 31, 2018, subject to the satisfaction of certain milestones for each tranche. As of December 31, 2017, we had not drawn down from the facility and the $3.5 million first tranche was available.

The first tranche of $3.5 million was made available upon entry into the Loan Agreement as we satisfied the borrowing conditions at such time. The second tranche of $3.5 million will be made available after the funding of the first tranche amounts and upon confirmation by SVB that either we have met certain clinical and developmental milestones, or we have subsequently obtained at least $7.5 million in cash proceeds from the sale of our equity securities from investors reasonably acceptable to SVB. The third tranche of $3.0 million will be

made available after the funding of the first and second tranche amounts and upon confirmation by SVB that we have subsequently obtained at least an additional $6.5 million in cash proceeds from the sale of our equity securities to investors reasonably acceptable to SVB, and we have received a signed and enforceable term sheet from investors acceptable to SVB committing to provide financing on or before March 31, 2018 in an amount equal to at least 12 months of operating expenses. In January 2018, we received gross cash proceeds of $60.5 million from the sale of our Series B preferred stock.

Any outstanding principal amounts under the Loan Agreement will accrue interest at a floating per annum rate equal to the greater of 1% and the "prime rate," as published in the Wall Street Journal, minus 3%. Payments on the Loan Agreement are interest only, payable monthly in arrears, until November 1, 2018, which can be extended by six months if the third tranche is drawn. Thereafter, principal and interest amounts are repayable over a 30-month period, unless the third tranche is funded and the initial interest-only period is extended by six months, in which case principal and interest amounts are repayable over a 24-month period.

Pursuant to the Loan Agreement, we provided a first priority security interest in all existing and after-acquired assets, excluding intellectual property and certain other assets owned by us. The Loan Agreement contains a negative pledge on our intellectual property.

In connection with the Loan Agreement, we issued a warrant to SVB to purchase shares of our Series A preferred stock at an exercise price of $0.7949 per share. This warrant is initially exercisable for 28,305 shares of Series A preferred stock. Up to an additional 160,397 shares of Series A preferred stock may become subject to this warrant, with the proportion of such additional shares equal to the percentage of the full $10.0 million aggregate principal amount under the Loan Agreement that we draw down thereunder.

The Loan Agreement allows us to voluntarily prepay all but not less than all the outstanding amounts thereunder. A scaling prepayment fee of 1% or 0.5% would be assessed if we prepay the amounts within the first anniversary of funding, or between the first and second anniversary of funding, respectively. No prepayment fee would be assessed if we prepay the amounts after the second anniversary of funding. A final payment fee of 6.75% multiplied by the original principal amount of each tranche drawn is due upon the earliest to occur of the maturity date of the Loan Agreement, the termination of the Loan Agreement, the acceleration of the Loan Agreement or repayment or prepayment of such borrowings.

The Loan Agreement contains customary indemnification obligations and customary events of default, including, among other things, our failure to fulfill certain of our obligations under the Loan Agreement and the occurrence of a material adverse change in our business, operations or condition, a material impairment of the prospect of repayment of any portion of the loan, or a material impairment in the perfection or priority of the SVB's lien in the collateral or in the value of such collateral. In the event of default by us under the Loan Agreement, SVB would be entitled to exercise its remedies thereunder, including the right to accelerate the debt, upon which we may be required to repay all amounts then outstanding under the Loan Agreement or SVB may take possession of the collateral securing the Loan Agreement.

The Loan Agreement includes certain restrictions on, among other things, our ability to incur additional indebtedness, change the name or location of our business, merge with or acquire other entities, pay dividends or make other distributions to holders of our capital stock, make certain investments, engage in transactions with affiliates, create liens, open new deposit accounts, sell assets or pay subordinated debt.

Funding Requirements

We expect our expenses to increase substantially in connection with our ongoing activities, particularly as we advance the preclinical activities and clinical trials of our product candidates. In addition, upon the closing of

this offering, we expect to incur additional costs associated with operating as a public company. Our expenses will also increase as we:

- continue our development of our product candidates, including initiating and conducting our planned Phase 2 clinical trial for AVR-RD-01;
- initiate additional clinical trials and preclinical studies for our other product candidates;
- seek to identify and develop or in-license or acquire additional product candidates and technologies;
- seek to industrialize our *ex vivo* lentiviral gene therapy approach into a robust, scalable and, if approved, commercially viable process;
- seek marketing approvals for our product candidates that successfully complete clinical trials, if any;
- establish a sales, marketing and distribution infrastructure to commercialize any product candidates for which we may obtain marketing approval;
- hire and retain additional personnel, such as clinical, quality control, commercial and scientific personnel;
- expand our infrastructure and facilities to accommodate our growing employee base, including adding equipment and physical infrastructure to support our research and development; and
- transition our organization to being a public company.

We believe that the anticipated net proceeds from this offering, together with our existing cash and cash equivalents, will enable us to fund our operating expenses and capital expenditure requirements into . We have based these estimates on assumptions that may prove to be wrong, and we could utilize our available capital resources sooner than we expect. If we receive regulatory approval for AVR-RD-01 or our other product candidates, we expect to incur significant commercialization expenses related to product manufacturing, sales, marketing and distribution, depending on where we choose to commercialize.

Until such time, if ever, that we can generate product revenue sufficient to achieve profitability, we expect to finance our cash needs through a combination of equity offerings, debt financings, collaboration agreements, government and other third-party funding, strategic alliances, licensing arrangements or marketing and distribution arrangements. Debt financing and preferred equity financing, if available, may involve agreements that include covenants limiting or restricting our ability to take specific actions, such as incurring additional debt, making capital expenditures or declaring dividends. If we raise additional funds through government and other third-party funding, collaboration agreements, strategic alliances, licensing arrangements or marketing and distribution arrangements, we may have to relinquish valuable rights to our technologies, future revenue streams, research programs or product candidates or grant licenses on terms that may not be favorable to us. If we are unable to raise additional funds through equity or debt financings when needed, we may be required to delay, limit, reduce or terminate our product development or future commercialization efforts or grant rights to develop and market products or product candidates that we would otherwise prefer to develop and market ourselves.

Contractual Obligations and Commitments

The following table summarizes our contractual obligations as of December 31, 2017 and the effects that such obligations are expected to have on our liquidity and cash flows in future periods:

	Payments Due by Period				
	Total	Less than 1 Year	1 to 3 Years	4 to 5 Years	More than 5 Years
	(in thousands)				
Operating lease commitments	$1,641	$ 395	$682	$341	$ 223
Total	$1,641	$ 395	$682	$341	$ 223

We enter into contracts in the normal course of business with CROs, CMOs and other third parties for clinical trials, preclinical research studies and testing and manufacturing services. Payments due upon cancellation consist only of payments for services provided or expenses incurred, including noncancelable obligations of our service providers, up to the date of cancellation. These payments are not included in the preceding table as the amount and timing of such payments are not known.

Additionally, the table above excludes the payment that may be due to UHN upon the closing of the sale of shares of common stock in an IPO, which includes this offering. If UHN's fully-diluted percentage ownership of our company is reduced within a range of specified percentages in an IPO, then we are obligated to pay UHN an amount up to $2.0 million. We have not included the UHN dilution payment in the preceding table as the amount, timing and likelihood of such payments are not known.

In addition, pursuant to our license agreements with UHN, BioMarin, GenStem and the Lund University rights holders, we are required to make certain milestone and royalty payments to our licensors. See "Business—License Agreements" for additional details regarding our payment obligations to these licensors.

Critical Accounting Policies and Significant Judgments and Estimates

Our consolidated financial statements are prepared in accordance with generally accepted accounting principles in the United States. The preparation of our consolidated financial statements and related disclosures requires us to make estimates and judgments that affect the reported amounts of assets, liabilities, revenue, costs and expenses, and the disclosure of contingent assets and liabilities in our financial statements. We base our estimates on historical experience, known trends and events and various other factors that we believe are reasonable under the circumstances, the results of which form the basis for making judgments about the carrying values of assets and liabilities that are not readily apparent from other sources. We evaluate our estimates and assumptions on an ongoing basis. Our actual results may differ from these estimates under different assumptions or conditions.

While our significant accounting policies are described in more detail in Note 2 to our consolidated financial statements appearing elsewhere in this prospectus, we believe that the following accounting policies are those most critical to the judgments and estimates used in the preparation of our consolidated financial statements.

Accrued Research and Development Expenses

As part of the process of preparing our consolidated financial statements, we are required to estimate our accrued research and development expenses. This process involves reviewing open contracts and purchase orders, communicating with our personnel to identify services that have been performed on our behalf and estimating the level of service performed and the associated cost incurred for the service when we have not yet been invoiced or otherwise notified of actual costs. The majority of our service providers invoice us in arrears for services performed, on a pre-determined schedule or when contractual milestones are met; however, some require advanced payments. We make estimates of our accrued expenses as of each balance sheet date in the consolidated financial statements based on facts and circumstances known to us at that time. We periodically confirm the accuracy of these estimates with the service providers and make adjustments if necessary. Examples of estimated accrued research and development expenses include fees paid to:

- vendors, including central laboratories, in connection with preclinical development activities;
- CROs and investigative sites in connection with preclinical and clinical studies; and
- CMOs in connection with drug substance and drug product formulation of preclinical and clinical trial materials.

We base our expenses related to preclinical studies and clinical trials on our estimates of the services received and efforts expended pursuant to quotes and contracts with multiple research institutions and CROs that

conduct and manage preclinical studies and clinical trials on our behalf. The financial terms of these agreements are subject to negotiation, vary from contract to contract and may result in uneven payment flows. There may be instances in which payments made to our vendors will exceed the level of services provided and result in a prepayment of the expense. Payments under some of these contracts depend on factors such as the successful enrollment of patients and the completion of clinical trial milestones. In accruing service fees, we estimate the time period over which services will be performed and the level of effort to be expended in each period. If the actual timing of the performance of services or the level of effort varies from the estimate, we adjust the accrual or the amount of prepaid expenses accordingly. Although we do not expect our estimates to be materially different from amounts actually incurred, our understanding of the status and timing of services performed relative to the actual status and timing of services performed may vary and may result in reporting amounts that are too high or too low in any particular period. To date, there have not been any material adjustments to our prior estimates of accrued research and development expenses.

Stock-Based Compensation

We measure stock options and other stock-based awards granted to employees and members of our board of directors for their services as directors based on the fair value on the date of the grant and recognize the corresponding compensation expense of those awards over the requisite service period, which is generally the vesting period of the respective award. We have only issued stock options with service-based vesting conditions and record the expense for these awards using the straight-line method.

For stock-based awards granted to consultants and non-employees, we recognize compensation expense over the period during which services are rendered by such consultants and non-employees until completed. At the end of each financial reporting period prior to completion of the service, the fair value of these awards is remeasured using the then-current fair value of our common stock and updated assumption inputs in the Black-Scholes option-pricing model.

We estimate the fair value of each stock option grant using the Black-Scholes option-pricing model, which uses as inputs the estimated fair value of our common stock and assumptions we make for the volatility of our common stock, the expected term of our stock options, the risk-free interest rate for a period that approximates the expected term of our stock options and our expected dividend yield.

We determined the assumptions for the Black-Scholes option-pricing model as discussed below. Each of these inputs is subjective and generally requires significant judgment to determine.

- *Fair Value of Our Common Stock.* Prior to this offering, our stock was not publicly traded, and therefore we estimated the fair value of our common stock, as discussed in “Determination of the Fair Value of Common Stock” below.
- *Expected Term.* The expected term represents the period that the stock-based awards are expected to be outstanding. The expected term of stock options granted has been determined using the simplified method, which uses the midpoint between the vesting date and the contractual term.
- *Risk-Free Interest Rate.* The risk-free interest rate is based on the U.S. Treasury yield curve in effect at the date of grant for zero-coupon U.S. Treasury constant maturity notes with terms approximately equal to the stock-based award’s expected term.
- *Expected Volatility.* Because we do not have a trading history of our common stock, the expected volatility was derived from the average historical stock volatilities of several public companies within our industry that we consider to be comparable to our business over a period equivalent to the expected term of the stock-based awards.
- *Dividend Rate.* The expected dividend is zero as we have not paid and do not anticipate paying any dividends in the foreseeable future.

If any of the assumptions used in the Black-Scholes model change significantly, stock-based compensation for future awards may differ materially compared with the awards granted previously.

The weighted-average fair values of options granted during the years ended December 31, 2016 and 2017 were $0.12 and $0.36, respectively. The weighted-average assumptions utilized to determine the fair value of options granted are presented in the following table:

	Year Ended December 31,	
	2016	2017
Expected option life (years)	6.00	6.08
Risk-free interest rate	1.39%	1.93%
Expected volatility	86.00%	84.54%
Expected dividend yield	—%	—%

Stock-based Awards Granted

The following table sets forth by grant date the number of shares subject to options granted since January 1, 2017, the per share exercise price of the options, the fair value of common stock per share on each grant date, and the per share estimated fair value of the options:

Grant Date	Number of Shares Subject to Options Granted	Per Share Exercise Price of Options	Fair Value per Common Share on Grant Date
June 13, 2017	796,822	$ 0.22	$ 0.22
June 26, 2017	16,666	$ 0.22	$ 0.22
July 10, 2017	35,224	$ 0.22	$ 0.22
July 17, 2017	50,320	$ 0.22	$ 0.22
August 28, 2017(1)	654,170	$ 0.22	$ 0.53
October 4, 2017(2)	35,000	$ 0.22	$ 0.99
October 17, 2017(2)	10,000	$ 0.22	$ 0.99
October 24, 2017(2)	201,396	$ 0.22	$ 0.99
March 16, 2018	3,114,710	$ 1.21	$ 1.21

(1) At the time of the option grants in August 2017, our board of directors determined that the fair value of our common stock of $0.22 per share calculated in the contemporaneous valuation as of March 31, 2017 reasonably reflected the per share fair value of one share of our common stock as of the grant date. However, as described below, the fair value of our common stock at this date was adjusted to $0.53 per share in connection with a retrospective fair value assessment for financial reporting purposes.

(2) At the time of the option grants in October 2017, our board of directors determined that the fair value of our common stock of $0.22 per share calculated in the contemporaneous valuation as of March 31, 2017 reasonably reflected the per share fair value of one share of our common stock as of the grant date. However, as described below, the fair value of our common stock at the date of these grants was adjusted to $0.99 per share in connection with a retrospective fair value assessment for financial reporting purposes.

Determination of the Fair Value of Common Stock

As there has been no public market for our common stock to date, the estimated fair value of our common stock has been determined by our board of directors as of the date of each option grant, with input from management, considering third-party valuations of our common stock as well as our board of directors' assessment of additional objective and subjective factors that it believed were relevant and which may have changed from the date of the most recent third-party valuation through the date of the grant. These third-party valuations were performed in accordance with the guidance outlined in the American Institute of Certified Public

Accountants' Accounting and Valuation Guide, Valuation of Privately-Held-Company Equity Securities Issued as Compensation. Once a public trading market for our common stock has been established following the closing of this offering, it will no longer be necessary for our board of directors to estimate the fair market value of our common stock in connection with our accounting for granted equity awards.

For financial reporting purposes, we performed ordinary share valuations, with the assistance of a third-party specialist, at various dates, which resulted in valuations of our common stock of $0.10 per share as of January 31, 2016, $0.29 per share as of August 31, 2016, $0.22 per share as of March 31, 2017, $0.53 per share as of August 31, 2017, and $0.99 per share as of October 31, 2017. In conducting the valuations, our board of directors, with input from management, considered various objective and subjective factors to determine the fair value of our common stock as of each grant date, including:

- the prices at which we sold preferred stock and the superior rights and preferences of the preferred stock relative to our common stock at the time of each grant;
- the progress of our research and development programs, including the status of preclinical studies and planned clinical trials for our product candidates;
- our stage of development and commercialization and our business strategy;
- external market conditions affecting the biotechnology industry, and trends within the biotechnology industry;
- our financial position, including cash on hand, and our historical and forecasted performance and operating results;
- the lack of an active public market for our common stock and our preferred stock;
- the likelihood of achieving a liquidity event, such as an initial public offering, or IPO, or a sale of our company in light of prevailing market conditions; and
- the analysis of IPOs and the market performance of similar companies in the biopharmaceutical industry.

The assumptions underlying these valuations represent management's best estimates, which involve inherent uncertainties and the application of management judgment. As a result, if factors or expected outcomes change and we use significantly different assumptions or estimates, our stock-based compensation expense could be materially different.

The dates of our valuations have not always coincided with the dates of our stock option grants. In determining the fair value of the shares underlying options set forth in the table above, we considered, among other things, the most recent contemporaneous valuations of our ordinary shares and our assessment of additional objective and subjective factors we believed were relevant as of the grant date. The additional factors considered when determining any changes in fair value between the most recent contemporaneous valuation and the grant dates included our stage of development and commercialization and our business strategy, our operating and financial performance and current business conditions.

Following the closing of this offering, the fair value of our common stock will be determined based on the quoted market price of our common stock.

Our common stock valuations were prepared using the option-pricing method, or OPM, which treats common stock and preferred stock as call options on the total equity value of a company, with exercise prices based on the value thresholds at which the allocation among the various holders of a company's securities changes. Under this method, the common stock has value only if the funds available for distribution to stockholders exceeded the value of the preferred stock liquidation preferences at the time of the liquidity event, such as a strategic sale or a merger. The future value of the common stock is discounted back to the valuation date at an appropriate risk-adjusted discount rate and probability weighted to arrive at an indication of value for the common stock.

Beginning with the August 23, 2017 valuation, we changed the methodology for allocating our equity value to our common stock to a hybrid method, which is a combination of a probability weighted expected return method, or PWERM and an OPM. We made this change as greater certainty developed regarding a possible liquidity event. The PWERM methodology relies on a forward-looking analysis to predict the possible future value of a company. Under this method, discrete future outcomes, such as an IPO, non-IPO scenarios, and a merger or sale are weighted based on our estimate of the probability of each scenario. In our application of the hybrid method, we considered an IPO scenario under the PWERM framework, and a non-IPO scenario modeled using an OPM to reflect the full distribution of possible non-IPO outcomes. The hybrid method is useful when certain discrete future outcomes can be predicted, but also accounts for uncertainty regarding the timing or likelihood of specific alternative exit events.

Valuation of Derivative Liability

The fair value of the derivative liability recognized in connection with our stock purchase agreement with UHN was determined based on significant inputs not observable in the market, which represents a Level 3 measurement within the fair value hierarchy. The fair value of the derivative liability was determined using the PWERM, which considered as inputs the type and probability of occurrence of an IPO dilution event, the amount of the payment, the expected timing of an IPO dilution event and a risk-adjusted discount rate.

Valuation of Warrant Liability

In connection with entering into a loan agreement, we agreed to issue a warrant to purchase shares of our Series A preferred stock to the lender. We classify the warrant as a liability on our consolidated balance sheet because the warrant represents a free-standing financial instrument that may require us to transfer assets upon exercise. The warrant liability was initially recorded at fair value upon the date of the warrant issuance and is subsequently remeasured to fair value at each reporting date. Changes in the fair value of the warrant liability are recognized as a component of other income (expense), net in the consolidated statements of operations and will continue to be recognized until the warrant is exercised, expires or qualifies for equity classification.

We utilize the Black-Scholes option-pricing model, which incorporates assumptions and estimates, to value the warrant. We assess these assumptions and estimates on a quarterly basis as additional information impacting the assumptions is obtained. Estimates and assumptions impacting the fair value measurement include the fair value per share of the underlying equity instruments issuable upon exercise of the warrant, the remaining contractual term of the warrant, risk-free interest rate, expected dividend yield and expected volatility of the underlying preferred stock. We have historically been a private company and lack company-specific historical and implied volatility information of our stock. Therefore, we estimate expected stock volatility based on the historical volatility of publicly traded peer companies for a term equal to the remaining contractual term of the warrant. The risk-free interest rate is determined by reference to the U.S. Treasury yield curve for time periods approximately equal to the remaining contractual term of the warrant. We have estimated a 0% dividend yield based on the fact that we have never paid or declared dividends.

Upon the closing of this offering, the preferred stock warrant will become exercisable for common stock instead of preferred stock, and the remeasured fair value of the warrant liability will be reclassified to additional paid-in capital.

Quantitative and Qualitative Disclosures about Market Risks

Interest Rate Risk

As of December 31, 2017, we had cash and cash equivalents of $6.0 million, which consisted of cash and money market funds. Interest income is sensitive to changes in the general level of interest rates; however, due to the nature of these investments, an immediate 10% change in interest rates would not have a material impact on our cash and cash equivalents, financial position or results of operations.

Foreign Currency Exchange Risk

We are exposed to foreign exchange rate risk. Our headquarters are located in the United States, where the majority of our general and administrative expenses and research and development costs are incurred in U.S. dollars. A portion of our research and development costs are incurred by our subsidiaries in Australia and Canada, whose functional currencies are the U.S. dollar but engage in transactions in Australian dollars and Canadian dollars, respectively. During each of the years ended December 31, 2016 and 2017, we recognized foreign currency transaction losses of $6,000 and $19,000, respectively. These losses primarily related to unrealized and realized foreign currency gains and losses as a result of transactions entered into by our Australian and Canadian subsidiaries in currencies other than the U.S. dollar. These foreign currency transaction gains and losses were recorded in other expense, net in our consolidated statements of operations. We believe that a 10% change in the exchange rate between the U.S. dollar, Australian dollar and Canadian dollar would not have a material impact on our financial position or results of operations.

As we continue to grow our business, our results of operations and cash flows will be subject to fluctuations due to changes in foreign currency exchange rates, which could adversely impact our results of operations. To date, we have not entered into any foreign currency hedging contracts to mitigate our exposure to foreign currency exchange risk.

Emerging Growth Company Status

We are an "emerging growth company," as defined in the Jumpstart Our Business Startups Act of 2012, or the JOBS Act, and we may take advantage of certain exemptions from various reporting requirements that are applicable to other public companies that are not emerging growth companies. We may take advantage of these exemptions until we are no longer an emerging growth company. Section 107 of the JOBS Act provides that an emerging growth company can take advantage of the extended transition period afforded by the JOBS Act for the implementation of new or revised accounting standards. We have elected to use the extended transition period for complying with new or revised accounting standards and, as a result of this election, our financial statements may not be comparable to companies that comply with public company effective dates. We may take advantage of these exemptions up until the last day of the fiscal year following the fifth anniversary of this offering or such earlier time that we are no longer an emerging growth company. We would cease to be an emerging growth company if we have more than $1.07 billion in annual revenue, we have more than $700.0 million in market value of our stock held by non-affiliates (and we have been a public company for at least 12 months and have filed one annual report on Form 10-K) or we issue more than $1.0 billion of non-convertible debt securities over a three-year period.

Off-Balance Sheet Arrangements

We did not have during the periods presented, and we do not currently have, any off-balance sheet arrangements, as defined in the rules and regulations of the Securities and Exchange Commission.

Recently Issued Accounting Pronouncements

A description of recently issued accounting pronouncements that may potentially impact our financial position and results of operations is disclosed in Note 2 to our consolidated financial statements appearing elsewhere in this prospectus.

BUSINESS

Overview

We are a clinical stage gene therapy company focused on developing potentially curative *ex vivo* lentiviral-based gene therapies to treat rare diseases following a single dose. Our gene therapies employ hematopoietic stem cells that are extracted from the patient and then modified with lentiviral vectors to insert a functional copy of the gene that is defective in the target disease. We believe that our approach has the potential to provide curative benefit in an outpatient setting for a range of diseases. Our initial focus is on a group of rare genetic diseases referred to as lysosomal storage diseases, which today are primarily managed with enzyme replacement therapies, or ERTs. These lysosomal storage diseases have well understood biologies, identified patient populations and represent large market opportunities with approximately $4.0 billion in worldwide net sales in 2017.

Our initial pipeline is comprised of four lentiviral-based gene therapies, including AVR-RD-01 for the treatment of Fabry disease, AVR-RD-02 for the treatment of Gaucher disease, AVR-RD-03 for the treatment of Pompe disease and AVR-RD-04 for the treatment of cystinosis. AVR-RD-01 is currently being evaluated in a Phase 1 clinical trial and has been well tolerated and demonstrated promising enzyme activity to date. We expect to initiate our Phase 2 clinical trial of AVR-RD-01 in mid-2018. In addition, Phase 1/2 clinical trials for both AVR-RD-02 and AVR-RD-04 are being planned and we expect patients will be dosed in 2019.

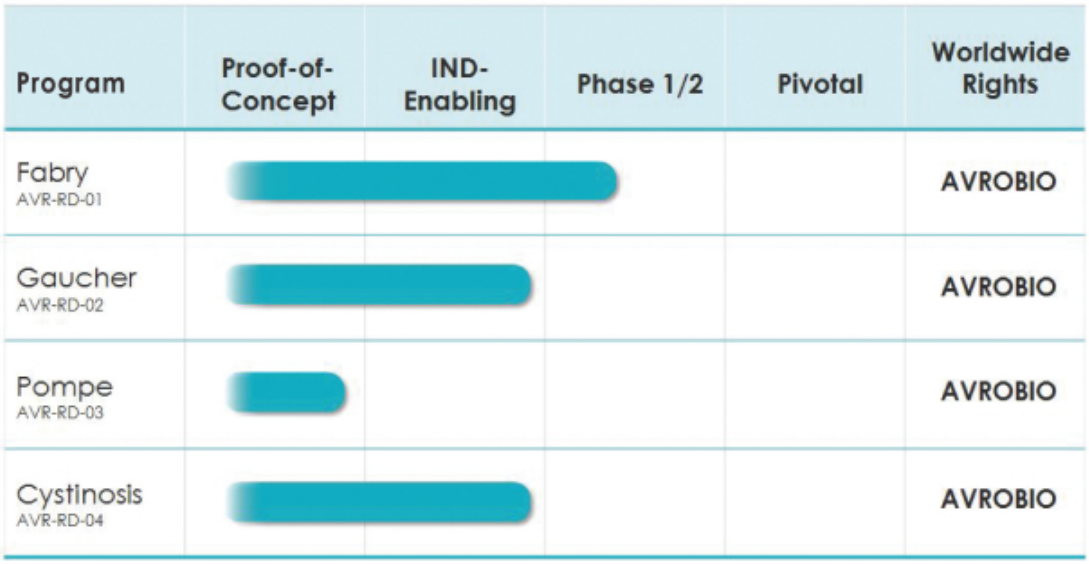
Lentiviral-based gene therapy has shown significant promise, demonstrating durable effects and safety in ongoing clinical trials for diseases such as beta thalassemia, ALD and ADA-SCID. Historically, the use of *ex vivo* lentiviral-based therapies has been restricted primarily to the most acutely severe diseases where risks of the typical requirement for heavily ablating the patients' bone marrow and thus significantly impairing these patients' immune systems had an acceptable risk/benefit profile. The ablation procedure, also known as the conditioning regimen, is administered prior to the gene therapy. The more intensive the conditioning regimen, the greater the risk of toxicity and thus the need for more intensive in-patient monitoring and potential for lengthy hospitalization.

Our goal is to broaden the applicability of lentiviral-based gene therapy by initially targeting diseases where we generally believe durable effects can be achieved following a milder conditioning regimen that allows for outpatient treatment. We believe our approach of choosing diseases where the conditioning regimen can be milder, thus improving patient tolerability, will extend the reach of our gene therapies to a broad range of diseases as first-line therapies.

We are initially targeting rare diseases in which current standard of care provides the mechanistic proof that the enzymes or proteins produced endogenously following treatment with our gene therapies can offer benefit to patients. Typically in lysosomal storage diseases, a gene mutation results in the deficiency or malfunctioning of an enzyme or other protein. This results in the inability of lysosomes to properly process cellular byproducts. As a result, these byproducts accumulate to toxic levels in the body's cells and, in turn, disrupt the function of multiple tissues and organs. Fabry disease, Gaucher disease and Pompe disease are primarily managed by bi-weekly, multi-hour infusions with ERTs that seek to exogenously replace the missing enzyme. However, given the characteristics of most ERTs, they typically only remain in the plasma for a short period of time and thus, are not ideal because they are only dosed every two weeks. These existing therapies manage, rather than cure, the underlying diseases and, as a result, patients continue to have disease progression. Further, the frequent, periodic and life-long dosing schedule required for ERTs results in significant costs for the healthcare system and is burdensome for the patient.

We believe our gene therapies leverage the well understood mechanism of ERTs by transforming a patient's own cells into a drug product that enables the patient to express functional enzyme or other protein and mirror the biology seen in an otherwise healthy individual. We believe that a single dose of our gene therapies may provide meaningful life-long benefit to these patients and potentially cure these diseases while also providing significant health economic advantages.

Our programs leverage years of extensive preclinical and early clinical research by leading researchers, as well as our internal research efforts. The status of our initial lentiviral-based gene therapy programs is reflected below.



Our lead product candidate, AVR-RD-01 for the treatment of Fabry disease, is derived from hematopoietic stem cells to which the gene encoding the enzyme a-galactosidase A, or AGA, is added in an *ex vivo* process using a lentiviral vector. In an ongoing Phase 1 clinical trial of patients with Fabry disease, AVR-RD-01 has been well-tolerated and has led to the production of active AGA enzyme in the two patients treated to date. The first patient dosed in this trial continues to express plasma activity levels of AGA enzyme above the range for males with classic Fabry disease twelve months after receiving AVR-RD-01. Plasma AGA enzyme activity levels in the second patient also began increasing after receiving AVR-RD-01 and remained above the range for males with classic Fabry disease one month after treatment. We anticipate initiating our Phase 2 clinical trial of AVR-RD-01 in mid-2018.

Preclinical data for both our Gaucher and cystinosis programs have been promising and we expect to begin dosing patients in Phase 1/2 clinical trials for both AVR-RD-02 (Gaucher) and AVR-RD-04 (cystinosis) in 2019. AVR-RD-03 for Pompe disease is currently in early preclinical development. We continue to seek opportunities to expand our approach to other rare and non-rare diseases. We plan to identify and develop future product candidates through our own internal research efforts as well as through collaborations with leading researchers worldwide.

We have developed a detailed plan for the more cost efficient and scalable manufacturing of our product candidates. We are establishing global manufacturing capabilities to support all aspects of the development and, if approved, the eventual commercialization of our gene therapies, from lentiviral vector production to cell processing. We are currently executing on our plans to move to a closed, automated manufacturing system. We also utilize a cryopreservation process that we believe will allow for the global distribution and, if approved, commercialization of our gene therapies.

Our Expertise

We are led by biopharmaceutical experts with extensive experience in gene and cellular therapy and rare diseases. Our team has broad expertise in the clinical, regulatory and commercialization aspects of rare diseases

as well as process development and manufacturing for cellular therapies. Members of our management team have held senior positions at Shire, Genzyme, Novartis, Lonza and other companies pursuing development, manufacturing and commercialization of gene and cellular therapies and therapies to treat rare diseases.

Our Strategy

Our goal is to develop and commercialize potentially curative lentiviral-based gene therapies for patients and expand the use of this approach to treat a number of diseases. Key elements of our strategy to achieve our goal include:

- *Rapidly Advance Our Initial Gene Therapies.* We are developing a deep pipeline of four gene therapies to treat Fabry disease, Gaucher disease, Pompe disease and cystinosis. We intend to rapidly advance these gene therapies into clinical trials and obtain initial efficacy data in patients from these development programs. AVR-RD-01 has been well tolerated and demonstrated promising enzyme activity to date in an ongoing Phase 1 clinical trial. We intend to initiate our Phase 2 clinical trial for AVR-RD-01 in mid-2018 in Australia and Canada, with enrollment in the United States and Japan beginning in 2019. Phase 1/2 clinical trials of both AVR-RD-02 and AVR-RD-04 are being planned and we expect patients will be dosed in 2019. In addition, we intend to pursue pathways for accelerated review and approval of our product candidates by the FDA and international regulatory authorities through programs such as the Regenerative Medicine Advanced Therapies, or RMAT, program in the United States.
- *Develop First-Line Gene Therapies for Lysosomal Storage Diseases.* We are initially targeting lysosomal storage diseases and intend to conduct clinical trials in both treatment-experienced and treatment-naïve patient groups in order to maximize the potential of our lentiviral-based gene therapies for patients. We are pioneering the use of a milder conditioning regimen, designed to be performed in an outpatient setting, as we believe this will enable us to pursue early intervention for the treatment of lysosomal storage diseases and expand into a wide range of diseases where lentiviral-based gene therapy has not been previously utilized. We will continue to leverage advancements in stem cell transplantation in order to improve patient tolerability of our lentiviral-based gene therapies.
- *Globally Develop, Manufacture and Commercialize Our Gene Therapies.* Lysosomal storage diseases afflict patients globally and we intend to build global infrastructure in order to provide treatment to patients around the world. We intend to conduct clinical trials across multiple geographies. We have established a global network of suppliers and contract manufacturing organizations, or CMOs.
- *Industrialize Lentiviral-Based Gene Therapy.* We are developing a manufacturing process that is both reproducible and scalable. We believe our innovations in viral vector design, cellular manufacturing and other related processes are important steps towards advancing the field of lentiviral-based gene therapy and realizing its full potential to treat a number of diseases. We intend to leverage our core competencies to implement a closed, automated manufacturing system that will enable us to deliver our gene therapies to patients at an industrialized scale.
- *Leverage Our Approach Beyond Our Initial Indications.* We are initially developing gene therapies for the treatment of four different lysosomal storage diseases and believe that we will gain significant learnings and technical insights from these programs. We intend to leverage our technology and insights to treat a number of rare and non-rare diseases where we believe our lentiviral approach has transformative potential.

Our Approach

We develop therapies utilizing our *ex vivo* lentiviral-based gene therapy approach to transform a patient's own cells into a drug product. Our gene therapies employ lentiviral vectors that are designed to result in stable integration of the desired genes in the chromosomes of the stem cells such that they are permanently maintained

in the cell and can be reproduced as the cell divides. We focus on delivering our lentiviral-based gene therapies to hematopoietic stem cells, which are primitive stem cells that develop into all types of blood cells, including white blood cells, red blood cells and platelets. To accomplish this, we extract a patient's hematopoietic stem cells and modify them *ex vivo* to add a new, functional copy of the gene that is defective in the target disease. We then infuse the modified cells back into the patient. Our gene therapies are designed to be administered to the patient as a one-time therapy in an outpatient setting following a milder outpatient conditioning regimen.

We are initially focused on employing our approach to treat and potentially cure lysosomal storage diseases. These diseases have well understood biologies, identified patient populations and represent large markets with approximately $4.0 billion in worldwide net sales in 2017. We are industrializing our *ex vivo* lentiviral-based gene therapy approach into a robust, scalable and, if approved, commercially viable process that will allow us to deliver our potentially curative therapies to patients with these and other serious monogenic disorders.

Advantages of Our Lentiviral-Based Gene Therapy Approach

We believe lentiviral-based gene therapy provides numerous advantages, including:

- *Durable Benefit.* Lentiviral vectors have the potential to provide life-long benefits with a single dose. Lentiviral vectors can integrate stably into the genes of hematopoietic stem cells and, when these cells replicate, they pass the integrated genes on to their progeny cells.
- *Systemic Therapeutic Effect.* Progeny cells circulate systemically and therefore have the ability to provide therapeutic benefit to affected tissues and organs throughout the body.
- *History of Safety.* Over the past 10 years, no instances of insertional mutagenesis or leukemogenesis from lentiviral vectors have been observed in clinical trials in which over 200 total patients have been treated.
- *Broad Patient Applicability.* Lentiviral-based gene therapies have been used to deliver treatments to patients of all ages, including children, and to patients who may be ineligible for other types of gene therapy due to the presence of preexisting antibodies that fight against viral vectors.
- *Larger and Varied Payloads.* In contrast to other viral vectors, lentiviruses have the capacity to carry larger gene sequences, which allow them to potentially address a large variety of indications.

Strategic Selection of Our Initial Indications

There are approximately 50 identified lysosomal storage diseases, which are characterized by an abnormal toxic build-up of by-products in the body's cells. We are initially targeting Fabry disease, Gaucher disease, Pompe disease and cystinsois. Each of these diseases affects a meaningful number of patients, has a suboptimal standard of care and, we believe, is appropriate for lentiviral-based gene therapy. We believe our approach addresses the shortcomings of existing therapies where patients' disease continues to progress despite chronic dosing and that our approach has the potential to cure these diseases.

Clinical proof of concept already exists for allogeneic bone marrow transplant in some lysosomal storage diseases, supporting the notion that transplantation of cells that produce normal enzyme can have clinical impact on disease. Experience with allogeneic bone marrow transplant in patients with Gaucher disease provides evidence to support our *ex vivo* gene therapy approach. Additionally, in cystinosis, transplant of human bone marrow and hematopoietic stem cells into a mouse model demonstrates proof of concept efficacy for transplant. Our *ex vivo* gene therapy approach allows patients to be their own cell donor, eliminating the need to find a matched bone marrow donor, while reducing the risk of complications related to more intensive conditioning regimens and short-term immunosuppressants utilized in allogeneic cell transplant.

Expanding the Utility of Lentiviral-Based Gene Therapy with Outpatient Conditioning

A core part of our approach is to expand the use of lentiviral-based gene therapy to treat numerous diseases. We believe that we will be able to demonstrate durable effects in our targeted diseases with a milder conditioning

regimen which has the potential for reduced short- and long-term toxicities. This, in turn, will make lentiviral-based gene therapy a therapeutic option for less acutely severe diseases or diseases with approved therapies in which large unmet medical needs remain.

Prior to the reintroduction of *ex vivo* modified stem cells, a conditioning regimen is generally required to remove cells from the bone marrow. These conditioning regimens create sufficient space in the bone marrow for the modified hematopoietic stem cells to engraft and produce their progeny cells. Ablation requires the use of cytotoxic drugs that can compromise the patient's immune system. The degree of immune system compromise increases with the degree of cell removal, so the need for ablation has historically required a risk/benefit assessment to balance the risks of immune system compromise with potential therapeutic benefit in the targeted disease.

Lentiviral-based gene therapy has shown significant promise, demonstrating durable effects and safety, in ongoing clinical trials for diseases such as beta thalassemia, ALD and ADA-SCID. Lentiviral vectors also serve as the tool for gene transfer for CAR-T therapies in cancer. Within gene therapy, the use of *ex vivo* lentiviral-based therapies has been restricted primarily to the most acutely severe diseases where risks of the typical requirement for heavily ablating the patients' bone marrow and thus significantly impairing these patients' immune systems had an acceptable risk/benefit profile. The ablation procedure, also known as the conditioning regimen, is administered prior to the gene therapy. The more intensive the conditioning regimen, the greater the risk of toxicity and thus the need for more intensive in-patient monitoring and potential for lengthy hospitalization.

In contrast to other diseases with pathophysiologies where gene therapy requires aggressive conditioning regimens, we believe we can generally achieve sufficient cell engraftment in the lysosomal storage diseases on which we are focused by utilizing a milder conditioning regimen. We believe this approach will lead to less immunosuppression and therefore potentially necessitate only an outpatient conditioning regimen. This outpatient regimen has the potential to improve patient tolerability and extend the reach of *ex vivo* lentiviral-based gene therapy into a number of diseases.

Enhancing Our Gene Therapies and Industrializing Our Manufacturing Capabilities

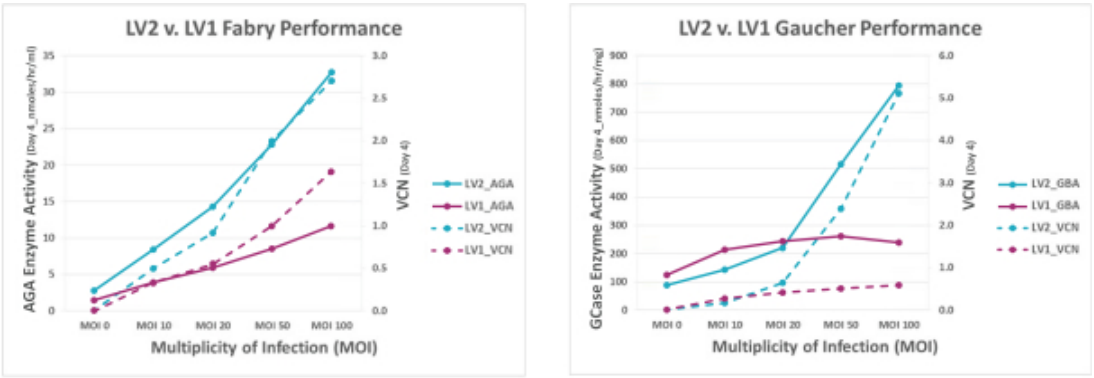
Key to our strategy is to continuously improve our technology and production processes and to leverage these improvements across our gene therapies.

Next Generation Vector Technology

We utilize our core expertise in the development and optimization of lentiviral vectors to continuously improve the vectors used in our gene therapies. We have made and expect to continue to make enhancements to our lentiviral vectors to improve efficacy, efficiency and safety. Our goal is to employ vectors that are state of the art and that can be produced in a cost-effective and scalable manner.

As one example from early, small-scale *in vitro* studies, the figures below show the improved efficacy of our optimized proprietary four-plasmid-produced lentiviral vector, or LV2, over the three-plasmid-produced lentiviral vector, or LV1, for Fabry disease and Gaucher disease, as measured by increases in both vector copy number, or VCN, and enzyme activity.

Increased Enzyme Activity and VCN *in vitro* with LV2



Development of Industrialized Manufacturing Processes

We are establishing global manufacturing relationships that will provide us with drug product manufacturing capabilities to support all aspects of the development and eventual commercialization of our gene therapies. We have key manufacturing partnerships in place for the production of plasmids and vectors used in our gene therapies.

Automated, Closed Manufacturing System

Our team has significant experience in cell processing and commercial-scale cellular therapy manufacturing. We have developed and are implementing a detailed plan for the more cost efficient and scalable manufacturing of our gene therapies. In contrast to a number of other gene therapy companies that have not developed their commercial scale plans from the outset, we are currently executing on our plans to move to a closed suspension bioreactor system for vector production as well as a closed, automated system for manufacturing our gene therapy product. We currently have a CMO partner for the production of our cellular drug product in Australia and we have established two CMO partners in the United States who are currently preparing for production. We also plan to establish a CMO partner in Europe.

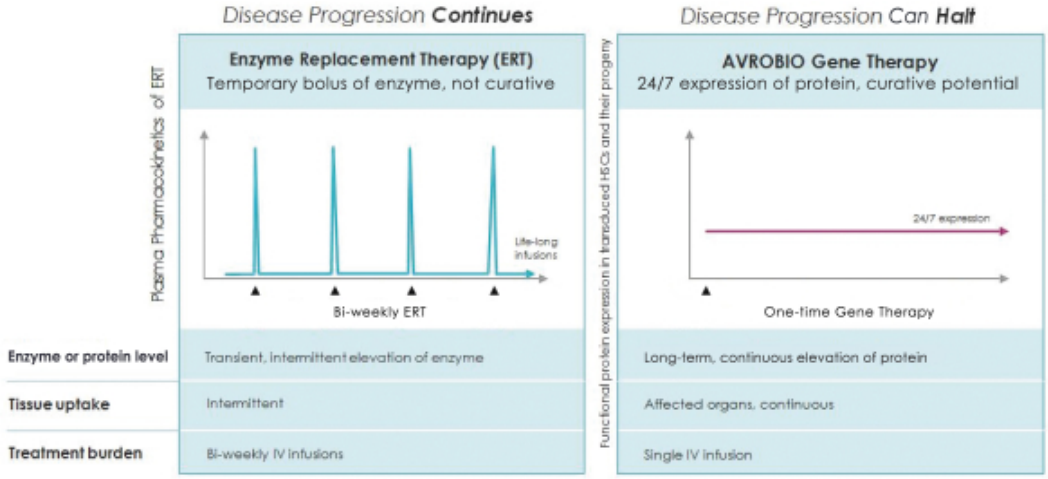
Advantages of Cryopreservation

Our drug product is cryopreserved. In production of our gene therapy for the ongoing Phase 1 clinical trial for AVR-RD-01, greater than 75% cell viability was observed after thaw. Cryopreserved drug product allows for multiple benefits for patients and across the supply chain, including extensive safety testing of the drug product prior to patient administration, convenient patient/clinic scheduling and overall flexibility of supply chain logistics.

Advantages of Our Approach over Existing Therapies

We believe our gene therapy solutions offer several potential advantages over existing therapies for lysosomal storage diseases, including:

- *Curative Impact that can Halt or Reverse Disease Progression.* Existing ERTs for Fabry, Gaucher and Pompe and oral therapies for cystinosis provide some therapeutic benefit to patients. However, because of their suboptimal pharmacokinetics, these ERTs only temporarily increase plasma enzyme levels and the therapies for cystinosis require multiple doses throughout the day. In contrast, our lentiviral-based gene therapies are designed to cause the body to constantly produce the functional enzyme or other protein. This can potentially halt pathological damage and, depending on the targeted indication and organ system, may even reverse disease progression. Our lentiviral-based gene therapies may provide potentially curative treatment to patients. This concept is illustrated in the graphs below.

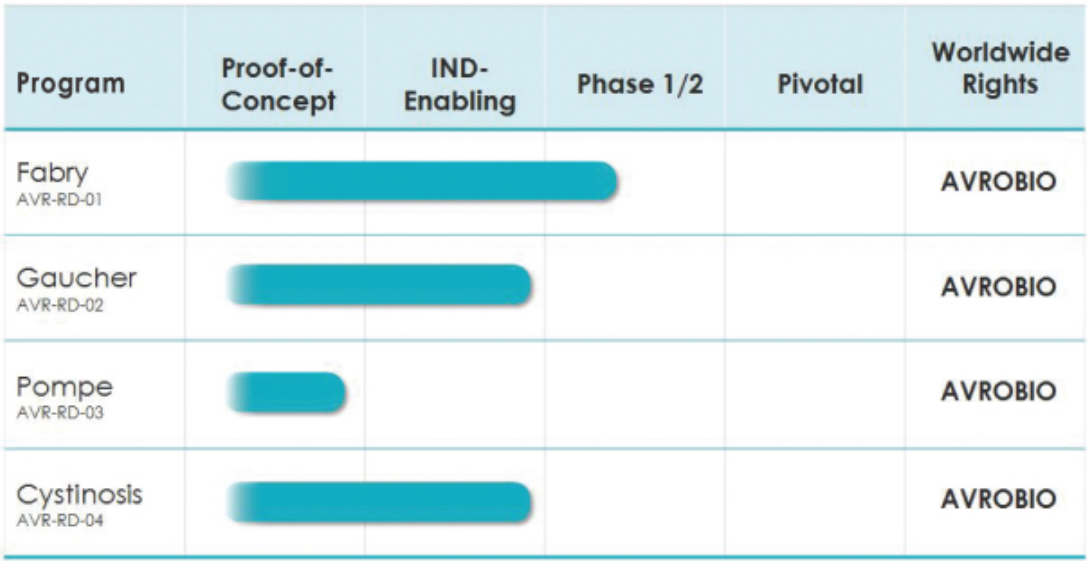


- *Durable, Single-Dose Treatment.* Our gene therapies offer the potential for a single dose to replace life-long, bi-weekly infusions or daily oral therapies that are often accompanied by numerous side effects and impact patients' quality of life. Our gene therapies are designed to transform the patient's own cells into a drug product that enables the continuous delivery of functional enzyme or other protein throughout the body after a single dose.
- *Reduced Treatment Cost Over a Patient's Lifetime.* Existing ERTs and oral therapies can cost millions of dollars over a patient's lifetime because these therapies require frequent doses of expensive treatments to manage symptoms. Our single-dose gene therapies are designed to replace the costly chronic intravenous and oral therapies that are the current standard of care for patients with lysosomal storage diseases.

Our Pipeline

Our initial gene therapies are AVR-RD-01 for the treatment of Fabry disease, AVR-RD-02 for the treatment of Gaucher disease, AVR-RD-03 for the treatment of Pompe disease and AVR-RD-04 for the treatment of cystinosis. AVR-RD-01 is currently being evaluated in a Phase 1 clinical trial and we expect to begin enrolling our Phase 2 clinical trial in mid-2018. In addition, Phase 1/2 clinical trials for both AVR-RD-02 and AVR-RD-04

are being planned and we expect patients will be dosed in 2019. The status of our initial lentiviral-based gene therapy programs is reflected below.



AVR-RD-01, Our Gene Therapy for Fabry Disease

We are developing AVR-RD-01 for the treatment of Fabry disease. We manufacture AVR-RD-01 from stem cells that are first extracted from the patient, modified to add the gene that encodes for AGA, and then infused into the patient. AVR-RD-01 is currently being investigated in an academic-sponsored Phase 1 clinical trial and has been well tolerated and demonstrated promising activity to-date. We anticipate beginning enrollment in our concurrent multinational Phase 2 clinical trial in mid-2018.

Disease Overview

Fabry disease is a rare lysosomal storage disease associated with significant morbidity and early mortality. It is caused by a gene defect that causes a deficiency of AGA, which breaks down a particular type of fat in the body's cells known as globotriaosylceramide, or Gb3. As Gb3 and other related substrates increase in patients with Fabry disease, Gb3 becomes toxic to the patient's cells. Gb3 and other glycosphingolipids accumulate and result in damage to the kidneys, heart and brain. Accumulation of Gb3 in tissues such as the heart and the vascular system can lead to life threatening vascular blockages and thus stroke and heart attacks. In addition, high levels of Gb3 substrate accumulation in the kidney can cause kidney failure. Gb3 can also accumulate in other tissues, such as the nervous system where it leads to debilitating pain. Due to end-stage renal disease and other life-threatening complications associated with Fabry disease, the average life expectancy in affected males is approximately 58 years of age.

Most patients with Fabry disease begin experiencing chronic pain in childhood but are often not diagnosed with Fabry disease until their twenties, due to a broad variation in patient symptoms. Over 1,000 gene mutations associated with Fabry disease have been identified. It is estimated that Fabry disease affects approximately one in 40,000 males and one in 120,000 males and females combined in the United States, but studies have suggested that a larger number of patients may be undiagnosed.

Fabry disease is an X-linked disorder, with the responsible gene located on the X chromosome. Because males have only one X chromosome, an abnormal copy of the gene that causes Fabry disease is sufficient to

cause the disease. However, unlike other X-linked disorders, where female carriers of an abnormal gene are usually unaffected, Fabry disease also often causes significant morbidity in females who inherit one abnormal copy and one normal copy of the gene associated with the disease.

Limitations of Current Therapies

Fabry disease is primarily treated with periodic infusions of ERT consisting of AGA enzyme over the patient's lifetime. The most commonly prescribed ERTs for Fabry disease are Fabrazyme, marketed by Sanofi Genzyme, and Replagal, marketed by Shire. In 2017, Fabrazyme and Replagal generated worldwide net sales of over $880 million and $470 million, respectively. The annual average cost to the healthcare system per patient prescribed Fabrazyme in the United States is approximately $320,000. In addition, because ERTs are not curative and only slow, but do not halt, the progression of disease, patients deteriorate and the healthcare system incurs significant costs associated with recurring medical interventions.

Although ERT provides therapeutic benefit and can reduce Gb3 substrate levels and extend a patient's life expectancy, ERT requires chronic infusions throughout the patient's life. Patients prescribed ERT generally receive an infusion every other week. However, because of their suboptimal pharmacokinetics, ERTs only temporarily increase plasma enzyme levels. As a result, patients with Fabry disease prescribed ERT continue to have disease progression, including ongoing decline in renal function, potentially including renal failure, cardiovascular disease and ongoing debilitating pain including periods of severe pain crisis. Physicians report that patients have recurrence of symptoms as the therapeutic effect of ERT wanes between bi-weekly treatments.

Alternatives to ERT for patients with Fabry disease are limited. Galafold (migalastat), an oral therapy marketed by Amicus, was approved by the European Medicines Agency, or EMA, in May 2016, and Amicus has also submitted a new drug application, or NDA, for migalastat to the FDA. Amicus reports that only 35% to 50% of the gene mutations associated with Fabry disease are amenable to migalastat.

Our Solution

We are developing AVR-RD-01 to halt disease progression and potentially cure patients with Fabry disease with a single dose of the patient's own hematopoietic stem cells modified in an *ex vivo* procedure. AVR-RD-01 is a lentiviral-based gene therapy that contains a codon-optimized human gene and is designed to maximize the likelihood of sustained AGA production by hematopoietic stem cells and their progeny.

We believe that AVR-RD-01 offers a promising treatment for Fabry disease for the following reasons:

- *One-Time Delivery.* Lentiviral-based gene therapy provides the potential to transform a patient's own cells into a drug product that enables the continuous delivery of active enzyme throughout the body after a single dose.
- *Proven Biology.* Years of observations of patients prescribed ERT indicate that even partial plasma AGA activity is associated with improved outcomes. Increased AGA enzyme is able to reduce Gb3 levels in multiple cells and tissues supporting the ability of AGA in the plasma to enter lysosomes and degrade Gb3 in a process referred to as cross correction.
- *Wide Therapeutic Window.* We believe that even partial enzyme activity, if continuous, has the potential to provide long-term therapeutic benefit. A wide range of levels of plasma AGA activity has been demonstrated to be both safe and effective in preclinical studies, reducing the need for precise regulation of enzyme expression levels and reinforcing that overexpression of AGA is not associated with increased safety risks.
- *Mutation Independent.* AVR-RD-01 is designed to increase plasma AGA levels in a patient's cells, regardless of which of the more than 1,000 specific mutations underlie the patient's disease.

Ongoing Multicenter Clinical Trial

In an ongoing Phase 1 clinical trial of AVR-RD-01 being conducted by the University Health Network, or UHN, at three centers in Canada, up to six patients with Fabry disease who have been treated with ERT for at least six months are expected to be enrolled. In this clinical trial, ERT for these patients is suspended one month prior to receiving AVR-RD-01 and ERT is then resumed one month after the AVR-RD-01 treatment and continued at bi-weekly intervals.

The primary goal for this clinical trial is to assess the safety and tolerability of AVR-RD-01. The safety of our out-patient conditioning regimen is also being assessed in this clinical trial.

A secondary objective for this clinical trial is to obtain preliminary efficacy signals of AVR-RD-01 therapy as assessed by AGA enzyme activity. Plasma AGA enzyme activity derived from administration of ERT decreases rapidly after administration with no residual plasma activity remaining approximately one day after treatment. To evaluate the ability of AVR-RD-01 to increase enzyme activity, we assess the level of AGA activity in a patient immediately prior to the administration of the patient's next dose of ERT, when limited or no plasma AGA activity would be expected.

The first two patients in this clinical trial have been dosed and the treatment was well tolerated. In both patients, the level of plasma AGA enzyme activity began to rise within days of receiving AVR-RD-01, from nearly undetectable levels before treatment to levels above the range for males with classic Fabry disease.

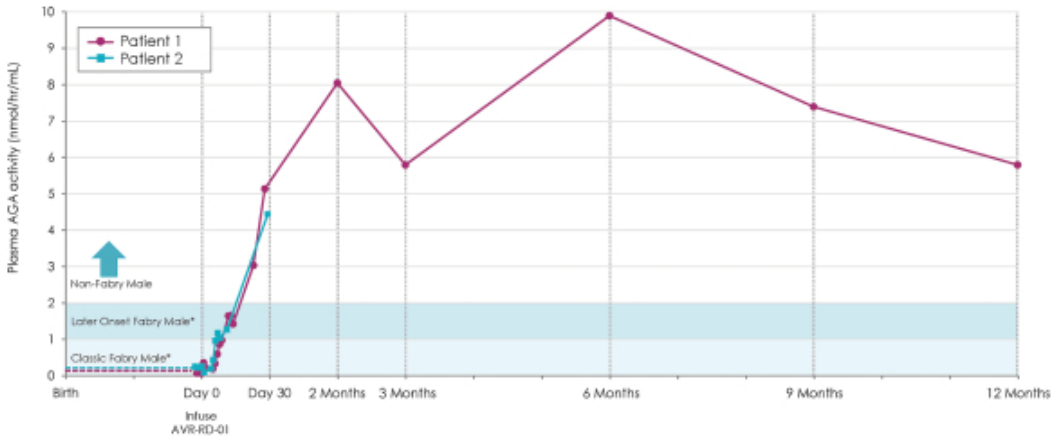
As of twelve months after receiving AVR-RD-01, the first patient's plasma AGA enzyme activity levels continued to be above the range for males with classic Fabry disease. AGA enzyme activity levels in the second patient remained above the range for males with classic Fabry disease as of one month after treatment. We believe these preliminary results support the potential of AVR-RD-01 to drive active enzyme production for long durations.

Plasma AGA Activity (nmol/hr/ml) Following Treatment with AVR-RD-01

	Day 0 (Infusion of AVR-RD-01)	1 Month	12 Months
Patient 1	0.1	5.1	5.8
Patient 2	0.2	4.4	N/A

The below graph illustrates the levels of plasma AGA activity following AVR-RD-01 treatment in the two patients over various points in time.

Expression of Functional Plasma AGA



VCN refers to the number of copies of the lentiviral-vector inserted gene that are integrated into the genome of a cell. It is typically expressed as an average VCN for a cell population.

We believe the trends in average VCN observed for both AVR-RD-01 and *in vivo* nucleated blood cells in the ongoing Phase 1 clinical trial are consistent with the trends observed in a 2017 published study on hematopoietic stem cell gene therapy for ALD in the *New England Journal of Medicine*. The table below reflects average VCN data observed for the first two patients in the ongoing Phase 1 clinical trial. Importantly, these VCNs have been sufficient to generate plasma AGA enzyme activity in these two patients that was continuously above the range for males with classic Fabry disease.

Average VCN in Patients Dosed with AVR-RD-01 in the Ongoing Phase 1 Clinical Trial

	Patient 1	Patient 2
Drug Product VCN (day 2)	1.13	1.67
Drug Product VCN (day 4)	0.68	1.43
1 month VCN	0.42	0.79
3 month VCN	0.55	n/a
6 month VCN	0.35	n/a
12 month VCN	0.16	n/a

Preliminary results from this clinical trial also indicate the presence of lentiviral-vector inserted sequences in the blood and bone marrow of the first patient, which is a signal for successful transduction of the cells. Because patients in this trial are also receiving ERT, it is not possible to assess the ability of the functional AGA produced by AVR-RD-01 to drive the reduction of substrates, including Gb3 levels, or reduce symptoms of the disease. Altogether, the results observed to date suggest that AVR-RD-01 is capable of delivering and integrating the gene coding for AGA into the human genome and subsequently enabling expression of active AGA enzyme in patients with Fabry disease.

Safety

Preliminary safety data from the first two enrolled patients indicate AVR-RD-01 was generally well-tolerated. As of February 26, 2018, there were 51 adverse events reported, 40 of which were assessed by the investigator as being possibly, probably or definitely related to protocol treatment or procedures. Only one event, the development of a left thigh mass, was a serious adverse event and this mass was not attributed by the investigator to protocol treatment or study procedures. In addition, investigators observed a suppression of white blood cell counts and thrombocytopenia in both patients which is an expected outcome based on the conditioning regimen. These decreases were transient and not associated with any negative long-term impact on the patients. Because this clinical trial is ongoing, safety data are preliminary and subject to change. Subsequent to February 26, 2018, we have not been notified by the investigators in this clinical trial of any suspected unexpected serious adverse events. In addition, an independent data monitoring committee has reviewed the one-month post-treatment data of each patient treated with AVR-RD-01 and has approved continuing to enroll patients in this clinical trial.

Upcoming Multinational Clinical Trial

We anticipate commencing enrollment in our open label, multinational Phase 2 clinical trial of AVR-RD-01 in 2018. We expect to enroll eight to 12 treatment-naïve males, 16 years and older, with classic Fabry disease. Our objectives for this trial are to assess safety and efficacy as measured by multiple indicators, such as Gb3 levels in various tissues, kidney and cardiac function, gastrointestinal symptoms, and pain and quality of life scores. All enrolled patients will receive a single treatment with AVR-RD-01 and will be followed for 48 weeks to measure safety and efficacy. Regulatory authorities in Australia and Canada have reviewed our trial application and have allowed the trial to proceed, and we expect to begin enrollment for this clinical trial in Australia. We plan to submit applications to allow commencement of clinical trials in the United States to the FDA and in Japan to the Pharmaceuticals and Medical Devices Agency, or PMDA, following meetings with each of these respective regulatory authorities.

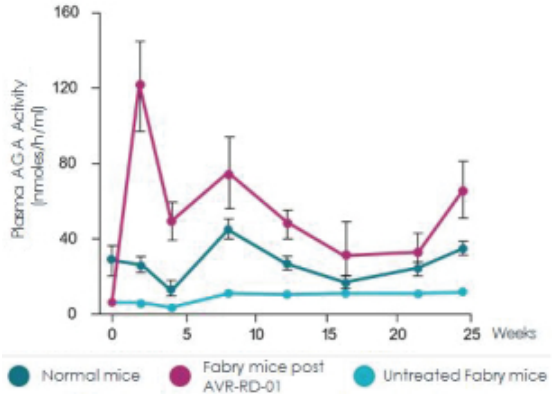
During our Phase 2 clinical trial, we plan to transition the lentiviral vector from LV1 to our optimized proprietary LV2, which we believe will further improve the efficacy and further enhance the safety of our lentiviral-based gene therapy. Because this proposed transition only impacts the *ex vivo* cell transduction process, and not the actual AGA enzyme that is produced by the transduced cells, or drug product, we believe this transition will be supported with *in vitro* comparability studies.

Preclinical Data

AVR-RD-01 has been evaluated in multiple mouse models. Key observations from these preclinical studies serve as the foundation for our lentiviral-based gene therapy approach:

- AGA cross correction occurs by which AGA in plasma was taken up into cells confirming that efficacy of AGA is not limited only to the cells that receive the gene therapy.
- Lentiviral-based gene therapy targeting stem cells in mouse models of Fabry disease led to an elevated and sustained level of AGA enzyme activity in plasma.

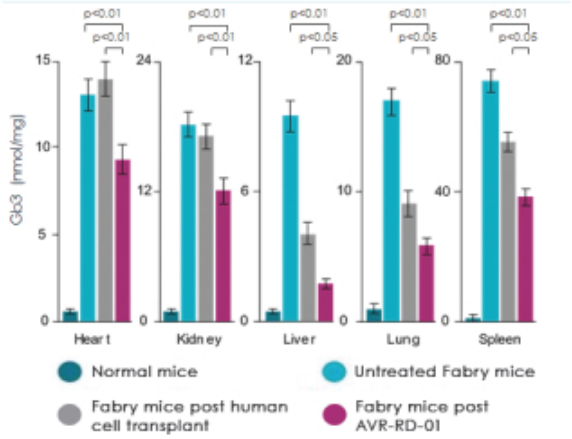
Increased Enzyme Activity in Fabry Mouse Model After Receiving AVR-RD-01



In a direct test of the ability of AVR-RD-01 to correct deficiencies in plasma AGA enzyme activity, a mouse model was created using a mouse strain in which the gene for AGA was inactivated. Human stem cells were extracted from patients with Fabry disease and the gene for AGA was added using a lentiviral vector to create AVR-RD-01. AVR-RD-01 was then introduced to the mice. Twelve weeks following administration, the levels of Gb3 in both the spleen and liver were significantly reduced compared to mice that received unmodified cells from patients with Fabry disease. Levels in other tissues such as the heart and kidney also showed promising downward trends in Gb3. This study demonstrated that:

- Our lentiviral vector could efficiently transform human stem cells into a gene therapy.
- AVR-RD-01 could engraft and replicate to produce progeny cells containing the AGA gene.
- The AGA gene was expressed and functionally active post-treatment.
- Cross correction of AGA produced by cells containing the functional AGA gene caused reductions in Gb3 in various tissues in the mouse model.

Significant Reduction in Gb3 Levels in Multiple Tissues in a NOD/SCID/Fabry Mouse Model After Receiving AVR-RD-01



In addition, in a peer reviewed publication, overexpression of functional AGA with levels as high as 3,000 times the normal range in the mouse model over an 18 month period was not linked to toxicity or adverse effects as determined by long-term animal studies, implying a wide therapeutic window.

AVR-RD-02, Our Gene Therapy for Gaucher Disease

We are developing AVR-RD-02 for the treatment of Type 1 Gaucher disease. We will manufacture AVR-RD-02 from hematopoietic stem cells that are first extracted from the patient, modified to add the gene that encodes for glucocerebrosidase, or GCase, and then infused into the patient. We plan to initiate a Phase 1/2 clinical trial for AVR-RD-02 in patients with Type 1 Gaucher disease and expect to dose the first patient in this clinical trial in 2019.

Disease Overview

Gaucher disease is a rare, autosomal recessive, lysosomal storage disease caused by a hereditary deficiency of functional GCase, an enzyme responsible for degrading glucocerebroside, a cell membrane building block, into glucose and lipids within lysosomes of cells. In patients with Gaucher disease, the recycling of glucocerebroside from the breakdown of old red and white blood cells is inhibited, leading to its accumulation in macrophages. These abnormal macrophages, known as Gaucher cells, accumulate in multiple organs, particularly the liver, spleen and bone marrow.

Gaucher disease is one of the most common lysosomal storage diseases. It occurs in approximately one in 44,000 births worldwide and is more prevalent in certain ethnic groups, such as people of Ashkenazi Jewish heritage. Approximately 90% of patients suffering from Gaucher disease in western countries have Type 1 Gaucher disease, which manifests as multiple morbidities including enlargement of the spleen and liver, low red blood cells, or anemia, low platelet count, or thrombocytopenia, and bone abnormalities including bone pain, fractures and arthritis. Bruising, risk of bleeding and fatigue are common due to the thrombocytopenia and anemia. Type 1 Gaucher disease does not have manifestations of central nervous system symptoms.

Limitations of Current Therapies

Type 1 Gaucher disease is currently treated with bi-weekly infusions of ERT consisting of recombinant GCase over a patient's lifetime. The most commonly prescribed ERTs for Gaucher disease are Cerezyme, marketed by Sanofi Genzyme, and VPRIV, marketed by Shire.

Although long-term ERT for Gaucher disease results in some therapeutic benefit, ERTs leave patients with significant unmet needs. In a published study of ERT therapy for Gaucher disease, six target goals were evaluated, including parameters for hemoglobin and platelet levels, spleen and liver volumes, and general bone pain and severe disabling bone pain known as bone crisis. Following at least four years of ERT in this study, approximately 60% of patients failed to achieve at least one of these target goals. In addition, up to 15% of patients with Gaucher disease develop antibodies that limit the efficacy of the ERT.

In addition to ERTs, the FDA has approved several oral therapies for the treatment of Gaucher disease, including Zavesca (miglustat) marketed by Actelion and Cerdelga (eliglustat) marketed by Sanofi Genzyme. We believe these oral therapies also provide suboptimal treatment. Zavesca is approved as a second line therapy and is associated with significant toxicities, including diarrhea, weight loss and tremors. Cerdelga is not approved for use in children, has highly variable metabolism due to patient-to-patient genetic variations and is highly susceptible to interactions with other drugs.

Both ERTs and oral therapies for Gaucher impose significant costs on the healthcare system. In the United States, the annual average cost to the healthcare system per patient prescribed Cerezyme or VPRIV is between approximately $325,000 and $400,000. The annual average cost to the healthcare system per patient prescribed Cerdelga is approximately $250,000. In 2017, Genzyme's Cerezyme and Cerdelga together generated worldwide net sales of over $1.0 billion and Shire's VPRIV generated worldwide net sales of approximately $350 million.

Our Solution

We are developing AVR-RD-02 to potentially cure patients with Gaucher disease with a single dose of the patient's own hematopoietic stem cells modified in an *ex vivo* procedure. AVR-RD-02 is a lentiviral-based gene therapy that contains a codon-optimized human gene and is designed to maximize the likelihood of sustained GCase production in hematopoietic stem cells and their progeny.

Upcoming Clinical Trial

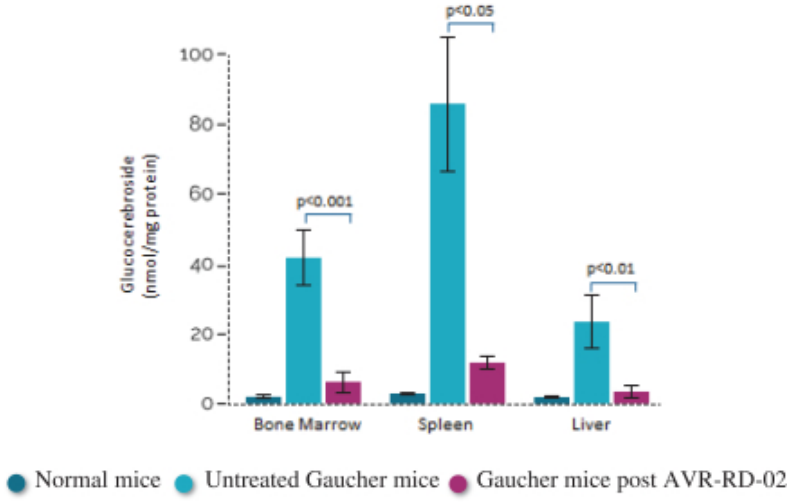
We plan to initiate a Phase 1/2 clinical trial of AVR-RD-02 in patients with Type 1 Gaucher disease and to begin dosing patients in this clinical trial in 2019. Our initial clinical trial will be an adaptive trial that will include both treatment-naïve patients and patients that are currently stable on ERT. We intend to enroll 12 to 16 patients, 16 years old and above, with Type 1 Gaucher disease. Patients currently prescribed ERT will cease treatment throughout the clinical trial. All enrolled patients will receive a single treatment with AVR-RD-02 and will be followed for 52 weeks to measure safety and efficacy. Our efficacy endpoints for this clinical trial will include measures of clinical efficacy, such as liver and spleen volumes, hemoglobin, platelet counts, bone pain and bone density measures along with other blood markers used in Gaucher disease.

Preclinical Data

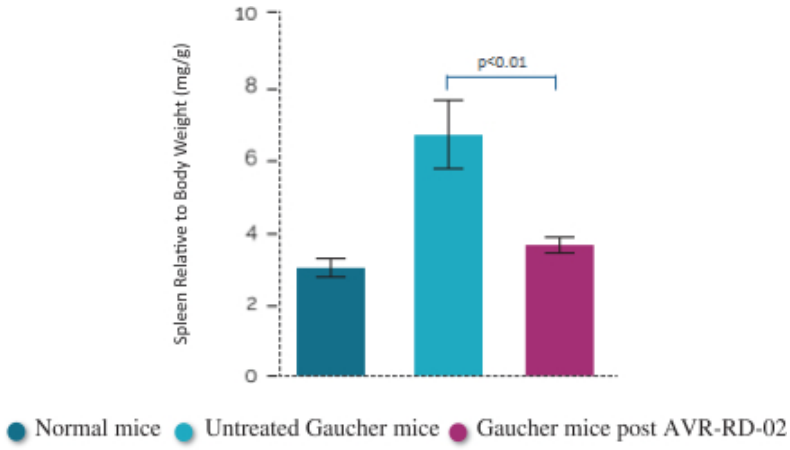
AVR-RD-02 is based on extensive preclinical work from our collaborators at Lund University and leverages findings published in 2015 in *Molecular Therapy* which concluded that, in a Gaucher disease mouse model, a lentiviral-based gene therapy containing the gene for GCase could prevent the development and reverse clinically relevant signs of the disease.

In preclinical studies, a mouse model of Gaucher disease demonstrated increases in glucocerebroside levels in the clinically-relevant tissues, the bone marrow, spleen and liver, and mimicked many of the same symptoms seen in patients such as an enlarged spleen. These preclinical studies assessed glucocerebroside levels, Gaucher cell infiltration, and spleen volume in the mouse model over 20 weeks following treatment with AVR-RD-02. When mice with established disease were treated with AVR-RD-02, symptoms such as an enlarged spleen were reversed within 20 weeks. Similarly, the mice that were treated with AVR-RD-02 prior to manifesting symptoms did not develop symptoms of the disease. These data support the potential efficacy of AVR-RD-02 to prevent, as well as reverse, symptoms in patients with Gaucher disease.

AVR-RD-02 Leads to a Significant Reduction in Glucocerebroside Levels Across Multiple Clinically-relevant Tissues



***Ex Vivo* Lentiviral-based Gene Therapy Leads to a Significant Reduction in Spleen Volume in a Mouse Model of Gaucher Disease**



AVR-RD-03, Our Gene Therapy for Pompe Disease

We are developing AVR-RD-03 for the treatment of Pompe disease. We will manufacture AVR-RD-03 from hematopoietic stem cells that are first extracted from the patient, modified to add the gene that encodes for acid alpha glucosidase A, or GAA, attached to a peptide sequence known as a glycosylation-independent lysosomal targeting, or GILT, tag and then infused into the patient. AVR-RD-03 will incorporate a GILT tag because the GILT tag has been found to increase the uptake of GAA into cells, especially in muscle cells, which is a particularly important target tissue for patients with Pompe disease.

Disease Overview

Pompe disease is a rare, autosomal recessive lysosomal storage disease caused by a mutation in the gene that encodes for GAA that results in the buildup of glycogen, a complex sugar, in the body's cells. The accumulation of glycogen in certain organs and tissues, especially muscles, impairs normal tissue and organ function. Patients with Pompe disease experience serious muscle related problems, including progressive muscle weakness, especially in the legs and trunk, and the muscles that control breathing. As the disorder progresses, breathing problems can lead to respiratory failure.

The overall diagnosed incidence of Pompe disease is estimated to be approximately one in 58,000 people although frequency and disease progression varies with age of onset, ethnicity and geography. Overall diagnosed incidence of Pompe disease is projected to increase to one in 22,000 people as it is increasingly included in newborn screening panels.

The severity of Pompe disease symptoms and rate of progression is highly variable and correlated with age of symptom onset and the degree of enzyme deficiency. Infantile or early onset disease, the most severe form of Pompe disease, accounts for approximately 25% of all affected patients. Those with early-onset disease are usually diagnosed in the first few months of life. Left untreated, these patients can die due to heart failure, respiratory distress or malnutrition resulting from feeding difficulties within the first year of life. Patients with late-onset disease typically have higher enzyme levels and usually have symptoms such as reduced mobility and respiratory problems. Late-onset patients experience progressive difficulty walking and respiratory decline. While life expectancy can vary, Pompe disease is a life-limiting disease that can result in death due to complications from respiratory failure.

Limitations of Current Therapies

Pompe disease is currently treated with ERT delivered by bi-weekly intravenous infusion. The only approved therapy for Pompe disease is Lumizyme (known as Myozyme outside of the United States), marketed by Sanofi Genzyme, which generated worldwide net sales of over $950 million in 2017. The annual average cost to the healthcare system per patient prescribed Lumizyme in the United States is approximately $500,000.

Though patients treated with ERT for Pompe disease have improved survival and respiratory function, ERT is not curative, and patients in long-term observational studies continue to have increased risk of heart failure and have residual muscle weakness including difficulties swallowing with risk of aspiration. One challenge with ERT treatment for Pompe disease is that a standard dose requires approximately twenty-fold more enzyme compared to standard doses for Fabry or Gaucher diseases. Large doses of Lumizyme that are delivered systemically in order to achieve potentially therapeutic levels in the target tissues result in approximately 90% of patients developing antibodies against the therapy. These antibody responses may impact both the efficacy and safety of Lumizyme. The FDA approval of Lumizyme carries a black box warning related to the risk of severe allergic and immune mediated reactions, including life-threatening anaphylaxis.

Our Solution

We are in early preclinical development of AVR-RD-03 to potentially cure patients with late-onset Pompe disease. We are developing AVR-RD-03 to be a gene therapy product containing a codon-optimized human gene for GAA attached to a GILT tag designed to increase uptake of GAA in muscle cells. AVR-RD-03 will target patients with late onset Pompe disease, which represent the majority of patients with this disease.

Preclinical Data

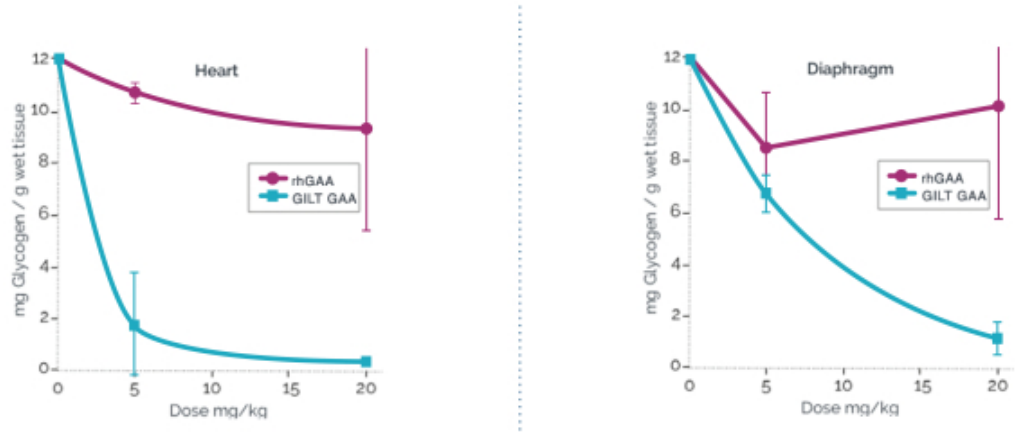
Published preclinical results from a mouse model of Pompe disease support the potential of lentiviral-based gene expression of GAA to prevent some of the symptoms of GAA deficiency. These results also demonstrated the need to further increase the uptake of GAA into muscle cells to treat patients, which is a known challenge for ERTs and leads to the use of large quantities of enzyme to attempt to deliver effective treatment levels.

In these published preclinical results from a mouse model of Pompe disease, treatment utilizing a lentiviral vector encoding GAA led to increased levels of active enzyme across multiple organs and tissues, including clinically relevant tissues such as heart and diaphragm. This enzyme activity was correlated with reductions in glycogen storage in these tissues. While reduction in left ventricular mass and normalization of heart rate were observed in the mouse models seven to eight months following treatment with this lentiviral-based gene expression of GAA, only lesser improvements in other muscles, such as skeletal muscle strength, were observed.

We believe we can use a GILT tag to address the known challenges of skeletal muscle uptake in patients with Pompe disease. Attachment of a GILT tag to a particular protein can increase the effective uptake of the protein into target tissues. We are designing AVR-RD-03 to use a GILT tag to facilitate GAA uptake into cells and thereby reduce the therapeutically required amount of GAA produced by a patient's cells following gene therapy treatment.

In mouse models of Pompe, administration of recombinant GAA with the GILT tag demonstrated significant reduction in glycogen in cardiac and skeletal muscles as compared to the administration of recombinant GAA alone. We licensed GILT tag technology from BioMarin and are incorporating a GILT tag into our lentiviral vector with the goal of the patient producing GILT-tagged GAA following treatment with AVR-RD-03.

GILT-tag Version of Recombinant Human (rh)GAA Impact on Levels of Stored Glycogen Compared to non GILT-tagged Recombinant Human (rh)GAA



AVR-RD-04, Our Gene Therapy for Cystinosis

We are developing AVR-RD-04 for the treatment of patients with cystinosis. We will manufacture AVR-RD-04 from hematopoietic stem cells that are first extracted from the patient, modified to add the gene that encodes for cystinosin, and then infused into the patient. In a planned academic sponsored Phase 1/2 clinical trial, we expect the first patient will be dosed in 2019.

Disease Overview

Cystinosis is a rare, genetic, autosomal recessive, lysosomal storage disease caused by the accumulation of the amino acid cystine that is produced in the lysosomes of cells as the result of protein degradation. Cystine is normally transported through the lysosomal membrane to the cytosol where it is reutilized after its transformation to cysteine. In cystinosis, cystine accumulates inside the lysosomes because of a defect in the gene that encodes

cystinosin, a protein that transports cystine across the lysosomal membrane. Cystine is poorly soluble and forms crystals as its concentration increases. These crystals build up and cause complications in many organs and tissues. The kidneys and eyes are especially vulnerable to damage, and the muscles, thyroid, pancreas and testes may also be affected.

The most severe form of cystinosis begins in infancy, causing poor growth and a particular type of kidney damage in which certain molecules, such as glucose, amino acids, phosphate, and bicarbonate, that should be reabsorbed into the bloodstream are instead eliminated in the urine. These renal problems ultimately lead to impaired growth and may result in soft, bowed bones, especially in the legs. By the time the patient is approximately two years old, cystine crystals may be present in the cornea, and the buildup of these crystals in the eye causes pain and an increased sensitivity to light. Untreated children with cystinosis may experience complete kidney failure by the age of ten. Other signs and symptoms that may occur in untreated patients, especially after adolescence, include muscle deterioration, blindness, inability to swallow, diabetes, thyroid and nervous system problems. More than 90% of untreated patients require a kidney transplant before the age of 20. It is estimated that cystinosis disease affects approximately one in 170,000 people.

Limitations of Current Therapies

Cystinosis is currently treated with two oral formulations of cysteamine that enter the lysosome and stimulate the breakdown of cystine into products that do not require the cystinosin protein to be transported. Oral treatment can delay the development of kidney failure by six to ten years if it is started at a very early age, however it cannot prevent kidney failure or the development of other complications, such as the formation of cystine crystals in the cornea. The approved oral therapies for cystinosis are Procysbi (delayed release cysteamine bitartrate), marketed by Horizon Orphan and Cystagon (cysteamine bitartrate) marketed by Mylan. The annual average cost to the healthcare system per patient prescribed Procysbi in the United States is between approximately $625,000 and $750,000.

Procysbi and Cystagon must be taken orally every 12 or six hours, respectively, leading to significant pill burden and compliance challenges. Because cysteamine works by directly binding to cystine, rather than through a typical small molecule that inhibits an enzyme or receptor, a substantial quantity is required. For adults, this can mean taking at least 12 capsules twice a day, every day. Oral therapy with cysteamine is associated with a high degree of noncompliance due to the frequency with which it must be dosed and the accompanying nausea, as well as the acrid sulfur smell that it produces in the breath and body. It has been estimated that only one third of patients are able to adhere to the strict dosing schedule. Studies have shown that adherence diminishes over time in adolescents and adults despite disease impact. Further, oral cysteamine treatment has no effect on ocular cystine crystals deposits, thus requiring patients to be treated with topical cysteamine eye drops which must be applied each hour the patient is awake.

Our Solution

We are developing AVR-RD-04 to potentially cure patients with cystinosis with a single dose of the patient’s own hematopoietic stem cells modified in an *ex vivo* procedure. AVR-RD-04 is a lentiviral-based gene therapy containing a human gene for cystinosin designed to maximize the likelihood of sustained cystinosin production in hematopoietic stem cells and their progeny.

Upcoming Clinical Trial

In a planned Phase 1/2 clinical trial of AVR-RD-04 that will be conducted by our collaborators at the University of California, San Diego, six patients with cystinosis who are currently being treated with cysteamine will be enrolled. Cystine levels in tissues such as white blood cells and skin will be followed in these patients as well as cystine crystal counts in the eye. Clinical parameters such as kidney function, muscle strength, bone density, and endocrine function will also be followed with the intent of identifying appropriate parameters to

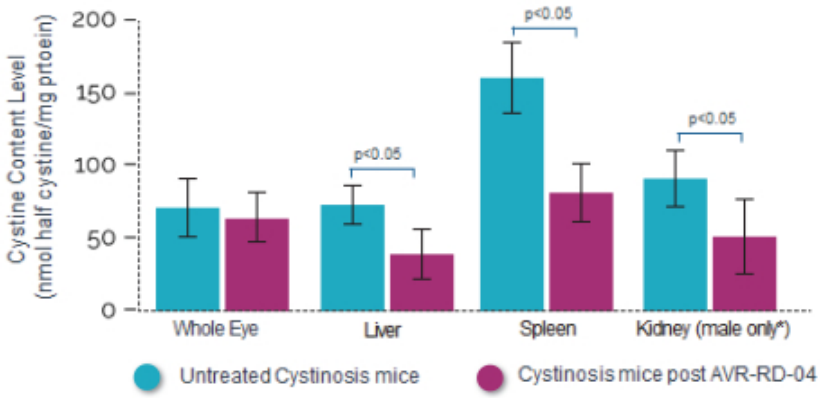
inform future clinical development. We expect that patients enrolled in this trial will undergo a more extensive conditioning regimen instead of the milder conditioning regimen we use for our other target indications. Our collaborators plan to submit an investigational new drug application, or IND, in the U.S. prior to commencing this planned clinical trial.

Preclinical Data

In order to mimic the human disease, the mouse model for cystinosis has the gene for cystinosin disrupted, resulting in the inability of the cystinosin protein to transport cystine out of the lysosomes. This ultimately results in the accumulation of cystine in all tissues similar to that seen in patients with cystinosis. The ability of mouse stem cells modified with a lentiviral vector containing the gene for human cystinosin to treat cystinosis was then tested in the affected mice.

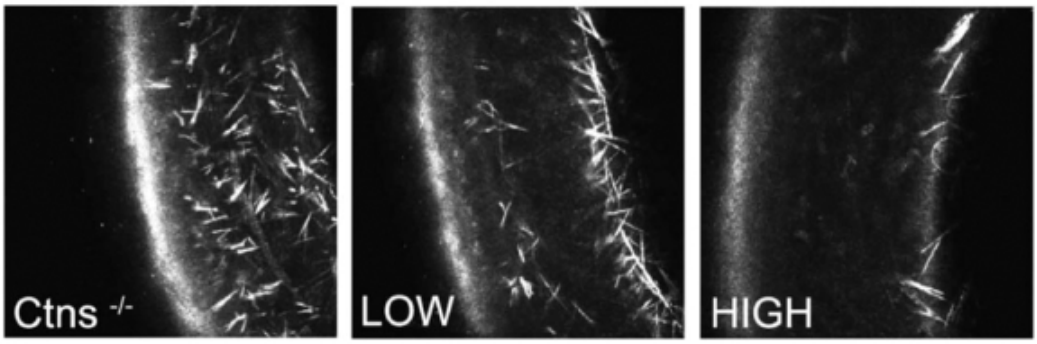
Introduction of AVR-RD-04 into the diseased mice was observed to significantly lower cystine levels in tissues such as the liver, spleen and, in male mice, the kidney. These lower levels persisted until the end of the experiment at eight months. AVR-RD-04 treatment was also associated with potentially improved kidney function in male mice, thus addressing an essential clinical need in patients with cystinosis.

AVR-RD-04 Leads to Lower Cystine Levels in Multiple Tissues in a Mouse Model of Cystinosis



In a separate experiment in this cystinosis mouse model, lentiviral-marked hematopoietic stem cell transplant using normal mouse stem cells led to the reduction of cystine crystals in the cornea, a clinically significant tissue in patients with cystinsosis. In this cystinosis mouse model, affected mice develop eye disease similar to humans, including crystal deposits in the cornea, central corneal opacification, loss of corneal cellular architecture and eventually a scarred, shrunken eye with no function. Published results from this study demonstrate that abundant hematopoietic stem cell-derived macrophages migrated into the cornea and provided functional cystinosin-bearing lysosomes to the corneal cells. The images below reflect the elimination of cystine crystals in the cornea of the mice following engraftment of the modified allogeneic stem cells. As the level of allogeneic stem cell engraftment increased, greater elimination of the cystine crystals was observed. This indicates that stem cells can migrate to the cornea and cross-correct corneal cells. This result demonstrates that it is possible to correct for the defective cystinosin gene in the eye indirectly through expression of the gene in hematopoietic cells.

Transplantation of Allogeneic Hematopoietic Stem Cells Results in Reduction of Cystine Crystals in Corneas of Cystinosis Mice



Manufacturing

Industrializing Our Gene Therapies Through Our Outsourced Manufacture and Supply Network

Our team has leveraged their broad expertise in the manufacturing of gene and cellular therapies to build a global network of CMO partners for the development and manufacture of drug products and outsourced suppliers for the supply of vectors and plasmids. We believe that our third-party CMO partners and suppliers have capacity to accommodate current and future clinical trials and we are continuing to build a global network that will have capacity to generate sufficient quantities to meet our expected commercial needs.

To optimize production of our gene therapies, we are moving our cell processing to an automated, closed system using all disposable supplies. We believe this industrialized manufacturing process will enable a repeatable approach through which we can design and manufacture commercially viable lentiviral gene therapies to potentially treat a large variety of genetic disorders. We expect that our automation of the manufacturing processes will further increase our CMO partners' manufacturing capacity.

Producing a Patient's Gene Therapy

We start the process to produce a patient's gene therapy with the mobilization of a patient's stem cells from the bone marrow to the blood stream and isolate them using a standard procedure used in stem cell transplants. We then treat these cells with a lentiviral vector to insert a functional copy of the gene that is defective in the target disease in a 48-hour process. We preserve patients' modified cells at a very low temperature, using cryopreservation to maintain the cellular material in optimal condition until it is thawed prior to being infused into the patient. The cryopreservation allows us to conduct a number of tests to validate the modified cells prior to introducing them into the patient.

Prior to infusion of the gene therapy-modified cells into the patient, the patients undergo a conditioning regimen to remove some of the patient's unmodified cells from the bone marrow to create sufficient space for the modified hematopoietic stem cells to engraft and produce their progeny. The conditioning regimen used in our approach for AVR-RD-01, AVR-RD-02 and AVR-RD-03 is planned to be completed in an outpatient setting.

After the conditioning regimen is complete, the genetically-modified stem cells are infused into the patient by intravenous administration in an outpatient setting. After infusion, these cells engraft into the bone marrow, replicate and differentiate into various types of blood cells that will distribute throughout the body. These widely distributed cells lead to sustained expression of the desired therapeutic enzyme or other protein. The sustained expression of the functional enzyme or protein is a direct substitute for the protein currently delivered by ERTs, which require periodic infusions.

Intellectual Property and Other Barriers to Entry

The proprietary nature of, or protection for, our gene therapy technology, our product candidates, our production methods and supply chain are an important part of our strategy to develop and commercialize novel therapies. To maximize the commercial opportunity for our gene therapies, if approved, we and our partners have been building and continue to build barriers to entry by our competitors, including:

- We in-license and develop know-how, including data, relating to certain of our product candidates.
- We rely on trade secret protection to protect aspects of our business that are not amenable to, or that we do not consider appropriate for, patent protection.
- Our management team has significant experience in cell processing and commercial-scale cellular therapy manufacturing. Leveraging this experience, we are building our global network of suppliers and CMO partners which combines their expertise in vector manufacturing, a closed, automated manufacturing system, production of current good manufacturing practices, or CGMP, materials and cryopreservation.
- Our gene therapies are designed to potentially provide a curative benefit. If our gene therapies are approved before any other potentially curative treatments, we believe the benefits of our approach and the resulting first mover advantage may provide meaningful disincentive for companies seeking to develop potentially curative therapies that may compete with our own. See "—Competition."
- We are developing therapies to treat rare diseases and expect to pursue orphan drug designation in the United States and similar protection outside of the United States. These and other regulatory exclusivities, if granted or applicable, can prevent competitors, during the exclusivity period, from obtaining regulatory approval of the same drug or biological product for the same indication. See "—Government Regulation."
- We currently in-license, and we expect to file our own, patents and patent applications relating to certain of our product candidates.

We have in-licensed patents and patent applications from BioMarin Pharmaceutical Inc., and GenStem Therapeutics, Inc., directed to compositions and methods related to the manufacture and use of certain of our gene therapies. In addition, we have in-licensed certain intellectual property rights and know-how from the University Health Network and affiliates of Lund University. For example, we have in-licensed know-how and data related to AVR-RD-01, including certain information about the vector and its use, from University Health Network, and we have in-licensed know-how and data related to AVR-RD-02, including certain information about the vector and its use, from certain professors affiliated with Lund University. Each of our licenses are limited to particular fields, such as Fabry disease, Gaucher disease, Pompe disease, or cystinosis, and are subject to certain retained rights. We do not control the prosecution and maintenance of all of our in-licensed patents and patent applications, and our rights to enforce the patents are limited in certain ways. For additional detail regarding the risks associated with our license agreements see "Risk Factors—Risks Related to Intellectual Property."

As of March 31, 2018, our in-licensed patent portfolio relating to certain of our gene therapies included the following:

- *AVR-RD-03*: two United States (U.S.) patents, projected to expire in 2022 and 2023, and one U.S. patent application, which if granted, would be projected to expire in 2029, as well as corresponding patents and patent applications in certain foreign jurisdictions, as they pertain to compositions and methods for promoting lysosomal uptake of acid alpha-glucosidase and the treatment of Pompe disease. These patents and patent applications are licensed to us by BioMarin and relate to the GILT tag; and
- *AVR-RD-04*: one international patent (PCT) application, which, if pursued and granted in the United States, would be projected to expire in 2038, containing claims directed to hematopoietic stem cells expressing cystinosin and methods of using the same for the treatment of cystinosis. This patent application is licensed to us by GenStem Therapeutics, and GenStem obtained its rights from the University of California, San Diego.

The term of any given patent depends upon the legal term of patents in the countries in which they are obtained. In most countries in which we file, the patent term is 20 years from the date of filing the application, subject to the timely payment of maintenance fees, among other considerations. In the United States, a patent's term may be lengthened by patent term adjustment, which compensates a patentee for administrative delays by the USPTO in granting a patent, or may be shortened if a patent is terminally disclaimed over an earlier-filed commonly owned patent. In addition, in certain instances, a patent term can be extended to recapture a portion of the term effectively lost as a result of FDA regulatory review period. However, the restoration period cannot be longer than five years and the total patent term including the restoration period must not exceed 14 years following FDA approval. In certain foreign jurisdictions similar extensions as compensation for regulatory delays are also available. The actual protection afforded by a patent varies on a claim by claim and country by country basis for each applicable product and depends upon many factors, including the type of patent, the scope of its coverage, the availability of regulatory related extensions, the availability of legal remedies in a particular country and the validity and enforceability of the patent. Currently, we do not own or license patents or patent applications related to our AVR-RD-01 or AVR-RD-02 product candidates. We rely, in some circumstances, on trade secrets and unpatented know-how that is either owned by or licensed to us to protect our technology. We seek to protect our proprietary technology and processes, in part, by entering into confidentiality agreements with our employees, consultants, scientific advisors and contractors.

License Agreements

Exclusive License Agreement with University Health Network

In November 2016, we entered into a license agreement with University Health Network, or UHN, pursuant to which UHN granted us an exclusive worldwide license under certain intellectual property rights and a non-exclusive worldwide license under certain know-how, including certain rights to data, in each case subject to certain retained rights, to develop, commercialize and sell products for use in the treatment of Fabry disease. Intellectual property licensed to us under this agreement relates to our Fabry program. In addition, for three years following the execution of the agreement, UHN granted us an exclusive option to obtain an exclusive license under certain improvements to the licensed intellectual property rights as well as an exclusive option to negotiate a license under certain other improvements. Under the terms of the agreement, we are required to meet certain performance milestones within specified timeframes. UHN may terminate the agreement if we fail to meet these performance milestones despite using commercially reasonable efforts and we are unable to reach agreement with UHN on revised timeframes.

As consideration for the licenses, we paid to UHN a one-time upfront fee in the amount of C$75,000 and are obligated to pay an additional annual fee until the first sale of a licensed product in certain markets. We are also required to make payments to UHN in connection with the achievement of certain development and regulatory milestones, in an aggregate amount of C$2.45 million, as well as royalties on a country-by-country basis of a low to mid-single digit percentages on annual sales of licensed products and a lower single digit royalty in certain circumstances. Additionally, we will pay a low double digit percentage of all sublicensing revenue. Our royalty obligation expires on a licensed product-by-licensed product and country-by-country basis upon the latest to occur of the expiration or termination of the last valid claim under the licensed intellectual property rights in such country, the tenth anniversary of the first commercial sale of such licensed product in such country and the expiration of any applicable regulatory exclusivity in such country.

In addition, under this agreement we made a philanthropic commitment to donate funds to organizations for the benefit of the Canadian Fabry community in an amount equal to a low double digit percentage of our royalty payments and regulatory milestone payments, up to a maximum amount of C$500,000 in any calendar year.

Unless terminated earlier, this exclusive license agreement with UHN will expire upon the expiration of our royalty obligation for all licensed products. Either we or UHN may terminate the license agreement if the other party commits a material breach and fails to cure such breach within a certain period of time. UHN may

terminate this agreement if we enter into bankruptcy or insolvency. We may terminate this agreement for any reason upon notice to UHN.

License Agreement with Lund University Rights Holders

In January 2017, we entered into an exclusive license agreement with Dr. Stefan Karlsson and Maria Dahl, affiliates of Lund University, pursuant to which Drs. Karlsson and Dahl, and certain other relevant rights holders that may have an interest in intellectual property generated under a research project we are funding with Lund University, granted to us an exclusive worldwide license, subject to certain retained rights, under certain intellectual property rights to develop, commercialize and sell products in any and all uses relevant to Gaucher disease. Intellectual property licensed to us under this agreement relates to our Gaucher program.

As consideration for the license, we are required to make payments in connection with the achievement of certain milestones up to an aggregate of $550,000.

Our license agreement with the rights holders expires on the latest of (i) the twentieth anniversary of the end of a certain research project we are funding pursuant to an agreement with Lund University, (ii) the expiration of the term of any patent filed on the licensed rights that covers a licensed product, (iii) the expiration of any applicable marketing exclusivity right and (iv) such time that neither we nor any of our sublicensees or partners or contractors are commercializing a licensed product. Either we or the rights holders acting together may terminate the license agreement if the other such party commits a material breach and fails to cure such breach within a certain period of time, or if the other party enters into liquidation, becomes insolvent, or enters into composition or statutory reorganization proceedings.

License Agreement with BioMarin Pharmaceutical Inc.

In August 2017, we entered into a license agreement with BioMarin Pharmaceutical Inc., or BioMarin, pursuant to which BioMarin granted us an exclusive worldwide license under certain intellectual property rights related to GILT tags owned or controlled by BioMarin to develop, commercialize and sell Retroviridae-based gene therapy products for use in the treatment of Pompe disease. Under the terms of the agreement, we must use commercially reasonable efforts to develop and commercialize one or more licensed products in the United States and certain European countries. In addition, we are required to initiate an IND-enabling pharmacology/toxicology study of a licensed product within a specified period of time.

As consideration for the license, we paid an initial license fee in the amount of $500,000 and issued 233,765 shares of our Series B preferred stock to BioMarin at the time of our Series B financing. We are also obligated to make payments to BioMarin upon achievement of certain milestones up to an aggregate of $13 million and pay to BioMarin a low single digit royalty percentage on net sales of licensed products covered by patent rights in a relevant country. Our royalty obligation expires on a licensed product-by-licensed product and country-by-country basis.

Unless terminated earlier, our license agreement with BioMarin will expire upon the expiration of our royalty obligation for all licensed products throughout the world. Either we or BioMarin may terminate the license agreement if the other party commits a material breach and fails to cure such breach within a certain period of time. BioMarin may also terminate the agreement in the event of any challenge or opposition to the licensed patent rights or related actions brought by us or our affiliates or sublicensees, or if we, our affiliates or sublicensees knowingly assist a third party in challenging or otherwise opposing the licensed patent rights, except as required under a court order or subpoena. In addition, BioMarin may terminate the agreement upon our bankruptcy or insolvency. We may terminate the agreement for any reason upon notice to BioMarin.

License Agreement with GenStem Therapeutics Inc.

In October 2017, we entered into a license agreement with GenStem Therapeutics, Inc., or GenStem, pursuant to which GenStem granted us an exclusive worldwide license, subject to certain retained rights, under

certain intellectual property rights owned or controlled by GenStem related to our cystinosis program, including certain rights licensed to GenStem from the University of California, San Diego, to develop, commercialize and sell products for use in the treatment of cystinosis. Under the terms of the agreement, we must use commercially reasonable efforts to develop and commercialize one or more licensed products in the United States and in at least one country from other specified markets. We also agreed to comply with certain access requirements consistent with the California Institute for Regenerative Medicine regulations and to manufacture certain licensed products substantially in the United States.

As consideration for the license, we paid an initial license fee in the amount of $1 million and are required to make payments upon completion of certain development milestones up to an aggregate of $16 million. Additionally, we will pay to GenStem a tiered mid to high-single digit royalty percentage on annual net sales of licensed products as well as a low double-digit percentage of sublicense income received from certain third party sublicensees. Our royalty obligation expires on a licensed product-by-licensed product and country-by-country basis on the eleventh anniversary of the first commercial sale of such licensed product in such country or the expiration of the last valid claim under the licensed patent rights covering such licensed product in such country, whichever is later.

Unless terminated earlier, our license agreement with GenStem will terminate upon the expiration of our royalty obligation for all licensed products throughout the world. Either we or GenStem may terminate the license agreement if the other party commits a material breach and fails to cure such breach within a certain period of time. In addition, we may terminate the agreement for any reason upon notice to GenStem.

Competition

Our industry is highly competitive and subject to rapid and significant technological change. Our potential competitors include larger pharmaceutical, specialty pharmaceutical and biotechnology companies, as well as academic institutions, government agencies and private and public research institutions. Key competitive factors affecting the commercial success of our gene therapies are likely to be efficacy, safety and tolerability profile, reliability, convenience, price and reimbursement.

The market for treatment of lysosomal storage diseases is especially large and competitive. The gene therapies we are currently developing, if approved, will face competition.

Mergers and acquisitions in the pharmaceutical and biotechnology industries may result in even more resources being concentrated among a small number of our competitors. Accordingly, our competitors may be more successful than we may be in obtaining FDA approval for drugs and achieving widespread market acceptance. Our competitors' products may be more effective, or more effectively marketed and sold, than any product we may commercialize and may render our gene therapies obsolete or non-competitive before we can recover the expenses of developing and commercializing any of our gene therapies. Our competitors may also obtain FDA or other regulatory approval for their products more rapidly than we may obtain approval for ours. We anticipate that we will face intense and increasing competition as new drugs enter the market and advanced technologies become available. Finally, the development of new treatment methods for the diseases we are targeting could render our gene therapies non-competitive or obsolete. See "Risk Factors—Risks related to the discovery and development of our product candidates—We face significant competition and our competitors may achieve regulatory approval before us or develop therapies that are more advanced or effective than ours, which may adversely affect our ability to successfully market or commercialize any of our product candidates," and elsewhere in this prospectus for more information regarding competitors and competitive products.

Government Regulation

In the United States, biological products, including gene therapy products, are subject to regulation under the Federal Food, Drug, and Cosmetic Act, or FD&C Act, and the Public Health Service Act, or PHS Act, and

other federal, state, local and foreign statutes and regulations. Both the FD&C Act and the PHS Act and their corresponding regulations govern, among other things, the testing, manufacturing, safety, efficacy, labeling, packaging, storage, record keeping, distribution, reporting, advertising and other promotional practices involving biological products. Each clinical study protocol for a gene therapy product must be reviewed by the FDA and, in some instances, the National Institute of Health, or NIH, through its Recombinant DNA Advisory Committee, or RAC. FDA approval must be obtained before the marketing of biological products. The process of obtaining regulatory approvals and the subsequent compliance with appropriate federal, state, local and foreign statutes and regulations require the expenditure of substantial time and financial resources and we may not be able to obtain the required regulatory approvals.

Within the FDA, the Center for Biologics Evaluation and Research, or CBER regulates gene therapy products. The CBER works closely with the NIH and its RAC, which makes recommendations to the NIH on gene therapy issues and engages in a public discussion of scientific, safety, ethical and societal issues related to proposed and ongoing gene therapy protocols. The FDA and the NIH have published guidance documents with respect to the development and submission of gene therapy protocols. The FDA also has published guidance documents related to, among other things, gene therapy products in general, their preclinical assessment, observing subjects involved in gene therapy studies for delayed adverse events, potency testing, and chemistry, manufacturing and control information in INDs for gene therapies.

Ethical, social and legal concerns about gene therapy, genetic testing and genetic research could result in additional regulations restricting or prohibiting the processes we may use. Federal and state agencies, congressional committees and foreign governments have expressed interest in further regulating biotechnology. More restrictive regulations or claims that our products are unsafe or pose a hazard could prevent us from commercializing any products. New government requirements may be established that could delay or prevent regulatory approval of our product candidates under development. It is impossible to predict whether legislative changes will be enacted, regulations, policies or guidance changed, or interpretations by agencies or courts changed, or what the impact of such changes, if any, may be.

U.S. Biological Products Development Process

The process required by the FDA before a biological product may be marketed in the United States generally involves the following:

- completion of nonclinical laboratory tests and animal studies according to good laboratory practices, or GLPs, and applicable requirements for the humane use of laboratory animals or other applicable regulations;
- submission to the FDA of an application for an IND, which must become effective before human clinical studies may begin;
- approval by an independent institutional review board, or IRB, or ethics committee at each clinical study site before each study may be initiated;
- performance of adequate and well-controlled human clinical studies according to the FDA's regulations commonly referred to as good clinical practices, or GCPs, and any additional requirements for the protection of human research subjects and their health information, to establish the safety and efficacy of the proposed biological product for its intended use;
- submission to the FDA of a Biologics License Application, or BLA, for marketing approval that includes substantive evidence of safety, purity, and potency from results of nonclinical testing and clinical studies;
- satisfactory completion of an FDA inspection of the manufacturing facility or facilities where the biological product is produced to assess compliance with current good manufacturing practices, or CGMPs, to assure that the facilities, methods and controls are adequate to preserve the biological

product's identity, strength, quality and purity and, if applicable, the FDA's current good tissue practices, or GTPs, for the use of human cellular and tissue products;

- potential FDA audit of the nonclinical and clinical study sites that generated the data in support of the BLA;
- payment of user fees for FDA review of the BLA (unless a fee waiver applies); and
- FDA review and approval, or licensure, of the BLA.

Before testing any biological product candidate, including a gene therapy product, in humans, the product candidate enters the preclinical testing stage. Preclinical tests, also referred to as nonclinical studies, include laboratory evaluations of product chemistry, toxicity and formulation, as well as animal studies to assess the potential safety and activity of the product candidate. The conduct of the preclinical tests must comply with federal regulations and requirements including GLPs.

Where a gene therapy study is conducted at, or sponsored by, institutions receiving NIH funding for recombinant DNA research, prior to the submission of an IND to the FDA, a protocol and related documentation is submitted to and the study is registered with the NIH Office of Science Policy, or OSP, pursuant to the NIH Guidelines for Research Involving Recombinant or Synthetic Nucleic Acid Molecules, or NIH Guidelines. Compliance with the NIH Guidelines is mandatory for investigators at institutions receiving NIH funds for research involving recombinant DNA; however, many companies and other institutions not otherwise subject to the NIH Guidelines voluntarily follow them. The NIH is responsible for convening the RAC, a federal advisory committee that discusses protocols that raise novel or particularly important scientific, safety or ethical considerations, at one of its quarterly public meetings. The OSP will notify the FDA of the RAC's decision regarding the necessity for full public review of a gene therapy protocol. RAC proceedings and reports are posted to the OSP web site and may be accessed by the public.

The clinical study sponsor must submit the results of the preclinical tests, together with manufacturing information, analytical data, any available clinical data or literature and a proposed clinical protocol, to the FDA as part of the IND. Some preclinical testing may continue even after the IND is submitted. An IND is a request for authorization from the FDA to ship an unapproved, investigational product in interstate commerce and to administer it to humans, and must become effective before clinical trials may begin. The IND automatically becomes effective 30 days after receipt by the FDA, unless the FDA places the clinical study on a clinical hold within that 30-day time period. In such a case, the IND sponsor and the FDA must resolve any outstanding concerns before the clinical study can begin. With gene therapy protocols, if the FDA allows the IND to proceed, but the RAC decides that full public review of the protocol is warranted, the FDA will request at the completion of its IND review that sponsors delay initiation of the protocol until after completion of the RAC review process. The FDA also may impose clinical holds on a biological product candidate at any time before or during clinical studies due to safety concerns or non-compliance. If the FDA imposes a clinical hold, studies may not recommence without FDA authorization and then only under terms authorized by the FDA. Accordingly, we cannot be sure that submission of an IND will result in the FDA allowing clinical studies to begin, or that, once begun, issues will not arise that suspend or terminate such studies.

Clinical studies involve the administration of the biological product candidate to healthy volunteers or patients under the supervision of qualified investigators, generally physicians not employed by or under the study sponsor's control. Clinical studies are conducted under protocols detailing, among other things, the objectives of the clinical study, dosing procedures, subject selection and exclusion criteria, and the parameters to be used to monitor subject safety, including stopping rules that assure a clinical study will be stopped if certain adverse events should occur. Each protocol and any amendments to the protocol must be submitted to the FDA as part of the IND. Clinical studies must be conducted and monitored in accordance with the FDA's regulations comprising the GCP requirements, including the requirement that all research subjects provide informed consent. Further, each clinical study must be reviewed and approved by an IRB at or servicing each institution at which the clinical

study will be conducted. An IRB is charged with protecting the welfare and rights of study participants and considers such items as whether the risks to individuals participating in the clinical studies are minimized and are reasonable in relation to anticipated benefits. The IRB also approves the form and content of the informed consent that must be signed by each clinical study subject or his or her legal representative and must monitor the clinical study until completed. Clinical research involving recombinant DNA that is subject to NIH guidelines also must be reviewed by an institutional biosafety committee, or IBC, a local institutional committee that reviews and oversees basic and clinical research conducted at that institution. The IBC assesses the safety of the research and identifies any potential risk to public health or the environment.

Clinical studies typically are conducted in three sequential phases that may overlap or be combined:

- *Phase 1*. The biological product is initially introduced into healthy human subjects and tested for safety. In the case of some products for severe or life-threatening diseases, especially when the product may be too inherently toxic to ethically administer to healthy volunteers, the initial human testing is often conducted in patients.
- *Phase 2*. The biological product is evaluated in a limited patient population to identify possible adverse effects and safety risks, to preliminarily evaluate the efficacy of the product for specific targeted diseases and to determine dosage tolerance, optimal dosage and dosing schedule.
- *Phase 3*. Clinical studies are undertaken to further evaluate dosage, clinical efficacy, potency, and safety in an expanded patient population at geographically dispersed clinical study sites. These clinical studies are intended to establish the overall risk/benefit ratio of the product and provide an adequate basis for approval and product labeling.

Post-approval clinical studies, sometimes referred to as Phase 4 clinical studies, may be conducted after initial marketing approval. These clinical studies are used to gain additional experience from the treatment of patients in the intended therapeutic indication, particularly for long-term safety follow-up. The FDA recommends that sponsors observe subjects for potential gene therapy-related delayed adverse events for a 15-year period, including a minimum of five years of annual examinations followed by ten years of annual queries, either in person or by questionnaire, of study subjects.

During all phases of clinical development, regulatory agencies require extensive monitoring and auditing of all clinical activities, clinical data, and clinical study investigators. Annual progress reports detailing the results of the clinical studies must be submitted to the FDA. Written IND safety reports must be promptly submitted to the FDA, the NIH and the investigators for serious and unexpected adverse events, any findings from other studies, tests in laboratory animals or *in vitro* testing that suggest a significant risk for human subjects, or any clinically important increase in the rate of a serious suspected adverse reaction over that listed in the protocol or investigator brochure. The sponsor must submit an IND safety report within 15 calendar days after the sponsor determines that the information qualifies for reporting. The sponsor also must notify the FDA of any unexpected fatal or life-threatening suspected adverse reaction within seven calendar days after the sponsor's initial receipt of the information. Phase 1, Phase 2 and Phase 3 clinical studies may not be completed successfully within any specified period, if at all. The FDA or the sponsor, acting on its own or based on a recommendation from the sponsor's data safety monitoring board may suspend a clinical study at any time on various grounds, including a finding that the research subjects or patients are being exposed to an unacceptable health risk. Similarly, an IRB can suspend or terminate approval of a clinical study at its institution if the clinical study is not being conducted in accordance with the IRB's requirements or if the biological product has been associated with unexpected serious harm to patients.

Human gene therapy products are a new category of therapeutics. Because this is a relatively new and expanding area of novel therapeutic interventions, there can be no assurance as to the length of the study period, the number of patients the FDA will require to be enrolled in the studies in order to establish the safety, efficacy, purity and potency of human gene therapy products, or that the data generated in these studies will be acceptable

to the FDA to support marketing approval. The NIH has a publicly accessible database, the Genetic Modification Clinical Research Information System which includes information on gene transfer studies and serves as an electronic tool to facilitate the reporting and analysis of adverse events on these studies.

Concurrent with clinical studies, companies usually complete additional animal studies and also must develop additional information about the physical characteristics of the biological product as well as finalize a process for manufacturing the product in commercial quantities in accordance with CGMP requirements. To help reduce the risk of the introduction of adventitious agents with use of biological products, the PHS Act emphasizes the importance of manufacturing control for products whose attributes cannot be precisely defined. The manufacturing process must be capable of consistently producing quality batches of the product candidate and, among other things, the sponsor must develop methods for testing the identity, strength, quality, potency and purity of the final biological product. Additionally, appropriate packaging must be selected and tested and stability studies must be conducted to demonstrate that the biological product candidate does not undergo unacceptable deterioration over its shelf life.

U.S. Review and Approval Processes

After the completion of clinical studies of a biological product, FDA approval of a BLA must be obtained before commercial marketing of the biological product. The BLA must include results of product development, laboratory and animal studies, human studies, information on the manufacture and composition of the product, proposed labeling and other relevant information. The testing and approval processes require substantial time and effort and there can be no assurance that the FDA will accept the BLA for filing and, even if filed, that any approval will be granted on a timely basis, if at all.

Within 60 days following submission of the application, the FDA reviews a BLA submitted to determine if it is substantially complete before the agency accepts it for filing. The FDA may refuse to file any BLA that it deems incomplete or not properly reviewable at the time of submission and may request additional information. In this event, the BLA must be resubmitted with the additional information. The resubmitted application also is subject to review before the FDA accepts it for filing. In most cases, the submission of a BLA is subject to a substantial application user fee, although the fee may be waived under certain circumstances. Under the goals and policies agreed to by the FDA under the Prescription Drug User Fee Act, or PDUFA, for original BLAs, the FDA has ten months from the filing date in which to complete its initial review of a standard application and respond to the applicant, and six months from the filing date for an application with priority review. The FDA does not always meet its PDUFA goal dates, and the review process is often significantly extended by FDA requests for additional information or clarification. This review typically takes twelve months from the date the BLA is submitted to the FDA because the FDA has approximately two months to make a ‘‘filing’’ decision. The review process and the PDUFA goal date may be extended by three months if the FDA requests or the BLA sponsor otherwise provides additional information or clarification regarding information already provided in the submission within the last three months before the PDUFA goal date.

Once the submission is accepted for filing, the FDA begins an in-depth substantive review of the BLA. The FDA reviews the BLA to determine, among other things, whether the proposed product is safe and potent, or effective, for its intended use, and has an acceptable purity profile, and whether the product is being manufactured in accordance with CGMP to assure and preserve the product’s identity, safety, strength, quality, potency and purity. The FDA may refer applications for novel biological products or biological products that present difficult questions of safety or efficacy to an advisory committee, typically a panel that includes clinicians and other experts, for review, evaluation and a recommendation as to whether the application should be approved and under what conditions. The FDA is not bound by the recommendations of an advisory committee, but it considers such recommendations carefully when making decisions. During the biological product approval process, the FDA also will determine whether a Risk Evaluation and Mitigation Strategy, or REMS, is necessary to assure the safe use of the biological product. If the FDA concludes a REMS is needed, the sponsor of the BLA must submit a proposed REMS; the FDA will not approve the BLA without a REMS, if required.

Before approving a BLA, the FDA typically will inspect the facilities at which the product is manufactured. The FDA will not approve the product unless it determines that the manufacturing processes and facilities are in compliance with CGMP requirements and adequate to assure consistent production of the product within required specifications. For a gene therapy product, the FDA also will not approve the product if the manufacturer is not in compliance with the GTPs. These are FDA regulations that govern the methods used in, and the facilities and controls used for, the manufacture of human cells, tissues, and cellular and tissue based products, or HCT/Ps, which are human cells or tissue intended for implantation, transplant, infusion, or transfer into a human recipient. The primary intent of the GTP requirements is to ensure that cell and tissue based products are manufactured in a manner designed to prevent the introduction, transmission and spread of communicable disease. FDA regulations also require tissue establishments to register and list their HCT/Ps with the FDA and, when applicable, to evaluate donors through screening and testing. Additionally, before approving a BLA, the FDA will typically inspect one or more clinical sites to assure that the clinical studies were conducted in compliance with IND study requirements and GCP requirements. To assure CGMP, GTP and GCP compliance, an applicant must incur significant expenditure of time, money and effort in the areas of training, record keeping, production, and quality control.

Under the Pediatric Research Equity Act, or PREA, a BLA or supplement to a BLA for a novel product (e.g., new active ingredient, new indication, etc.) must contain data to assess the safety and effectiveness of the biological product for the claimed indications in all relevant pediatric subpopulations and to support dosing and administration for each pediatric subpopulation for which the product is safe and effective. The FDA may grant deferrals for submission of data or full or partial waivers. Unless otherwise required by regulation, PREA does not apply to any biological product for an indication for which orphan designation has been granted.

Notwithstanding the submission of relevant data and information, the FDA may ultimately decide that the BLA does not satisfy its regulatory criteria for approval and deny approval. Data obtained from clinical studies are not always conclusive and the FDA may interpret data differently than we interpret the same data. If the agency decides not to approve the BLA in its present form, the FDA will issue a complete response letter that usually describes all of the specific deficiencies in the BLA identified by the FDA. The deficiencies identified may be minor, for example, requiring labeling changes, or major, for example, requiring additional clinical studies. Additionally, the complete response letter may include recommended actions that the applicant might take to place the application in a condition for approval. If a complete response letter is issued, the applicant may either resubmit the BLA, addressing all of the deficiencies identified in the letter, or withdraw the application.

If a product receives regulatory approval, the approval may be significantly limited to specific diseases and dosages or the indications for use may otherwise be limited, which could restrict the commercial value of the product. Further, the FDA may require that certain contraindications, warnings or precautions be included in the product labeling. The FDA may impose restrictions and conditions on product distribution, prescribing, or dispensing in the form of a REMS, or otherwise limit the scope of any approval. In addition, the FDA may require post marketing clinical studies, sometimes referred to as Phase 4 clinical studies, designed to further assess a biological product’s safety and effectiveness, and testing and surveillance programs to monitor the safety of approved products that have been commercialized.

Orphan Drug Designation

Under the Orphan Drug Act, the FDA may grant orphan designation to a drug or biological product intended to treat a rare disease or condition, which is generally a disease or condition that affects fewer than 200,000 individuals in the United States, or more than 200,000 individuals in the United States and for which there is no reasonable expectation that the cost of developing and making a drug or biological product available in the United States for this type of disease or condition will be recovered from sales of the product. Orphan product designation must be requested before submitting a BLA. After the FDA grants orphan product designation, the identity of the therapeutic agent and its potential orphan use are disclosed publicly by the FDA. Orphan product designation does not convey any advantage in or shorten the duration of the regulatory review and approval process.

Orphan drug designation entitles a party to financial incentives such as opportunities for grant funding towards clinical trial costs, tax advantages and user-fee waivers. If a product that has orphan designation subsequently receives the first FDA approval for the disease or condition for which it has such designation, the product is entitled to orphan product exclusivity, which means that the FDA may not approve any other applications to market the same drug or biological product for the same indication for seven years, except in limited circumstances, such as a showing of clinical superiority to the product with orphan exclusivity. Competitors, however, may receive approval of different products for the indication for which the orphan product has exclusivity or obtain approval for the same product but for a different indication for which the orphan product has exclusivity. Orphan product exclusivity also could block the approval of one of our products for seven years if a competitor obtains approval of the same biological product as defined by the FDA or if our product candidate is determined to be contained within the competitor's product for the same indication or disease. If a drug or biological product designated as an orphan product receives marketing approval for an indication broader than what is designated, it may not be entitled to orphan product exclusivity. Orphan drug status in the European Union has similar, but not identical, benefits.

Expedited Development and Review Programs

The FDA has various programs, including Fast Track designation, breakthrough therapy designation, accelerated approval and priority review, that are intended to expedite or simplify the process for the development and FDA review of drugs and biologics that are intended for the treatment of serious or life-threatening diseases or conditions. These programs do not change the standards for approval but may expedite the development or approval process. To be eligible for fast track designation, new drugs and biological products must be intended to treat a serious or life-threatening condition and demonstrate the potential to address unmet medical needs for the condition. Fast Track designation applies to the combination of the product and the specific indication for which it is being studied. The sponsor of a new drug or biologic may request the FDA to designate the drug or biologic as a Fast Track product at any time during the clinical development of the product. One benefit of fast track designation, for example, is that the FDA may consider for review sections of the marketing application for a product that has received Fast Track designation on a rolling basis before the complete application is submitted.

Under the breakthrough therapy program, products intended to treat a serious or life-threatening disease or condition may be eligible for the benefits of the Fast Track program when preliminary clinical evidence demonstrates that such product may have substantial improvement on one or more clinically significant endpoints over existing therapies. Additionally, FDA will seek to ensure the sponsor of a breakthrough therapy product receives timely advice and interactive communications to help the sponsor design and conduct a development program as efficiently as possible.

Any product is eligible for priority review if it has the potential to provide safe and effective therapy where no satisfactory alternative therapy exists or a significant improvement in the treatment, diagnosis or prevention of a disease compared to marketed products. The FDA will attempt to direct additional resources to the evaluation of an application for a new drug or biological product designated for priority review in an effort to facilitate the review. Under priority review, the FDA's goal is to review an application in six months, compared to ten months for a standard review.

Additionally, a product may be eligible for accelerated approval. Drug or biological products studied for their safety and effectiveness in treating serious or life-threatening illnesses and that provide meaningful therapeutic benefit over existing treatments may receive accelerated approval, which means that they may be approved on the basis of adequate and well-controlled clinical studies establishing that the product has an effect on a surrogate endpoint that is reasonably likely to predict a clinical benefit, or on the basis of an effect on a clinical endpoint other than survival or irreversible morbidity. As a condition of approval, the FDA may require that a sponsor of a drug or biological product receiving accelerated approval perform adequate and well-controlled post-marketing clinical studies. In addition, the FDA currently requires as a condition for accelerated

approval pre-approval of promotional materials, which could adversely impact the timing of the commercial launch of the product.

Regenerative Medicine Advanced Therapies Designation

As part of the 21st Century Cures Act, enacted in December 2016, Congress amended the FD&C Act to facilitate an efficient development program for, and expedite review of regenerative medicine advanced therapies, which include cell and gene therapies, therapeutic tissue engineering products, human cell and tissue products, and combination products using any such therapies or products. Regenerative medicine advanced therapies do not include those human cells, tissues, and cellular and tissue based products regulated solely under section 361 of the Public Health Service Act and 21 CFR Part 1271. This program is intended to facilitate efficient development and expedite review of regenerative medicine therapies, which are intended to treat, modify, reverse, or cure a serious or life-threatening disease or condition and qualify for RMAT designation. A drug sponsor may request that FDA designate a drug as a RMAT concurrently with or at any time after submission of an IND. FDA has 60 calendar days to determine whether the drug meets the criteria, including whether there is preliminary clinical evidence indicating that the drug has the potential to address unmet medical needs for a serious or life-threatening disease or condition. A BLA for a regenerative medicine therapy that has received RMAT designation may be eligible for priority review or accelerated approval through use of surrogate or intermediate endpoints reasonably likely to predict long-term clinical benefit, or reliance upon data obtained from a meaningful number of sites. Benefits of RMAT designation also include early interactions with FDA to discuss any potential surrogate or intermediate endpoint to be used to support accelerated approval. A regenerative medicine therapy with RMAT designation that is granted accelerated approval and is subject to post-approval requirements may fulfill such requirements through the submission of clinical evidence from clinical studies, patient registries, or other sources of real world evidence, such as electronic health records; the collection of larger confirmatory data sets; or post-approval monitoring of all patients treated with such therapy prior to its approval. Like FDA's other expedited development programs, RMAT designation does not change the standards for approval but may expedite the development or approval process.

Post-Approval Requirements

Maintaining substantial compliance with applicable federal, state, and local statutes and regulations requires the expenditure of substantial time and financial resources. Rigorous and extensive FDA regulation of biological products continues after approval, particularly with respect to CGMP. We will rely, and expect to continue to rely, on third parties for the production of clinical and commercial quantities of any products that we may commercialize. Manufacturers of our products are required to comply with applicable requirements in the CGMP regulations, including quality control and quality assurance and maintenance of records and documentation. Other post-approval requirements applicable to biological products, include reporting of CGMP deviations that may affect the identity, potency, purity and overall safety of a distributed product, record-keeping requirements, reporting of adverse effects, reporting updated safety and efficacy information, and complying with electronic record and signature requirements. After a BLA is approved, the product also may be subject to official lot release. As part of the manufacturing process, the manufacturer is required to perform certain tests on each lot of the product before it is released for distribution. If the product is subject to official release by the FDA, the manufacturer submits samples of each lot of product to the FDA together with a release protocol showing a summary of the history of manufacture of the lot and the results of all of the manufacturer's tests performed on the lot. The FDA also may perform certain confirmatory tests on lots of some products, such as viral vaccines, before releasing the lots for distribution by the manufacturer. In addition, the FDA conducts laboratory research related to the regulatory standards on the safety, purity, potency, and effectiveness of biological products.

We also must comply with the FDA's advertising and promotion requirements, such as those related to direct-to-consumer advertising, the prohibition on promoting products for uses or in patient populations that are not described in the product's approved labeling (known as "off-label use"), industry-sponsored scientific and educational activities, and promotional activities involving the internet. Discovery of previously unknown

problems or the failure to comply with the applicable regulatory requirements may result in restrictions on the marketing of a product or withdrawal of the product from the market as well as possible civil or criminal sanctions. Failure to comply with the applicable U.S. requirements at any time during the product development process, approval process or after approval, may subject an applicant or manufacturer to administrative or judicial civil or criminal sanctions and adverse publicity. FDA sanctions could include refusal to approve pending applications, withdrawal of an approval, clinical holds, warning or untitled letters, product recalls, product seizures, total or partial suspension of production or distribution, injunctions, fines, refusals of government contracts, mandated corrective advertising or communications with doctors or other stakeholders, debarment, restitution, disgorgement of profits, or civil or criminal penalties. Any agency or judicial enforcement action could have a material adverse effect on us.

Biological product manufacturers and other entities involved in the manufacture and distribution of approved biological products are required to register their establishments with the FDA and certain state agencies, and are subject to periodic unannounced inspections by the FDA and certain state agencies for compliance with CGMPs and other laws. Accordingly, manufacturers must continue to expend time, money, and effort in the area of production and quality control to maintain CGMP compliance. Discovery of problems with a product after approval may result in restrictions on a product, manufacturer, or holder of an approved BLA, including withdrawal of the product from the market. In addition, changes to the manufacturing process or facility generally require prior FDA approval before being implemented and other types of changes to the approved product, such as adding new indications and additional labeling claims, are also subject to further FDA review and approval.

U.S. Patent Term Restoration and Marketing Exclusivity

Depending upon the timing, duration and specifics of the FDA approval of the use of our product candidates, some of our U.S. patents may be eligible for limited patent term extension under the Drug Price Competition and Patent Term Restoration Act of 1984, commonly referred to as the Hatch-Waxman Amendments. The Hatch-Waxman Amendments permit a patent restoration term of up to five years as compensation for patent term lost during product development and the FDA regulatory review process. However, patent term restoration cannot extend the remaining term of a patent beyond a total of 14 years from the product's approval date. The patent term restoration period is generally one-half the time between the effective date of an IND and the submission date of a BLA plus the time between the submission date of a BLA and the approval of that application. Only one patent applicable to an approved biological product is eligible for the extension and the application for the extension must be submitted prior to the expiration of the patent. In addition, a patent can only be extended once and only for a single product. The U.S. PTO, in consultation with the FDA, reviews and approves the application for any patent term extension or restoration. In the future, we may intend to apply for restoration of patent term for one of our patents, if and as applicable, to add patent life beyond its current expiration date, depending on the expected length of the clinical studies and other factors involved in the filing of the relevant BLA.

A biological product can obtain pediatric market exclusivity in the United States. Pediatric exclusivity, if granted, adds six months to existing exclusivity periods, including some regulatory exclusivity periods tied to patent terms. This six-month exclusivity, which runs from the end of other exclusivity protection or patent term, may be granted based on the voluntary completion of a pediatric study in accordance with an FDA-issued "Written Request" for such a study.

The Patient Protection and Affordable Care Act, or Affordable Care Act or ACA or PPACA, signed into law on March 23, 2010, includes a subtitle called the Biologics Price Competition and Innovation Act of 2009 which created an abbreviated approval pathway for biological products shown to be similar to, or interchangeable with, an FDA-licensed reference biological product. This amendment to the PHS Act attempts to minimize duplicative testing. Biosimilarity, which requires that there be no clinically meaningful differences between the biological product and the reference product in terms of safety, purity, and potency, can be shown through analytical

studies, animal studies, and a clinical study or studies. Interchangeability requires that a product is biosimilar to the reference product and the product must demonstrate that it can be expected to produce the same clinical results as the reference product and, for products administered multiple times, the biologic and the reference biologic may be switched after one has been previously administered without increasing safety risks or risks of diminished efficacy relative to exclusive use of the reference biologic. However, complexities associated with the larger, and often more complex, structure of biological products, as well as the process by which such products are manufactured, pose significant hurdles to implementation that are still being worked out by the FDA.

A reference biological product is granted four and twelve year exclusivity periods from the time of first licensure of the product. FDA will not accept an application for a biosimilar or interchangeable product based on the reference biological product until four years after the date of first licensure of the reference product, and FDA will not approve an application for a biosimilar or interchangeable product based on the reference biological product until twelve years after the date of first licensure of the reference product. “First licensure” typically means the initial date the particular product at issue was licensed in the United States. Date of first licensure does not include the date of licensure of (and a new period of exclusivity is not available for) a biological product if the licensure is for a supplement for the biological product or for a subsequent application by the same sponsor or manufacturer of the biological product (or licensor, predecessor in interest, or other related entity) for a change (not including a modification to the structure of the biological product) that results in a new indication, route of administration, dosing schedule, dosage form, delivery system, delivery device or strength, or for a modification to the structure of the biological product that does not result in a change in safety, purity, or potency. Therefore, one must determine whether a new product includes a modification to the structure of a previously licensed product that results in a change in safety, purity, or potency to assess whether the licensure of the new product is a first licensure that triggers its own period of exclusivity. Whether a subsequent application, if approved, warrants exclusivity as the “first licensure” of a biological product is determined on a case-by-case basis with data submitted by the sponsor.

Additional Regulation

In addition to the foregoing, state and federal laws regarding environmental protection and hazardous substances, including the Occupational Safety and Health Act, the Resource Conservancy and Recovery Act and the Toxic Substances Control Act, affect our business. These and other laws govern our use, handling and disposal of various biological, chemical and radioactive substances used in, and wastes generated by, our operations. If our operations result in contamination of the environment or expose individuals to hazardous substances, we could be liable for damages and governmental fines. We believe that we are in material compliance with applicable environmental laws and that continued compliance therewith will not have a material adverse effect on our business. We cannot predict, however, how changes in these laws may affect our future operations.

U.S. Foreign Corrupt Practices Act

The U.S. Foreign Corrupt Practices Act, to which we are subject, prohibits corporations and individuals from engaging in certain activities to obtain or retain business or to influence a person working in an official capacity. It is illegal to pay, offer to pay or authorize the payment of anything of value to any foreign government official, government staff member, political party or political candidate in an attempt to obtain or retain business or to otherwise influence a person working in an official capacity.

Government Regulation outside of the United States

In addition to regulations in the United States, we will be subject to a variety of regulations in other jurisdictions governing, among other things, clinical studies and any commercial sales and distribution of our products. Because biologically sourced raw materials are subject to unique contamination risks, their use may be restricted in some countries.

Whether or not we obtain FDA approval for a product, we must obtain the requisite approvals from regulatory authorities in foreign countries prior to the commencement of clinical studies or marketing of the product in those countries. Certain countries outside of the United States have a similar process that requires the submission of a clinical study application much like the IND prior to the commencement of human clinical studies. In the European Union, for example, a Clinical Trial Application, or CTA, must be submitted for each clinical trial to each country's national health authority and an independent ethics committee, much like the FDA and an IRB, respectively. Once the CTA is approved in accordance with a country's requirements, the corresponding clinical study may proceed.

The requirements and process governing the conduct of clinical studies, product licensing, pricing and reimbursement vary from country to country. In all cases, the clinical studies must be conducted in accordance with GCP and the applicable regulatory requirements and the ethical principles that have their origin in the Declaration of Helsinki.

To obtain regulatory approval of an investigational product under European Union regulatory systems, we must submit a marketing authorization application. The application used to file the BLA in the United States is similar to that required in the European Union, with the exception of, among other things, region-specific document requirements. The European Union also provides opportunities for market exclusivity. For example, in the European Union, upon receiving marketing authorization, innovative medicinal products generally receive eight years of data exclusivity and an additional two years of market exclusivity. If granted, data exclusivity prevents regulatory authorities in the European Union from referencing the innovator's data to assess a generic or biosimilar application. During the additional two-year period of market exclusivity, a generic or biosimilar marketing authorization can be submitted, and the innovator's data may be referenced, but no generic or biosimilar product can be marketed until the expiration of the market exclusivity. However, there is no guarantee that a product will be considered by the European Union's regulatory authorities to be an innovative medicinal product, and products may not qualify for data exclusivity. Products receiving orphan designation in the European Union can receive ten years of market exclusivity, during which time no similar medicinal product for the same indication may be placed on the market. An orphan product can also obtain an additional two years of market exclusivity in the European Union for pediatric studies. No extension to any supplementary protection certificate can be granted on the basis of pediatric studies for orphan indications.

The criteria for designating an "orphan medicinal product" in the European Union are similar in principle to those in the United States. Under Article 3 of Regulation (EC) 141/2000, a medicinal product may be designated as orphan if (1) it is intended for the diagnosis, prevention or treatment of a life-threatening or chronically debilitating condition; (2) either (a) such condition affects no more than five in 10,000 persons in the European Union when the application is made, or (b) the product, without the benefits derived from orphan status, would not generate sufficient return in the European Union to justify investment; and (3) there exists no satisfactory method of diagnosis, prevention or treatment of such condition authorized for marketing in the European Union, or if such a method exists, the product will be of significant benefit to those affected by the condition, as defined in Regulation (EC) 847/2000. Orphan medicinal products are eligible for financial incentives such as reduction of fees or fee waivers and are, upon grant of a marketing authorization, entitled to ten years of market exclusivity for the approved therapeutic indication. The application for orphan drug designation must be submitted before the application for marketing authorization. The applicant will receive a fee reduction for the marketing authorization application if the orphan drug designation has been granted, but not if the designation is still pending at the time the marketing authorization is submitted. Orphan drug designation does not convey any advantage in, or shorten the duration of, the regulatory review and approval process.

The 10-year market exclusivity may be reduced to six years if, at the end of the fifth year, it is established that the product no longer meets the criteria for orphan designation, for example, if the product is sufficiently profitable not to justify maintenance of market exclusivity. Additionally, marketing authorization may be granted to a similar product for the same indication at any time if:

- The second applicant can establish that its product, although similar, is safer, more effective or otherwise clinically superior;
- The applicant consents to a second orphan medicinal product application; or
- The applicant cannot supply enough orphan medicinal product.

For other countries outside of the European Union, such as countries in Eastern Europe, Latin America or Asia, the requirements governing the conduct of clinical studies, product licensing, pricing and reimbursement vary from country to country. In all cases, again, the clinical studies must be conducted in accordance with GCP and the applicable regulatory requirements and the ethical principles that have their origin in the Declaration of Helsinki.

If we fail to comply with applicable foreign regulatory requirements, we may be subject to, among other things, fines, suspension or withdrawal of regulatory approvals, product recalls, seizure of products, operating restrictions and criminal prosecution.

Other Healthcare Laws and Compliance Requirements

In addition to FDA restrictions on the marketing of pharmaceutical products, we may be subject to various federal and state laws targeting fraud and abuse in the healthcare industry. These laws may impact, among other things, our business or financial arrangements and relationships through which we market, sell and distribute the gene therapies for which we obtain approval. In addition, we may be subject to patient privacy regulation by both the federal government and the states in which we conduct our business. The laws that may affect our ability to operate include:

- the federal Anti-Kickback Statute, which prohibits, among other things, knowingly and willfully soliciting, receiving, offering or paying any remuneration (including any kickback, bribe, or rebate), directly or indirectly, overtly or covertly, in cash or in kind, to induce, or in return for, either the referral of an individual, or the purchase, lease, order or recommendation of any good, facility, item or service for which payment may be made, in whole or in part, under a federal healthcare program, such as the Medicare and Medicaid programs; a person or entity does not need to have actual knowledge of the federal Anti-Kickback Statute or specific intent to violate it to have committed a violation. In addition, the government may assert that a claim including items or services resulting from a violation of the federal Anti-Kickback Statute constitutes a false or fraudulent claim for purposes of the federal False Claims Act or federal civil money penalties statute;
- federal civil and criminal false claims laws and civil monetary penalties laws, such as the federal False Claims Act, which impose criminal and civil penalties and authorize civil whistleblower or qui tam actions, against individuals or entities for, among other things: knowingly presenting, or causing to be presented, to the federal government, claims for payment that are false or fraudulent; making, using or causing to be made or used, a false statement or record material to a false or fraudulent claim or obligation to pay or transmit money or property to the federal government; or knowingly concealing or knowingly and improperly avoiding or decreasing an obligation to pay money to the federal government;
- the anti-inducement law, which prohibits, among other things, the offering or giving of remuneration, which includes, without limitation, any transfer of items or services for free or for less than fair market value (with limited exceptions), to a Medicare or Medicaid beneficiary that the person knows or should know is likely to influence the beneficiary’s selection of a particular supplier of items or services reimbursable by a federal or state governmental program;

- the federal Health Insurance Portability and Accountability Act of 1996, or HIPAA, which created new federal criminal statutes that prohibit knowingly and willfully executing, or attempting to execute, a scheme to defraud any healthcare benefit program or obtain, by means of false or fraudulent pretenses, representations, or promises, any of the money or property owned by, or under the custody or control of, any healthcare benefit program, regardless of the payer (e.g., public or private) and knowingly and willfully falsifying, concealing or covering up by any trick or device a material fact or making any materially false statements in connection with the delivery of, or payment for, healthcare benefits, items or services relating to healthcare matters; similar to the federal Anti-Kickback Statute, a person or entity does not need to have actual knowledge of the statute or specific intent to violate it in order to have committed a violation;
- HIPAA, as amended by the Health Information Technology for Economic and Clinical Health Act of 2009, and their respective implementing regulations, which impose requirements on certain covered healthcare providers, health plans, and healthcare clearinghouses as well as their respective business associates that perform services for them that involve the use, or disclosure of, individually identifiable health information, relating to the privacy, security and transmission of individually identifiable health information;
- the federal transparency requirements under the Affordable Care Act, including the provision commonly referred to as the Physician Payments Sunshine Act, which requires manufacturers of drugs, devices, biologics and medical supplies for which payment is available under Medicare, Medicaid or the Children's Health Insurance Program to report annually to the U.S. Department of Health and Human Services information related to payments or other transfers of value made to physicians (defined to include doctors, dentists, optometrists, podiatrists and chiropractors) and teaching hospitals, as well as ownership and investment interests held by the physicians described above and their immediate family members;
- federal government price reporting laws, which require us to calculate and report complex pricing metrics in an accurate and timely manner to government programs; and
- federal consumer protection and unfair competition laws, which broadly regulate marketplace activities and activities that potentially harm consumers.

Additionally, we are subject to state and foreign equivalents of each of the healthcare laws described above, among others, some of which may be broader in scope and may apply regardless of the payer. Many U.S. states have adopted laws similar to the federal Anti-Kickback Statute, some of which apply to the referral of patients for healthcare services reimbursed by any source, not just governmental payers, including private insurers. In addition, some states have passed laws that require pharmaceutical companies to comply with the April 2003 Office of Inspector General Compliance Program Guidance for Pharmaceutical Manufacturers and/or the Pharmaceutical Research and Manufacturers of America's Code on Interactions with Healthcare Professionals. Several states also impose other marketing restrictions or require pharmaceutical companies to make marketing or price disclosures to the state. There are ambiguities as to what is required to comply with these state requirements and if we fail to comply with an applicable state law requirement we could be subject to penalties. Finally, there are state and foreign laws governing the privacy and security of health information, many of which differ from each other in significant ways and often are not preempted by HIPAA, thus complicating compliance efforts.

Because of the breadth of these laws and the narrowness of the statutory exceptions and safe harbors available, it is possible that some of our business activities could be subject to challenge under one or more of such laws.

Violations of fraud and abuse laws may be punishable by criminal and/or civil sanctions, including penalties, fines, imprisonment and/or exclusion or suspension from federal and state healthcare programs such as Medicare and Medicaid and debarment from contracting with the U.S. government. In addition, private

individuals have the ability to bring actions on behalf of the U.S. government under the federal False Claims Act as well as under the false claims laws of several states.

Law enforcement authorities are increasingly focused on enforcing fraud and abuse laws, and it is possible that some of our practices may be challenged under these laws. Efforts to ensure that our current and future business arrangements with third parties, and our business generally, will comply with applicable healthcare laws and regulations will involve substantial costs. It is possible that governmental authorities will conclude that our business practices, including our arrangements with physicians and other healthcare providers, some of whom receive stock options as compensation for services provided, may not comply with current or future statutes, regulations, agency guidance or case law involving applicable fraud and abuse or other healthcare laws and regulations. If any such actions are instituted against us, and we are not successful in defending ourselves or asserting our rights, those actions could have a significant impact on our business, including the imposition of civil, criminal and administrative penalties, damages, disgorgement, monetary fines, imprisonment, possible exclusion from participation in Medicare, Medicaid and other federal healthcare programs, contractual damages, reputational harm, diminished profits and future earnings, and curtailment of our operations, any of which could adversely affect our ability to operate our business and our results of operations. In addition, the approval and commercialization of any of our gene therapies outside the United States will also likely subject us to foreign equivalents of the healthcare laws mentioned above, among other foreign laws.

If any of the physicians or other healthcare providers or entities with whom we expect to do business are found to be not in compliance with applicable laws, they may be subject to criminal, civil or administrative sanctions, including exclusions from government funded healthcare programs, which may also adversely affect our business.

Healthcare Reform

A primary trend in the U.S. healthcare industry and elsewhere is cost containment. Government authorities and other third-party payers have attempted to control costs by limiting coverage and the amount of reimbursement for particular medical products. For example, in March 2010, the Affordable Care Act was enacted, which, among other things, increased the minimum Medicaid rebates owed by most manufacturers under the Medicaid Drug Rebate Program; introduced a new methodology by which rebates owed by manufacturers under the Medicaid Drug Rebate Program are calculated for drugs that are inhaled, infused, instilled, implanted or injected; extended the Medicaid Drug Rebate Program to utilization of prescriptions of individuals enrolled in Medicaid managed care plans; imposed mandatory discounts for certain Medicare Part D beneficiaries as a condition for manufacturers' outpatient drugs coverage under Medicare Part D; subjected drug manufacturers to new annual fees based on pharmaceutical companies' share of sales to federal healthcare programs; imposed a new federal excise tax on the sale of certain medical devices; created a new Patient Centered Outcomes Research Institute to oversee, identify priorities in and conduct comparative clinical effectiveness research, along with funding for such research; and established the Center for Medicare Innovation at the CMS to test innovative payment and service delivery models to lower Medicare and Medicaid spending.

Since its enactment, there have been a number of significant changes to the Affordable Care Act. On October 13, 2017, President Trump signed an Executive Order terminating the cost-sharing subsidies that reimburse insurers under the Affordable Care Act. Several state Attorneys General filed suit to stop the administration from terminating the subsidies, but their request for a restraining order was denied by a federal judge in California on October 25, 2017. In addition, CMS has recently proposed regulations that would give states greater flexibility in setting benchmarks for insurers in the individual and small group marketplaces, which may have the effect of relaxing the essential health benefits required under the Affordable Care Act for plans sold through such marketplaces. In January 2017, President Trump signed an Executive Order directing federal agencies with authorities and responsibilities under the Affordable Care Act to waive, defer, grant exemptions from, or delay the implementation of any provision of the Affordable Care Act that would impose a fiscal or regulatory burden on states, individuals, healthcare providers, health insurers, or manufacturers of

pharmaceuticals or medical devices. On October 13, 2017, President Trump signed an Executive Order terminating the cost-sharing subsidies that reimburse insurers under the ACA. Several state Attorneys General filed suit to stop the administration from terminating the subsidies, but their request for a restraining order was denied by a federal judge in California on October 25, 2017. In addition, CMS has recently proposed regulations that would give states greater flexibility in setting benchmarks for insurers in the individual and small group marketplaces, which may have the effect of relaxing the essential health benefits required under the ACA for plans sold through such marketplaces.

The Tax Cuts and Jobs Act of 2017, or TCJA, includes a provision repealing, effective January 1, 2019, the tax-based shared responsibility payment imposed by the ACA on certain individuals who fail to maintain qualifying health coverage for all or part of a year that is commonly referred to as the "individual mandate." Additionally, on January 22, 2018, President Trump signed a continuing resolution on appropriations for fiscal year 2018 that delayed the implementation of certain ACA-mandated fees, including the so-called "Cadillac" tax on certain high cost employer-sponsored insurance plan, the annual fee imposed on certain health insurance providers based on market share, and the medical device exercise tax on non-exempt medical devices. Further, the Bipartisan Budget Act of 2018, or the BBA, among other things, amends the ACA, effective January 1, 2019, to reduce the coverage gap in most Medicare drug plans, commonly referred to as the "donut hole." Congress will likely consider other legislation to replace or modify elements of the Affordable Care Act. We continue to evaluate the effect that the Affordable Care Act and its possible repeal, replacement or further modification could have on our business. It is uncertain the extent to which any such changes may impact our business or financial condition.

In addition, the Budget Control Act of 2011 and the Bipartisan Budget Act of 2015 led to aggregate reductions of Medicare payments to providers of up to 2% per fiscal year that will remain in effect through 2027 unless additional Congressional action is taken. Further, on January 2, 2013, the American Taxpayer Relief Act was signed into law, which, among other things, reduced Medicare payments to several types of providers, including hospitals, imaging centers and cancer treatment centers, and increased the statute of limitations period for the government to recover overpayments to providers from three to five years. More recently, there has been heightened governmental scrutiny over the manner in which manufacturers set prices for their marketed products, which have resulted in several recent Congressional inquiries and proposed bills designed to, among other things, bring more transparency to product pricing, review the relationship between pricing and manufacturer patient programs, and reform government program reimbursement methodologies for pharmaceutical products. Individual states in the United States have also become increasingly active in passing legislation and implementing regulations designed to control pharmaceutical product pricing, including price or patient reimbursement constraints, discounts, restrictions on certain product access and marketing cost disclosure and transparency measures, and, in some cases, designed to encourage importation from other countries and bulk purchasing.

We expect that additional foreign, federal and state healthcare reform measures will be adopted in the future, any of which could limit the amounts that federal and state governments will pay for healthcare products and services, which could result in limited coverage and reimbursement and reduced demand for our products, once approved, or additional pricing pressures.

Coverage and Reimbursement

Significant uncertainty exists as to the coverage and reimbursement status of any gene therapies for which we obtain regulatory approval. In the United States and markets in other countries, sales of any gene therapies for which we receive regulatory approval for commercial sale will depend, in part, on the availability of coverage and reimbursement from third-party payers. Third-party payers include government authorities, managed care providers, private health insurers and other organizations. The process for determining whether a payer will provide coverage for a product may be separate from the process for setting the reimbursement rate that the payer will pay for the product. Third-party payers may limit coverage to specific products on an approved list, or

formulary, which might not include all of the FDA-approved products for a particular indication. A decision by a third-party payer not to cover our gene therapies could reduce physician utilization of our products once approved and have a material adverse effect on our sales, results of operations and financial condition. Moreover, a payer's decision to provide coverage for a product does not imply that an adequate reimbursement rate will be approved. Adequate third-party reimbursement may not be available to enable us to maintain price levels sufficient to realize an appropriate return on our investment in product development.

In addition, coverage and reimbursement for products can differ significantly from payer to payer. One third-party payer's decision to cover a particular medical product or service does not ensure that other payers will also provide coverage for the medical product or service, or will provide coverage at an adequate reimbursement rate.

As a result, the coverage determination process will require us to provide scientific and clinical support for the use of our products to each payer separately and will be a time-consuming process.

Third-party payers are increasingly challenging the price and examining the medical necessity and cost-effectiveness of medical products and services, in addition to their safety and efficacy. In order to obtain and maintain coverage and reimbursement for any product, we may need to conduct expensive clinical trials in order to demonstrate the medical necessity and cost-effectiveness of such product, in addition to the costs required to obtain regulatory approvals. If third-party payers do not consider a product to be cost-effective compared to other available therapies, they may not cover the product as a benefit under their plans or, if they do, the level of payment may not be sufficient to allow a company to sell its products at a profit.

Outside of the United States, the pricing of pharmaceutical products is subject to governmental control in many countries. For example, in the European Union, pricing and reimbursement schemes vary widely from country to country. Some countries provide that products may be marketed only after a reimbursement price has been agreed. Some countries may require the completion of additional studies that compare the cost-effectiveness of a particular therapy to currently available therapies or so-called health technology assessments, in order to obtain reimbursement or pricing approval. Other countries may allow companies to fix their own prices for products, but monitor and control product volumes and issue guidance to physicians to limit prescriptions. Efforts to control prices and utilization of pharmaceutical products and medical devices will likely continue as countries attempt to manage healthcare expenditures.

Facilities

Our corporate headquarters are located in Cambridge, Massachusetts. Our current leased facility encompasses approximately 4,580 square feet of office and laboratory space initially, with the ability to expand up to 11,218 square feet during 2018. The lease for this facility expires in January 2023.

Employees

As of March 31, 2018, we had 24 full-time employees, 14 of whom have Ph.D. or M.D. degrees. Of these full-time employees, 16 employees are engaged in research and development activities and eight employees are engaged in finance, legal, human resources, facilities and general management. We have no collective bargaining agreements with our employees and we have not experienced any work stoppages. We consider our relations with our employees to be good.

Legal Proceedings

From time to time, we are subject to various legal proceedings and claims that arise in the ordinary course of our business activities. Although the results of litigation and claims cannot be predicted with certainty, as of the date of this prospectus, we do not believe we are party to any claim or litigation the outcome of which, if determined adversely to us, would individually or in the aggregate be reasonably expected to have a material adverse effect on our business. Regardless of the outcome, litigation can have an adverse impact on us because of defense and settlement costs, diversion of management resources and other factors.

MANAGEMENT

The following table sets forth the name, age and position of each of our executive officers and directors, as of March 31, 2018:

NAME	AGE	POSITION
Executive Officers		
Geoff MacKay	51	President, Chief Executive Officer and Director
Katina Dorton	60	Chief Financial Officer
Nerissa Kreher, M.D.	45	Chief Medical Officer
Non-Employee Directors		
Bruce Booth, D.Phil.	43	Chairman of the Board of Directors
Ian Clark	57	Director
Annalisa Jenkins, M.B.B.S., F.R.C.P.	52	Director
Christopher Paige, Ph.D.	65	Director
Scott Requadt	50	Director
Joshua Resnick, M.D.	42	Director

(1) Member of the audit committee
(2) Member of the compensation committee
(3) Member of the nominating and corporate governance committee

Executive Officers

Geoff MacKay is our co-founder and has been our chief executive officer and director since November 2015. From April 2015 to June 2017, Mr. MacKay served as interim chief executive officer of eGenesis, Inc., a biotechnology company, and from December 2003 to December 2014, he served as chief executive officer of Organogensis Inc., a biotechnology company. Prior to that, from February 1993 to December 2003, Mr. MacKay served in various senior leadership positions within the global transplantation & immunology franchise at Novartis Canada, Global (Basel), USA. Mr. MacKay has served on the board of directors of Replicel, Inc., a regenerative medicine company, since 2016 and previously served as chairman of the board of MassBio, chairman of the board of the Alliance of Regenerative Medicine, and on the advisory council to the Health Policy Commission for Massachusetts. Mr. MacKay holds a B.A in psychology and a graduate certificate in marketing management from McGill University. We believe Mr. MacKay is qualified to serve on our board because of his executive experience in our industry.

Katina Dorton has been our chief financial officer since August 2017. Prior to joining our company, she served as chief financial officer of Immatics GmbH, a biotechnology company, from 2015 to 2017. Ms. Dorton also served as the principle owner of Doric LLC, an advisory firm, from 2011 to 2015, where she provided consulting services to public and private companies in the areas of mergers and acquisitions and strategic finance. Prior to that, she served as managing director at Needham & Co., managing director-investment banking at Morgan Stanley and as an attorney in private practice at Sullivan & Cromwell. Ms. Dorton serves on the board of directors of US Ecology, Inc. Ms. Dorton holds a J.D. from the University of Virginia School of Law, an M.B.A. from George Washington University, and a B.A. from Duke University.

Nerissa Kreher, M.D. has been our chief medical officer since October 2016. Prior to joining our company, Dr. Kreher was the global head of clinical and medical affairs at Zafgen, Inc. from March 2015 to July 2016. Prior to that, from April 2013 to March 2015, Dr. Kreher held roles of increasing responsibility at Shire HGT, most recently as global clinical development lead. From February 2012 to April 2013, Dr. Kreher served as the

executive medical director, metabolic disorders at Alexion Pharmaceuticals, and as senior medical director, medical affairs at Enobia Pharma from January 2011 to June 2012. Dr. Kreher also served as medical director at Genzyme from April 2008 to January 2011 and as director, medical affairs at EMD Serono from April 2006 to April 2008. Dr. Kreher received a B.S. from the University of North Carolina, an M.D. from East Carolina University School of Medicine, an M.S. in Clinical Research from Indiana University and an Executive M.B.A. from Northeastern University.

Non-Employee Directors

Bruce Booth, D.Phil. has served as the chairman of our board of directors since February 2016. Dr. Booth joined Atlas Venture in 2005, and currently serves as partner. Previously, from 2004 to 2005, Dr. Booth was a principal at Caxton Health Holdings L.L.C., a healthcare-focused investment firm, where he focused on the firm's venture capital activities. Prior to Caxton, from 1999 to 2004, he was an associate principal at McKinsey & Company, a global strategic management consulting firm, where he advised clients on R&D productivity, corporate strategy and business development issues across the biopharmaceutical sector. Dr. Booth serves on the board of several privately held companies, as well as on the board of miRagen Therapeutics, Inc. (Nasdaq: MGEN), Zafgen, Inc. (Nasdaq: ZFGN) and Unum Therapeutics Inc. (Nasdaq: UMRX). Dr. Booth also serves on UCB Pharma's New Medicines Scientific Advisory Board and participates on several other advisory boards for pharmaceutical companies and academic medical centers. As a British Marshall Scholar, Dr. Booth holds a D.Phil. in molecular immunology from Oxford University's Nuffield Department of Medicine and a B.S. in biochemistry, summa cum laude, from Pennsylvania State University. We believe Dr. Booth's extensive leadership, executive, managerial and business experience with life sciences companies, including experience in the formation, development and business strategy of multiple start-up companies in the life sciences sector qualifies him to serve on our board of directors.

Ian Clark has served as a member of our board of directors since January 2018. Mr. Clark currently serves as an operating partner within Clarus Ventures. Previously, Mr. Clark served as the chief executive officer and head of North American commercial operations at Genentech from 2010 to 2016. He joined Genentech in 2003 as senior vice president and general manager, BioOncology. In August 2005, he became senior vice president, commercial operations of Genentech. In January 2006, Mr. Clark became executive vice president, commercial operations of Genentech and became a member of its executive committee. Mr. Clark was named head of global product strategy and chief marketing officer of Roche in April 2009. Prior to joining Genentech, Mr. Clark served as general manager of Novartis Canada, overseeing all of the company's country operations, and as chief operating officer for Novartis United Kingdom. Mr. Clark worked in executive positions in sales and marketing for Sanofi and Ivax in the United Kingdom, France and Eastern Europe. Mr. Clark began his career at Searle, where he held management positions in both sales and marketing. Mr. Clark also serves on the board of directors of Agios Pharmaceuticals, Inc., (Nasdaq: AGIO), Corvus Pharmaceuticals, Inc., (Nasdaq: CVRS), and Shire plc, (Nasdaq: SHPG). He has served on the board of directors of the Biotechnology Industry Organization (BIO) since 2009 as well as on the boards of TerraVia and the Gladstone Foundation and as a member of the Federal Reserve Bank of San Francisco's economic advisory council. Mr. Clark received a B.S and honorary doctorate in biological sciences from Southampton University in the United Kingdom. We believe Mr. Clark is qualified to serve on our board because of his industry experience in the field in which we operate and his executive experience with companies in our industry.

Annalisa Jenkins, M.B.B.C., F.C.R.P. has served as a member of our board of directors since March 2018. Dr. Jenkins has served as the chief executive officer of PlaqueTec Ltd. since November 2017 and was previously the chief executive officer and a member of the board of directors of Dimension Therapeutics, Inc., from September 2014 until its sale to Ultragnyx Pharmaceutical in November 2017. From October 2013 to March 2014, Dr. Jenkins served as executive vice president, head of global research and development for Merck Serono Pharmaceuticals, a biopharmaceutical company. Previously, from September 2011 to October 2013, she served as Merck Serono's executive vice president, global development and medical, and was a member of Merck Serono's executive committee. Prior to that, Dr. Jenkins pursued a 15-year career at Bristol-Myers Squibb

Company, a biopharmaceutical company, where, from July 2009 to June 2011, she was a senior vice president and head of global medical affairs. Dr. Jenkins is currently a committee member of the science board to the FDA, which advises FDA leadership on complex scientific and technical issues. Dr. Jenkins serves on the board of directors of Ardelyx, Inc. (Nasdaq: ARDX), Silence Therapeutics (Nasdaq: SLN), Oncimmune (Nasdaq: ONC) and a number of privately held biotech and life science companies. Dr. Jenkins graduated with a degree in medicine from St. Bartholomew's Hospital in the University of London and subsequently trained in cardiovascular medicine in the UK National Health Service. Earlier in her career, Dr. Jenkins served as a medical officer in the British Royal Navy. We believe Dr. Jenkins is qualified to serve on our board based on her industry experience in the field in which we operate and her executive experience with companies in our industry.

Christopher Paige, Ph.D. has served as a member of our board of directors since January 2016. Dr. Paige is a professor in the departments of medical biophysics and immunology at the University of Toronto. In 1997, he served as the vice president, research of the University Health Network and now serves as senior scientist. In 1990, Dr. Paige became the founding director of the Arthritis and Autoimmunity Research Centre as well as director of research at The Wellesley Hospital. He became a member of the Basel Institute for Immunology in Switzerland in 1980 where he worked until joining the Ontario Cancer Institute as a senior scientist in 1987. Dr. Paige earned a B.S. in biology at the University of Notre Dame in 1974 and a Ph.D. in immunology at the Sloan-Kettering Division of Cornell University Graduate School of Medical Sciences in 1979. We believe Dr. Paige is qualified to serve on our board because of his scientific and industry experience in the field in which we operate.

Scott Requadt has served as a member of our board of directors since July 2016. Mr. Requadt is currently a managing director at Clarus, a life sciences investment fund. Mr. Requadt has 17 years of operating and investment experience in the pharmaceutical industry. Prior to joining Clarus in 2005, Mr. Requadt was Director, Business Development of TransForm Pharmaceuticals, and previously practiced for several years as a mergers and acquisitions attorney at the New York City-based law firm of Davis Polk & Wardwell. Before that, Mr. Requadt was a law clerk for a senior judge at the Supreme Court of Canada. Mr. Requadt holds a B.Com (Joint Honors, Economics & Finance) from McGill University, an LL.B from University of Toronto and an M.B.A. from Harvard Business School (Baker Scholar). Mr. Requadt has been involved in multiple Clarus investments spanning both therapeutics and medtech, as well as several research and development risk-sharing collaborations with large pharmaceutical partners. He is currently also a director of VBI Vaccines (Nasdaq: VBIV), ESSA Pharmaceuticals (Nasdaq: EPIX) and Edev S.a.r.l. and has previously been active on the board of directors of TyRx, Catabasis (Nasdaq: CATB), Oxford Immunotec (Nasdaq: OXFD), Link Medicine and Biolex Therapeutics. We believe Mr. Requadt is qualified to serve on our board because of his industry experience as a biotech public and private company investor.

Joshua Resnick, M.D. has served as a member of our board of directors since July 2016. Dr. Resnick has been a partner at SV Health Investors, or SV, since January 2016. Before joining SV in January 2016, Dr. Resnick was president and managing partner at MRL Ventures Fund, or MRL Ventures, an early-stage therapeutics-focused corporate venture fund that he built and managed within Merck & Co from December 2014 to January 2016. Prior to MRL Ventures, Dr. Resnick was a venture partner with Atlas Venture, or Atlas, focusing on company formation, Seed and Series A investing. During his tenure at Atlas, Dr. Resnick was also the founder and chief executive officer of two start-ups in the immuno-oncology and neuro spaces. Prior to Atlas, Dr. Resnick was a partner at Prism Venture Partners, where he focused on early-stage biopharmaceutical, medical device, tools and diagnostics investments. Dr. Resnick is also an attending physician at Massachusetts General Hospital, as well as Brigham and Women's Hospital since 2006, and an instructor in medicine at Harvard Medical School. Dr. Resnick serves on the board of directors of Kalvista Pharmaceuticals, Inc. (Nasdaq: KALV). Dr. Resnick graduated Magna Cum Laude with a B.A. from Williams College and received his M.D. from the University of Pennsylvania School of Medicine and his M.B.A. from The Wharton School of Business. We believe Dr. Resnick is qualified to serve on our board because of his industry experience as a biotech public and private company investor.

Composition of Our Board of Directors

Our board of directors currently consists of seven members, each of whom is a member pursuant to the board composition provisions of our current certificate of incorporation and agreements with our stockholders. These board composition provisions will terminate upon the completion of this offering. Upon the termination of these provisions, there will be no further contractual obligations regarding the election of our directors. Our nominating and corporate governance committee and our board of directors may therefore consider a broad range of factors relating to the qualifications and background of nominees. Our nominating and corporate governance committee's and our board of directors' priority in selecting board members is the identification of persons who will further the interests of our stockholders through their established record of professional accomplishment, the ability to contribute positively to the collaborative culture among board members, knowledge of our business, understanding of the competitive landscape, professional and personal experiences and expertise relevant to our growth strategy. Our directors hold office until their successors have been elected and qualified or until the earlier of their resignation or removal. Our amended and restated certificate of incorporation and amended and restated bylaws that will become effective upon the closing of this offering also provide that our directors may be removed only for cause by the affirmative vote of the holders of at least two-thirds of the votes that all our stockholders would be entitled to cast in an annual election of directors, and that any vacancy on our board of directors, including a vacancy resulting from an enlargement of our board of directors, may be filled only by vote of a majority of our directors then in office.

Director Independence

Our board of directors has determined that all members of the board of directors, except Mr. MacKay, are independent directors, including for purposes of the rules of The Nasdaq Global Market and the Securities and Exchange Commission, or SEC. In making such independence determination, our board of directors considered the relationships that each non-employee director has with us and all other facts and circumstances that our board of directors deemed relevant in determining their independence, including the beneficial ownership of our capital stock by each non-employee director. In considering the independence of the directors listed above, our board of directors considered the association of our directors with the holders of more than 5% of our common stock. Upon the completion of this offering, we expect that the composition and functioning of our board of directors and each of our committees will comply with all applicable requirements of The Nasdaq Global Market and the rules and regulations of the SEC. There are no family relationships among any of our directors or executive officers. Mr. MacKay is not an independent director under these rules because he is an executive officer of our company.

Staggered Board

In accordance with the terms of our amended and restated certificate of incorporation and amended and restated bylaws that will become effective upon the closing of this offering, our board of directors will be divided into three staggered classes of directors and each will be assigned to one of the three classes. At each annual meeting of the stockholders, a class of directors will be elected for a three-year term to succeed the directors of the same class whose terms are then expiring. The terms of the directors will expire upon the election and qualification of successor directors at the annual meeting of stockholders to be held during the years 2019 for Class I directors, 2020 for Class II directors and 2021 for Class III directors.

- Our Class I directors will be ;
- Our Class II directors will be ; and
- Our Class III directors will be .

Our amended and restated certificate of incorporation and amended and restated bylaws that will become effective upon the closing of this offering will provide that the number of our directors shall be fixed from time to time by a resolution of a majority of our board of directors.

The division of our board of directors into three classes with staggered three-year terms may delay or prevent stockholder efforts to effect a change of our management or a change in control.

Board Leadership Structure and Board's Role in Risk Oversight

Currently, the positions of chairman of the board and that of Chief Executive Officer are separated. We believe that separating these positions will allow our Chief Executive Officer to focus on our day-to-day business, while allowing our chairman of the board to lead the board of directors in its fundamental role of providing advice to and independent oversight of management. Our board of directors recognizes the time, effort and energy that the Chief Executive Officer is required to devote to his position in the current business environment, as well as the commitment required to serve as our chairman, particularly as the board of directors' oversight responsibilities continue to grow. While our amended and restated by-laws and corporate governance guidelines do not require that our chairman and Chief Executive Officer positions be separate, our board of directors believes that having separate positions will be the appropriate leadership structure for us following the completion of this offering.

Risk is inherent with every business, and how well a business manages risk can ultimately determine its success. We face a number of risks, including risks more fully discussed in the section entitled "Risk Factors" appearing elsewhere in this prospectus. Management is responsible for the day-to-day management of risks we face, while our board of directors, as a whole and through its committees, has responsibility for the oversight of risk management. In its risk oversight role, our board of directors has the responsibility to satisfy itself that the risk management processes designed and implemented by management are adequate and functioning as designed.

The role of the board of directors in overseeing the management of our risks is conducted primarily through committees of the board of directors, as disclosed in the descriptions of each of the committees below and in the charters of each of the committees. The full board of directors (or the appropriate board committee in the case of risks that are under the purview of a particular committee) discusses with management our major risk exposures, their potential impact on us, and the steps we take to manage them. When a board committee is responsible for evaluating and overseeing the management of a particular risk or risks, the chairman of the relevant committee reports on the discussion to the full board of directors during the committee reports portion of the next board meeting. This enables the board of directors and its committees to coordinate the risk oversight role, particularly with respect to risk interrelationships.

Committees of Our Board of Directors

Our board of directors has established an audit committee, a compensation committee and a nominating and corporate governance committee, each of which will operate pursuant to a charter to be adopted by our board of directors and will be effective upon the effectiveness of the registration statement of which this prospectus is a part. Upon the effectiveness of the registration statement of which this prospectus is a part, the composition and functioning of all of our committees will comply with all applicable requirements of the Sarbanes-Oxley Act of 2002, Nasdaq and SEC rules and regulations.

Audit Committee

will serve on the audit committee, which will be chaired by . Our board of directors has determined that are "independent" for audit committee purposes as that term is defined in the rules of the SEC and the applicable Nasdaq rules, and each has sufficient knowledge in financial and auditing matters to serve on the audit committee. Our board of directors has designated as an "audit committee financial expert," as defined under the applicable rules of the SEC. The audit committee's responsibilities include:

- appointing, approving the compensation of, and assessing the independence of our independent registered public accounting firm;

- pre-approving audit and permissible non-audit services, and the terms of such services, to be provided by our independent registered public accounting firm;
- reviewing the overall audit plan with our independent registered public accounting firm and members of management responsible for preparing our financial statements;
- reviewing and discussing with management and our independent registered public accounting firm our annual and quarterly financial statements and related disclosures as well as critical accounting policies and practices used by us;
- coordinating the oversight and reviewing the adequacy of our internal control over financial reporting;
- establishing policies and procedures for the receipt and retention of accounting-related complaints and concerns;
- recommending based upon the audit committee's review and discussions with management and our independent registered public accounting firm whether our audited financial statements shall be included in our Annual Report on Form 10-K;
- monitoring the integrity of our financial statements and our compliance with legal and regulatory requirements as they relate to our financial statements and accounting matters;
- preparing the audit committee report required by SEC rules to be included in our annual proxy statement;
- reviewing all related person transactions for potential conflict of interest situations and approving all such transactions; and
- reviewing quarterly earnings releases.

Compensation Committee

will serve on the compensation committee, which will be chaired by . Our board of directors has determined that each member of the compensation committee is "independent" as defined in the applicable Nasdaq rules. The compensation committee's responsibilities include:

- annually reviewing and approving the corporate goals and objectives relevant to the compensation of our Chief Executive Officer;
- evaluating the performance of our Chief Executive Officer in light of such corporate goals and objectives and based on such evaluation (i) determining the cash compensation of our Chief Executive Officer and (ii) determining and approving grants and awards to our Chief Executive Officer under equity-based plans;
- reviewing and approving the cash compensation of our other executive officers;
- reviewing and establishing our overall management compensation, philosophy and policy;
- overseeing and administering our compensation and similar plans;
- evaluating and assessing potential and current compensation advisors in accordance with the independence standards identified in the applicable Nasdaq rules;
- reviewing and approving our policies and procedures for the grant of equity-based awards;
- reviewing and recommending to the board of directors the compensation of our directors;
- preparing our compensation committee report if and when required by SEC rules;
- reviewing and discussing annually with management our "Compensation Discussion and Analysis," if and when required, to be included in our annual proxy statement; and

- reviewing and approving the retention or termination of any consulting firm or outside advisor to assist in the evaluation of compensation matters.

Nominating and Corporate Governance Committee

will serve on the nominating and corporate governance committee, which will be chaired by . Our board of directors has determined that each member of the nominating and corporate governance committee is "independent" as defined in the applicable Nasdaq rules. The nominating and corporate governance committee's responsibilities include:

- developing and recommending to the board of directors, criteria for board and committee membership;
- establishing procedures for identifying and evaluating board of director candidates, including nominees recommended by stockholders;
- reviewing the composition of the board of directors to ensure that it is composed of members containing the appropriate skills and expertise to advise us;
- identifying individuals qualified to become members of the board of directors;
- recommending to the board of directors the persons to be nominated for election as directors and to each of the board's committees;
- developing and recommending to the board of directors, a code of business conduct and ethics and a set of corporate governance guidelines; and
- overseeing the evaluation of our board of directors and management.

Our board of directors may from time to time establish other committees.

Compensation Committee Interlocks and Insider Participation

None of the members of our compensation committee has at any time during the prior three years been one of our officers or employees. None of our executive officers currently serves, or in the past fiscal year has served, as a member of the board of directors or compensation committee of any entity that has one or more executive officers serving on our board of directors or compensation committee.

Corporate Governance

Prior to the effectiveness of the registration statement of which this prospectus is a part, we will adopt a written code of business conduct and ethics that applies to our directors, officers and employees, including our principal executive officer, principal financial officer, principal accounting officer or controller, or persons performing similar functions. Following the effectiveness of the registration statement of which this prospectus is a part, a current copy of the code will be posted on the investor relations section of our website, which is located at www.avrobio.com. If we make any substantive amendments to, or grant any waivers from, the code of business conduct and ethics for any officer or director, we will disclose the nature of such amendment or waiver on our website or in a current report on Form 8-K.

EXECUTIVE COMPENSATION

Executive Compensation Overview

As an emerging growth company, we have opted to comply with the executive compensation disclosure rules applicable to "smaller reporting companies," as such term is defined in the rules promulgated under the Securities Act. This section provides an overview of the compensation awarded to, earned by, or paid to our principal executive officer and our next two most highly compensated executive officers in respect of their service to our company for our fiscal year ended December 31, 2017. We refer to these individuals as our 2017 named executive officers. Our 2017 named executive officers are:

- Geoff MacKay, our President and Chief Executive Officer;
- Katina Dorton, our Chief Financial Officer; and
- Nerissa Kreher, M.D., our Chief Medical Officer.

Our executive compensation program is based on a pay for performance philosophy. Compensation for our executive officers is composed primarily of the following main components: base salary; bonus; and equity incentives in the form of options. Our executive officers, like all full-time employees, are eligible to participate in our health and welfare benefit plans. As we transition from a private company to a publicly traded company, we intend to evaluate our compensation values and philosophy and compensation plans and arrangements as circumstances require. Compensation plans or arrangements that we adopt following the completion of this offering may be materially different from those described in this section.

2017 Summary Compensation Table

The following table sets forth information regarding compensation awarded to, earned by, or paid to our 2017 named executive officers for services rendered to us in all capacities during the fiscal year ended December 31, 2017.

NAME AND PRINCIPAL POSITION	YEAR	SALARY ($)	BONUS ($)(1)	OPTION AWARDS ($)(2)	ALL OTHER COMPENSATION ($)	TOTAL ($)
Geoff MacKay, *President and Chief Executive Officer*	2017	408,000	163,200	30,306	—	601,506
Katina Dorton, *Chief Financial Officer*(3)	2017	113,333	37,917	286,705	24,856(4)	462,811
Nerissa Kreher, M.D., *Chief Medical Officer*	2017	336,600	84,150	18,165	—	438,915

(1) Amounts reflect annual bonuses earned based upon achievement of company and individual performance metrics for the year ended December 31, 2017, but paid in 2018.

(2) Amounts reflect the grant date fair value of option awards granted or modified in 2017 in accordance with the Financial Accounting Standards Board's Accounting Standards Codification Topic 718, or ASC 718. Such grant date fair value does not take into account any estimated forfeitures related to service-vesting conditions. For information regarding assumptions underlying the valuation of equity awards, see Note 2 to our financial statements and the discussion under "Management's Discussion and Analysis of Financial Condition and Results of Operations—Critical Accounting Policies and Significant Judgments and Estimates—Stock-based Compensation" included elsewhere in this prospectus. These amounts do not correspond to the actual value that may be recognized by the 2017 named executive officers upon vesting of applicable awards.

(3) Ms. Dorton commenced her employment with us in August 2017. Her annual salary and bonus were prorated to reflect her partial year of service.

(4) Amount reflects our reimbursement of travel and relocation expenses.

Narrative to the 2017 Summary Compensation Table

Base Salary

We use base salaries to recognize the experience, skills, knowledge and responsibilities required of all our employees, including our 2017 named executive officers. Base salaries for our named executive officers are reviewed annually by our compensation committee, typically in connection with our annual performance review process, and adjusted from time to time, based on the recommendation of the compensation committee, to realign salaries with market levels after taking into account individual responsibilities, performance and experience. None of our 2017 named executive officers is currently party to an employment agreement or other agreement or arrangement that provides for automatic or scheduled increases in base salary.

Annual Bonus

We currently do not have a formal performance-based bonus plan but intend to adopt our Senior Executive Cash Incentive Bonus Plan in connection with this offering. Our employment agreements with our 2017 named executive officers provide that the executive may be eligible to earn an annual performance bonus of up to a target percentage of the executive's base salary, as described further below under the section entitled "—Employment Arrangements with our Chief Executive Officer and our 2017 Named Executive Officers." From time to time, our board of directors or compensation committee may approve annual bonuses for our named executive officers based on individual performance, company performance or as otherwise determined appropriate.

Equity Compensation

Although we do not have a formal policy with respect to the grant of equity incentive awards to our executive officers, or any formal equity ownership guidelines applicable to them, we believe that equity grants provide our executives with a strong link to our long-term performance, create an ownership culture and help to align the interests of our executives and our stockholders. In addition, we believe that equity grants with a time-based vesting feature promote executive retention because this feature incentivizes our executive officers to remain in our employment during the vesting period. Accordingly, our board of directors periodically reviews the equity incentive compensation of our named executive officers and from time to time may grant equity incentive awards to them in the form of stock options.

We typically grant stock option awards at the start of employment to each executive and our other employees. We award our stock options on the date our board of directors approves the grant. We set the option exercise price and grant date fair value based on our per-share estimated valuation on the date of grant. For grants in connection with initial employment, vesting begins on the initial date of employment. To date, we have not maintained a practice of granting additional equity on an annual basis, but we have retained discretion to provide additional targeted grants in certain circumstances.

Employment Arrangements with our Chief Executive Officer and our 2017 Named Executive Officers

We have entered into employment agreements with each of our 2017 named executive officers. These agreements set forth the initial terms and conditions of each executive's employment with us, including base salary, target annual bonus opportunity and standard employee benefit plan participation. In connection with this offering, we intend to enter into an amended and restated employment agreement with each of Mr. MacKay, Dr. Kreher and Ms. Dorton.

These employment agreements provide for "at will" employment. The material terms of these employment agreements with our 2017 named executive officers are described below. The terms "change of control," "cause" and "good reason" referred to below are defined in each employment agreement.

Geoff MacKay

We entered into an employment agreement with Geoff MacKay, our President and Chief Executive Officer, on December 22, 2016. Under the terms of the employment agreement, Mr. MacKay is entitled to receive an annual base salary of $400,000 and an annual target bonus of 40% of his annual base salary based upon our board of directors' assessment of Mr. MacKay's performance and our attainment of targeted goals as set by the board of directors in their sole discretion. Pursuant to his employment agreement, Mr. MacKay also entered into a Confidentiality and IP Assignment Agreement with us.

Mr. MacKay's employment agreement provides that, in the event that his employment is terminated by us without "cause" or by Mr. MacKay with "good reason", subject to the execution and effectiveness of a separation agreement and release, he will be entitled to receive (i) an amount equal to 75% of his base salary, provided that Mr. MacKay has not breached any provisions contained in the Confidentiality and IP Assignment Agreement, payable on our normal payroll cycle, and (ii) reimbursement of COBRA premiums for health benefit coverage, up to an amount equal to the monthly employer contribution that we would have made to provide health insurance to Mr. MacKay had he remained employed with us for up to nine months. Additionally, all stock options and other stock based awards held by Mr. MacKay that would have vested if he had remained employed by us for an additional nine months following the date of termination will vest and become exercisable or non-forfeitable as of the date of termination.

In the event of a "change in control" all stock options and other stock-based awards held by Mr. MacKay shall accelerate and become fully exercisable or non-forfeitable immediately prior to the change in control.

Nerissa Kreher, M.D.

We entered into an employment agreement with Dr. Nerissa Kreher, our Chief Medical Officer, on November 1, 2016. Under the terms of the employment agreement, Dr. Kreher is entitled to receive an annual base salary of $330,000 and an annual target bonus of 25% of her annual base salary based upon our board of directors' assessment of Dr. Kreher's performance and our attainment of targeted goals as set by the board of directors in their sole discretion. Pursuant to her employment agreement, Dr. Kreher also entered into a Confidentiality and IP Assignment Agreement with us.

Dr. Kreher's employment agreement provides that, in the event that her employment is terminated by us without "cause" or by Dr. Kreher with "good reason", subject to the execution and effectiveness of a separation agreement and release, she will be entitled to receive (i) an amount equal to 50% of her base salary, provided that Dr. Kreher has not breached any provisions contained in the Confidentiality and IP Assignment Agreement, payable on our normal payroll cycle, and (ii) reimbursement of COBRA premiums for health benefit coverage, up to an amount equal to the monthly employer contribution that we would have made to provide health insurance to Dr. Kreher had she remained employed with us for up to six months. Additionally, all stock options and other stock based awards held by Dr. Kreher that would have vested if she had remained employed by us for an additional six months following the date of termination will vest and become exercisable or non-forfeitable as of the date of termination.

In the event of a "change in control" all stock options and other stock-based awards held by Dr. Kreher shall accelerate and become fully exercisable or non-forfeitable immediately prior to the change in control.

Katina Dorton

We entered into an employment agreement with Katina Dorton, our Chief Financial Officer, on July 20, 2017. Under the terms of the employment agreement, Ms. Dorton is entitled to receive an annual base salary of $325,000 and an annual target bonus of 35% of her annual base salary based upon our board of directors' assessment of Ms. Dorton's performance and our attainment of targeted goals as set by the board of directors in their sole discretion. Pursuant to her employment agreement, Ms. Dorton also entered into a Confidentiality and IP Assignment Agreement with us.

Pursuant to Ms. Dorton's employment agreement, Ms. Dorton is entitled to reimbursement of temporary living and travel expenses in connection with traveling to and temporary living in Massachusetts of up to $4,000 per month until the earlier of August 28, 2018 and the sale of her Raleigh, North Carolina residence. Ms. Dorton is also entitled to a one-time relocation payment of up to $100,000, less any reimbursements for temporary living and travel expenses previously paid to her, in connection with the relocation of her primary residence from North Carolina to Massachusetts.

Ms. Dorton's employment agreement provides that, in the event that her employment is terminated by us without "cause" or by Ms. Dorton with "good reason", subject to the execution and effectiveness of a separation agreement and release, she will be entitled to receive (i) an amount equal to 50% of her base salary, provided that Ms. Dorton has not breached any provisions contained in the Confidentiality and IP Assignment Agreement, payable on our normal payroll cycle, and (ii) reimbursement of COBRA premiums for health benefit coverage, up to an amount equal to the monthly employer contribution that we would have made to provide health insurance to Ms. Dorton had she remained employed with us for up to six months. Additionally, all stock options and other stock based awards held by Ms. Dorton that would have vested if she had remained employed by us for an additional six months following the date of termination will vest and become exercisable or non-forfeitable as of the date of termination.

In the event of a "change in control" all stock options and other stock-based awards held by Ms. Dorton shall accelerate and become fully exercisable or non-forfeitable immediately prior to the change in control.

Outstanding Equity Awards at 2017 Fiscal Year-End

The following table sets forth information concerning outstanding equity awards held by our 2017 named executive officers as of December 31, 2017. All equity awards set forth in the table below were granted under our Amended and Restated 2015 Stock Option and Grant Plan, or 2015 Plan.

	Option Awards				Stock Awards	
Name	Number of Securities Underlying Unexercised Options (#) Exercisable	Number of Securities Underlying Unexercised Options (#) Unexercisable	Option Exercise Price ($)	Option Expiration Date	Number of Shares or Units of Stock that Have Not Vested (#)	Market Value of Shares or Units that Have Not Vested ($) (5)
Geoff MacKay	312,500	687,500(1)	0.10	4/12/2026	300,000(4)	297,000
	—	190,068(2)	0.22	6/12/2027	—	—
Katina Dorton	—	654,170(2)	0.22	7/19/2027	—	—
Nerissa Kreher, M.D.	103,540	251,460(3)	0.29	10/24/2026	—	—
	—	113,926(2)	0.22	6/12/2027	—	—

(1) The shares underlying this stock option vest as follows: 25% of the shares vested on July 1, 2017 and the remainder vest in equal quarterly installments until the option is fully vested on July 1, 2020, subject to the continued employment of the executive officer.

(2) The shares underlying this stock option vest as follows: 25% of the shares vest on the first anniversary of the grant date and the remainder vest in equal monthly installments until the option is fully vested on the fourth anniversary of the grant date, subject to the continued employment of the executive officer.

(3) The shares underlying this stock option vest as follows: 25% of the shares vested on October 3, 2017 and the remainder vest in equal monthly installments until the option is fully vested on October 3, 2020, subject to the continued employment of the executive officer.

(4) On November 27, 2015, Mr. MacKay transferred his ownership of 300,000 shares to each of his two children, 150,000 shares subject to each transfer remain unvested and subject to vesting as of December 31, 2017, based on Mr. MacKay's continued service to our company.

(5) There was no public market for our common stock as of December 31, 2017. This column represents the value of the shares of restricted stock as of December 31, 2017, based on the fair market value of our common stock as of December 31, 2017, which was $0.99 per share.

Compensation Risk Assessment

We believe that although a portion of the compensation provided to our executive officers and other employees is performance-based, our executive compensation program does not encourage excessive or unnecessary risk taking. This is primarily due to the fact that our compensation programs are designed to encourage our executive officers and other employees to remain focused on both short-term and long-term strategic goals. As a result, we do not believe that our compensation programs are reasonably likely to have a material adverse effect on us.

Employee Benefit and Equity Compensation Plans

Amended and Restated 2015 Stock Option and Grant Plan

The 2015 Plan, was approved by our board of directors and our stockholders on July 21, 2016. The 2015 Plan was most recently amended in January 2018 with the approval of both our board of directors and our stockholders. Under the 2015 Plan, we have reserved for issuance an aggregate of 8,299,387 shares of our common stock. The number of shares of common stock reserved for issuance is subject to adjustment in the event of any merger, consolidation, sale of all or substantially all of our assets, reorganization, recapitalization, reclassification, stock dividend, stock split, reverse stock split or other similar transaction.

The shares of common stock underlying awards that are forfeited, canceled, reacquired by us prior to vesting, satisfied without the issuance of stock or otherwise terminated (other than by exercise) and shares of common stock that are withheld upon exercise of an option or settlement of an award to cover the exercise price or tax withholding are added back to the shares of common stock available for issuance under the 2015 Plan.

Our board of directors has acted as administrator of the 2015 Plan. The administrator has full power to select, from among the individuals eligible for awards, the individuals to whom awards will be granted, and to determine the specific terms and conditions of each award, subject to the provisions of the 2015 Plan. Persons eligible to participate in the 2015 Plan are those employees, officers and directors of, and consultants and advisors to, our company as selected from time to time by the administrator in its discretion.

The 2015 Plan permits the granting of (1) options to purchase common stock intended to qualify as incentive stock options under Section 422 of the Internal Revenue Code of 1986, as amended, or the Code and (2) options that do not so qualify. The per share option exercise price of each option will be determined by the administrator but may not be less than 100% of the fair market value of the common stock on the date of grant. The term of each option will be fixed by the administrator. The administrator will determine at what time or times each option may be exercised. In addition, the 2015 Plan permits the granting of restricted shares of common stock, unrestricted shares of common stock, and restricted stock units.

The 2015 Plan provides that upon the occurrence of a “sale event,” as defined in the 2015 Plan, our board of directors may take one or more of the following actions as to some or all awards outstanding under the 2015 Plan: (i) provide that outstanding options awards will be assumed or substituted by the acquiring or successor corporation, (ii) provide that all unexercised options will terminate immediately prior to the consummation of the sale event unless exercised by the optionee (to the extent exercisable) within a specified period prior to the consummation of the sale event, (iii) make or provide for a cash payment to the optionees equal to the difference between the per share cash consideration in the sale event and the per share exercise price of the outstanding award, (iv) provide that all restricted stock and unvested restricted stock unit awards (other than those becoming vested as a result of the sale event) will be assumed or substituted by the acquiring or successor corporation (v) provide that all restricted stock and unvested restricted stock unit awards (other than those becoming vested as a result of the sale event) will terminate immediately prior to the effective time of any sale event unless repurchased at a price per share equal to the lower of the original per share purchase price paid by the holder (subject to adjustment) or the current fair market value of such shares, determined immediately prior to the effective time of the sale event, (vi) make or provide for a cash payment to the holders of restricted stock or

restricted stock unit awards in an amount equal to the consideration payable per share of stock pursuant to the sale event times the number of shares subject to such award. We may also make or provide for a cash payment to participants holding options in an amount equal to the difference between the per share cash consideration payable to stockholders in the sale event and the exercise price of the options (to the extent then exercisable).

The administrator may amend or discontinue the 2015 Plan at any time, subject to stockholder approval where such approval is required by applicable law. The administrator of the 2015 Plan may also amend or cancel any outstanding award, provided that no amendment to an award may adversely affect a participant's rights without his or her consent.

The 2015 Plan will terminate automatically upon the earlier of 10 years from the date on which the 2015 Plan was adopted by our board of directors or 10 years from the date the 2015 Plan is approved by the Company's stockholders. As of March 31, 2018, options to purchase 7,391,214 shares of common stock were outstanding under the 2015 Plan. Our board of directors has determined not to make any further awards under the 2015 Plan following the closing of this offering.

2018 Stock Option and Incentive Plan

Our 2018 Stock Option and Incentive Plan, or the 2018 Plan, was adopted by our board of directors on , 2018 and approved by our stockholders on , 2018 and will become effective upon the effectiveness of the registration statement of which this prospectus is part. The 2018 Plan will replace the 2015 Plan as our board of directors has determined not to make additional awards under the 2015 Plan following the closing of our initial public offering. The 2018 Plan allows the compensation committee to make equity-based and cash-based incentive awards to our officers, employees, directors and other key persons (including consultants).

We have initially reserved shares of our common stock, or the Initial Limit, for the issuance of awards under the 2018 Plan, plus the shares of common stock remaining available for issuance under our 2015 Plan. The 2018 Plan provides that the number of shares reserved and available for issuance under the plan will automatically increase each January 1, beginning on January 1, 2019, by % of the outstanding number of shares of our common stock on the immediately preceding December 31, or such lesser number of shares as determined by our compensation committee, or the Annual Increase. This number is subject to adjustment in the event of a stock split, stock dividend or other change in our capitalization.

The shares we issue under the 2018 Plan will be authorized but unissued shares or shares that we reacquire. The shares of common stock underlying any awards that are forfeited, cancelled, held back upon exercise or settlement of an award to satisfy the exercise price or tax withholding, reacquired by us prior to vesting, satisfied without any issuance of stock, expire or are otherwise terminated (other than by exercise) under the 2018 Plan and the 2015 Plan will be added back to the shares of common stock available for issuance under the 2018 Plan.

Stock options and stock appreciation rights with respect to no more than shares of stock may be granted to any one individual in any one calendar year. The maximum aggregate number of shares that may be issued in the form of incentive stock options shall not exceed the Initial Limit cumulatively increased on January 1, 2019 and on each January 1 thereafter by the lesser of the Annual Increase for such year or shares of common stock.

The 2018 Plan will be administered by our compensation committee. Our compensation committee has full power to select, from among the individuals eligible for awards, the individuals to whom awards will be granted, to make any combination of awards to participants, and to determine the specific terms and conditions of each award, subject to the provisions of the 2018 Plan. Persons eligible to participate in the 2018 Plan will be those full or part-time officers, employees, non-employee directors and other key persons (including consultants) as selected from time to time by our compensation committee in its discretion.

The 2018 Plan permits the granting of both options to purchase common stock intended to qualify as incentive stock options under Section 422 of the Code, and options that do not so qualify. The option exercise price of each option will be determined by our compensation committee but may not be less than 100% of the fair market value of our common stock on the date of grant. The term of each option will be fixed by our compensation committee and may not exceed 10 years from the date of grant. Our compensation committee will determine at what time or times each option may be exercised.

Our compensation committee may award stock appreciation rights subject to such conditions and restrictions as it may determine. Stock appreciation rights entitle the recipient to shares of common stock, or cash, equal to the value of the appreciation in our stock price over the exercise price. The exercise price of each stock appreciation right may not be less than 100% of the fair market value of the common stock on the date of grant.

Our compensation committee may award restricted shares of common stock and restricted stock units to participants subject to such conditions and restrictions as it may determine. These conditions and restrictions may include the achievement of certain performance goals and/or continued employment with us through a specified vesting period. Our compensation committee may also grant shares of common stock that are free from any restrictions under the 2018 Plan. Unrestricted stock may be granted to participants in recognition of past services or other valid consideration and may be issued in lieu of cash compensation due to such participant. Our compensation committee may grant cash bonuses under the 2018 Plan to participants, subject to the achievement of certain performance goals.

Our compensation committee may grant awards that vest or become payable upon the attainment of performance goals that are established by our compensation committee and related to one or more performance criteria. The performance criteria that could be used with respect to any such awards include: achievement of specified research and development, publication, clinical and/or regulatory milestones, earnings before interest, taxes, depreciation and amortization, net income (loss) (either before or after interest, taxes, depreciation and/or amortization), changes in the market price of our common stock, economic value added, funds from operations or similar measures, sales or revenue, acquisitions or strategic transactions, operating income (loss), cash flow (including, but not limited to, operating cash flow and free cash flow), return on capital, assets, equity, or investment, stockholder returns, return on sales, gross or net profit levels, productivity, expense, margins, operating efficiency, customer satisfaction, working capital, earnings (loss) per share of stock, sales or market shares and number of customers, any of which may be measured either in absolute terms or as compared to any incremental increase or as compared to results of a peer group.

The 2018 Plan provides that in the case of, and subject to, the consummation of a “sale event” as defined in the 2018 Plan, all outstanding awards may be assumed, substituted or otherwise continued by the successor entity. To the extent that the successor entity does not assume, substitute or otherwise continue such awards, then (i) all stock options and stock appreciation rights will automatically become fully exercisable and the restrictions and conditions on all other awards with time-based conditions will automatically be deemed waived, and awards with conditions and restrictions relating to the attainment of performance goals may become vested and non-forfeitable in connection with a sale event in the compensation committee’s discretion and (ii) upon the effectiveness of the sale event, the 2018 Plan and all awards will automatically terminate. In the event of such termination, (i) individuals holding options and stock appreciation rights will be permitted to exercise such options and stock appreciation rights (to the extent exercisable) prior to the sale event; or (ii) we may make or provide for a cash payment to participants holding options and stock appreciation rights equal to the difference between the per share cash consideration payable to stockholders in the sale event and the exercise price of the options or stock appreciation rights (to the extent then exercisable).

Our board of directors may amend or discontinue the 2018 Plan and our compensation committee may amend the exercise price of options and amend or cancel outstanding awards for purposes of satisfying changes in law or any other lawful purpose but no such action may adversely affect rights under an award without the

holder's consent. Certain amendments to the 2018 Plan require the approval of our stockholders. No awards may be granted under the 2018 Plan after the date that is 10 years from the date of stockholder approval. No awards under the 2018 Plan have been made prior to the date of this prospectus.

2018 Employee Stock Purchase Plan

Our 2018 Employee Stock Purchase Plan, or the ESPP, was adopted by our board of directors on , 2018 and approved by our stockholders on , 2018 and will become effective upon the effectiveness of the registration statement of which this prospectus is part. The ESPP is intended to qualify as an "employee stock purchase plan" within the meaning of Section 423(b) of the Code. The ESPP initially reserves and authorizes the issuance of up to a total of shares of common stock to participating employees. The ESPP provides that the number of shares reserved and available for issuance will automatically increase each January 1, beginning on January 1, 2019 and each January 1 thereafter through January 1, , by the least of (i) % of the outstanding number of shares of our common stock on the immediately preceding December 31; (ii) shares or (iii) such number of shares as determined by the ESPP administrator. The number of shares reserved under the ESPP is subject to adjustment in the event of a stock split, stock dividend or other change in our capitalization.

All employees who have completed at least days of employment and whose customary employment is for more than hours per week are eligible to participate in the ESPP. However, any employee who owns 5% or more of the total combined voting power or value of all classes of stock is not eligible to purchase shares under the ESPP.

We will make one or more offerings each year to our employees to purchase shares under the ESPP. Offerings will usually begin on each January 1 and July 1 and will continue for six-month periods, referred to as offering periods. Each eligible employee may elect to participate in any offering by submitting an enrollment form at least 15 business days before the relevant offering date.

Each employee who is a participant in the ESPP may purchase shares by authorizing payroll deductions of up to 10% of his or her base compensation during an offering period. Unless the participating employee has previously withdrawn from the offering, his or her accumulated payroll deductions will be used to purchase shares on the last business day of the offering period at a price equal to 85% of the fair market value of the shares on the first business day or the last business day of the offering period, whichever is lower. Under applicable tax rules, an employee may purchase no more than $ worth of shares of common stock, valued at the start of the purchase period, under the ESPP in any calendar year.

The accumulated payroll deductions of any employee who is not a participant on the last day of an offering period will be refunded. An employee's rights under the ESPP terminate upon voluntary withdrawal from the plan or when the employee ceases employment with us for any reason.

The ESPP may be terminated or amended by our board of directors at any time. An amendment that increases the number of shares of common stock authorized under the ESPP and certain other amendments require the approval of our stockholders.

Senior Executive Cash Incentive Bonus Plan

In , 2018, our board of directors adopted the Senior Executive Cash Incentive Bonus Plan, or the Bonus Plan. The Bonus Plan provides for cash bonus payments based upon the attainment of performance targets established by our compensation committee. The payment targets will be related to financial and operational measures or objectives with respect to our company, or corporate performance goals, as well as individual performance objectives.

Our compensation committee may select corporate performance goals from among the following: achievement of specified research and development, publication, clinical and/or regulatory milestones, adjusted

billings, earnings before interest, taxes, depreciation and amortization, net income (loss) (either before or after interest, taxes, depreciation and/or amortization), changes in the market price of our common stock, economic value-added, funds from operations or similar measure, sales or revenue, acquisitions or strategic transactions, operating income (loss), cash flow (including, but not limited to, operating cash flow and free cash flow), return on capital, assets, equity, or investment, stockholder returns, return on sales, gross or net profit levels, productivity, expense, margins, operating efficiency, customer satisfaction, working capital, earnings (loss) per share of stock, sales or market shares and number of customers, any of which may be measured in absolute terms, as compared to any incremental increase, in terms of growth, or as compared to results of a peer group.

Each executive officer who is selected to participate in the Bonus Plan will have a target bonus opportunity set for each performance period. The bonus formulas will be adopted in each performance period by the compensation committee and communicated to each executive. The corporate performance goals will be measured at the end of each performance period after our financial reports have been published or such other appropriate time as the compensation committee determines. If the corporate performance goals and individual performance objectives are met, payments will be made as soon as practicable following the end of each performance period. Subject to the rights contained in any agreement between the executive officer and us, an executive officer must be employed by us on the bonus payment date to be eligible to receive a bonus payment. The Bonus Plan also permits the compensation committee to approve additional bonuses to executive officers in its sole discretion and provides the compensation committee with discretion to adjust the size of the award as it deems appropriate to account for unforeseen factors beyond management's control that affected corporate performance.

401(k) Plan

We maintain a tax-qualified retirement plan that provides eligible employees with an opportunity to save for retirement on a tax-advantaged basis. All participants' interests in their contributions are 100% vested when contributed. Contributions are allocated to each participant's individual account and are then invested in selected investment alternatives according to the participants' directions. The retirement plan is intended to qualify under Section 401(a) of the Code. Matching contributions to the plan are made at the discretion of our board of directors.

DIRECTOR COMPENSATION

The following table presents the total compensation for each person who served as a non-employee member of our board of directors and received compensation for such service during the fiscal year ended December 31, 2017. Other than as set forth in the table and described more fully below, we did not pay any compensation, make any equity awards or non-equity awards to, or pay any other compensation to any of the non-employee members of our board of directors in 2017. We reimburse non-employee members of our board of directors for reasonable travel expenses. Mr. MacKay, our President and Chief Executive Officer, did not receive any compensation for his service as a member of our board of directors in 2017. Mr. MacKay's compensation for service as an employee for fiscal year 2017 is presented in "Executive Compensation—2017 Summary Compensation Table."

NAME	FEES EARNED OR PAID IN CASH ($)	OPTION AWARDS ($)	TOTAL ($)
Bruce Booth, D.Phil.	—	—	—
Ian Clark(1)	12,500	176,624	189,124
Christopher Paige, Ph.D.	—	—	—
Joshua Resnick, M.D.	—	—	—
Scott Requadt	—	—	—

(1) Pursuant to a letter agreement with us, Mr. Clark is paid an annual cash retainer of $50,000 for his service on the board of directors. As of December 31, 2017, Mr. Clark held an option to purchase 201,396 shares of our common stock, no portion of which was vested as of such date.

Non-Employee Director Compensation Policy

Our board of directors expects to adopt a non-employee director compensation policy, effective upon effectiveness of the registration statement of which this prospectus forms a part, that is designed to enable us to attract and retain, on a long-term basis, highly qualified non-employee directors. Under the policy, each director who is not an employee will be paid cash compensation from and after the completion of this offering, as set forth below:

	MEMBER ANNUAL FEE ($)	CHAIRMAN ADDITIONAL ANNUAL FEE ($)
Board of Directors		
Audit Committee		
Compensation Committee		
Nominating and Corporate Governance Committee		

In addition, each non-employee director serving on our board of directors upon completion of this offering and each non-employee director elected or appointed to our board of directors following the completion of this offering will be granted on the date of such director's election or appointment to the board of directors, which will vest in the following manner, subject to continued service through such vesting date(s): . On the date of each annual meeting of stockholders of our company, each non-employee director will be granted , which will vest in the following manner, subject to continued service as a director through such vesting date(s):

CERTAIN RELATIONSHIPS AND RELATED PARTY TRANSACTIONS

Other than the compensation agreements and other arrangements described under “Executive Compensation” and “Director Compensation” in this prospectus and the transactions described below, since November 17, 2015 (date of inception), there has not been and there is not currently proposed, any transaction or series of similar transactions to which we were, or will be, a party in which the amount involved exceeded, or will exceed, $120,000 and in which any director, executive officer, holder of five percent or more of any class of our capital stock or any member of the immediate family of, or entities affiliated with, any of the foregoing persons, had, or will have, a direct or indirect material interest.

License Agreements and Related Agreements with University Health Network

On January 27, 2016, we entered into an exclusive license agreement with University Health Network, or UHN, pursuant to which UHN granted us an exclusive license to certain intellectual property rights relating to Interleukin-12 proteins, or IL-12. We entered into an amendment to this agreement on September 28, 2017. Under this agreement, we paid C$264,000 to UHN upon execution of the agreement which consisted of an upfront license fee and reimbursement of certain patent expenses. We are also obligated to pay an annual license fee as well as payments in connection with the achievement of certain performance and development milestones for an aggregate total of up to C$19.275 million in milestone payments. Additionally, we will pay a low to mid-single digit royalty percentage on annual sales of licensed products, and a low double digit percentage of all sublicensing revenue. For the years ended December 31, 2016 and 2017, we paid $736,0000 and $151,000 to UHN under this agreement, respectively. Pursuant to this agreement, UHN also purchased 4,800,000 shares of our common stock for an aggregate purchase price of $480.00 under a stock purchase agreement. Under the terms of the stock purchase agreement, we are obligated to pay to UHN five percent of the proceeds from this offering, up to a cap of $2 million, upon the closing of this offering.

On January 27, 2016, we entered into an option agreement with UHN pursuant to which UHN granted us an exclusive option to enter into an exclusive license under certain intellectual property rights related to Fabry disease. On November 4, 2016, we executed our option and entered into an exclusive license agreement with UHN. Under this agreement, UHN granted us an exclusive worldwide license under certain intellectual property rights and a non-exclusive worldwide license under certain know-how, in each case subject to certain retained rights, to develop, commercialize and sell products for use in the treatment of Fabry disease. Under the terms of the agreement, we paid to UHN a one-time upfront fee of C$75,000 and are obligated to pay an annual maintenance fee until the first sale of a licensed product in certain markets. We are also required to make payments to UHN in connection with the achievement of certain development and regulatory milestones in an aggregate amount of up to C$2.45 million, as well as royalties on a country-by-country basis of a low to mid-single digit percentage on annual sales of licensed products and a lower single digit royalty in certain circumstances. Additionally, we will pay a low double digit percentage of all sublicensing revenue. We also made a philanthropic commitment to donate funds to organizations for the benefit of the Canadian Fabry community in an amount equal to a low double digit percentage of our royalty payments and regulatory milestone payments, up to a maximum of C$500,000 in any calendar year. For the years ended December 31, 2016 and 2017, we paid $87,000 and $16,000 to UHN in connection with this agreement, respectively, which consisted of our license option fee, the upfront fee and maintenance fees. See “Business—License Agreements—Exclusive License Agreement with University Health Network” for further information regarding the 2016 Fabry license agreement with UHN. In connection with this agreement, we also entered into (i) a letter agreement with UHN on November 4, 2016, pursuant to which we agreed to provide certain funding and costs and expenses associated with a clinical trial conducted by UHN for the treatment of Fabry disease, and (ii) a letter agreement with UHN on June 2, 2017, pursuant to which we agreed to provide additional funding and costs and expenses associated with the clinical trial conducted by UHN for the treatment of Fabry disease.

In connection with the above agreements, we have also entered into two separate sponsored research agreements with UHN, one in March 2017 and one in June 2017. The March 2017 agreement was amended and

restated and subsequently amended in November 2017. Pursuant to each of these sponsored research agreements, we agreed to fund certain research projects related to IL-12 and Fabry disease, including salaries of certain researchers of up to C$200,000 and C$164,652 under the March 2017 and June 2017 agreements, respectively.

UHN is currently a greater than 5% beneficial owner of our outstanding capital stock. Additionally, Christopher Paige is a senior scientist at UHN and is currently a member of our board of directors. As an inventor of certain of the intellectual property rights related to IL-12 that we license from UHN, Dr. Paige is entitled to a portion of the consideration that we pay to UHN pursuant to the IL-12 license agreement.

Private Placements of Securities

Series Seed Preferred Stock Financing

In January 2016, we sold an aggregate of 3,333,333 shares of our Series Seed preferred stock at a purchase price of $0.45 per share. The following table summarizes purchases of our Series Seed preferred stock by related persons:

STOCKHOLDER	SHARES OF SERIES SEED PREFERRED STOCK	TOTAL PURCHASE PRICE
Atlas Venture Fund X, L.P.(1)	3,333,333	$1,499,999.85

(1) Bruce Booth, D.Phil., a partner at Atlas Venture, is a member of our board of directors. Atlas Venture is a holder of five percent or more of our capital stock.

Series A Preferred Stock Financing

In July 2016, we sold 5,714,286 shares of Series A preferred stock, at a price of $1.3125 per share, pursuant to a stock purchase agreement entered into with the investors. In March 2017, we amended certain provisions of our Series A preferred stock purchase agreement and issued a preferred stock dividend in the form of 3,720,864 additional shares of Series A preferred stock to such investors, which effectively repriced the outstanding shares of Series A preferred stock and changed the purchase price for future shares of Series A preferred stock to be sold under the Series A preferred stock purchase agreement to $0.7949 per share. Concurrent with the amendment, we issued 4,403,070 additional shares of Series A preferred stock at a purchase price of $0.7949 per share. In October 2017, we issued 17,612,279 additional shares of Series A preferred stock in a subsequent closing, at a purchase price of $0.7949 per share.

The following table summarizes purchases of our Series A preferred stock and the issuance of the preferred stock dividend referenced above by related persons:

STOCKHOLDER	SHARES OF SERIES A PREFERRED STOCK	TOTAL PURCHASE PRICE
Atlas Venture Fund X, L.P.(1)	12,580,199	$ 9,999,999.53
Entities affiliated with SV Life Sciences Fund(2)(3)	9,435,150	$ 7,500,000.91
Clarus Life Sciences III, L.P.(4)	9,435,150	$ 7,500,000.91

(1) Bruce Booth, D.Phil., a partner at Atlas Venture, is a member of our board of directors. Atlas Venture is a holder of five percent or more of our capital stock.

(2) Joshua Resnick, M.D., a partner at SV Health Investors, is a member of our board of directors. SV Health Investors is a holder of five percent or more of our capital stock.

(3) Consists of (1) 9,122,809 shares of Series A preferred stock held by SV Life Sciences Fund VI, L.P. and (2) 312,341 shares of Series A preferred stock held by SV Life Sciences Fund VI, Strategic Partners L.P.

(4) Scott G. Requadt, J.D., MBA, a Managing Director at Clarus, is a member of our board of directors. Clarus is a holder of five percent or more of our capital stock.

Series B Preferred Stock Financing

In January 2018, we sold an aggregate of 28,519,322 shares of our Series B preferred stock at a purchase price of $2.1389 per share, pursuant to agreements entered into with the investors. The following table summarizes purchases of our Series B preferred stock by related persons:

STOCKHOLDER	SHARES OF SERIES B PREFERRED STOCK	TOTAL PURCHASE PRICE
Atlas Venture Fund X, L.P.(1)	3,740,239	$ 7,999,997
Entities affiliated with SV Life Sciences Fund(2)(3)	1,870,119	$ 3,999,998
Clarus Life Sciences III, L.P.(4)	2,805,179	$ 5,999,997
Citadel Multi-Strategy Equities Master Fund Ltd.(5)	5,610,360	$11,999,999
Cormorant Private Healthcare Fund I, LP(6)(7)	5,610,360	$11,999,999

(1) Bruce Booth, D.Phil., a partner at Atlas Venture, is a member of our board of directors. Atlas Venture is a holder of five percent or more of our capital stock

(2) Joshua Resnick, M.D., a partner at SV Health Investors, is a member of our board of directors. SV Health Investors, is a holder of five percent or more of our capital stock.

(3) Consists of (i) 1,808,211 shares of Series A preferred stock held by SV Life Sciences Fund VI, L.P. and (ii) 61,908 shares of Series A preferred stock held by SV Life Sciences Fund VI, Strategic Partners L.P.

(4) Scott G. Requadt, J.D., MBA, a Managing Director at Clarus, is a member of our board of directors. Clarus is a holder of five percent or more of our capital stock.

(5) Citadel Multi-Strategy Equities Master Fund Ltd is a holder of five percent or more of our capital stock

(6) Cormorant Private Healthcare Fund I, LP is a holder of five percent or more of our capital stock

(7) Consists of (i) 4,366,543 shares, all purchased and received by Cormorant Private Healthcare Fund I, L.P. (ii) 1,005,938 shares, all purchased and received by Cormorant Global Healthcare Master Fund, L.P. and (iii) 237,879 shares, all purchased and received by CRMA SPV, L.P.

Strategic and Operational Services

Following the Series Seed preferred stock investment in our company by Atlas Venture X, L.P., or Atlas Venture, we were provided with certain services related to strategic and ordinary course business operations in connection with the incubation of our company during its early stages, including the use of office space provided by the management company for Atlas Venture. During the years ended December 31, 2016 and 2017, we paid to such management company fees in the amount of approximately $78,000 and $15,000, respectively. None of these fees were paid directly or indirectly to Bruce Booth, the chairman of our board of directors and a partner at Atlas Venture. In addition, the fees paid to such management company did not exceed 5% of the consolidated gross revenue of Atlas Venture during any of these fiscal years. Atlas Venture X, L.P. is a beneficial owner of more than 5% of our voting securities.

Agreements with Stockholders

In connection with our Series Seed, Series A and Series B preferred stock financings, we entered into investors' rights, voting and right of first refusal and co-sale agreements containing registration rights, information rights, voting rights and rights of first refusal, among other things, with certain holders of our preferred stock and certain holders of our common stock. These stockholder agreements will terminate upon the closing of this offering, except for the registration rights granted under our investors' rights agreement, as more fully described in "Description of Capital Stock—Registration Rights."

Indemnification Agreements

In connection with this offering, we intend to enter into agreements to indemnify our directors and executive officers. These agreements will, among other things, require us to indemnify these individuals for certain expenses (including attorneys' fees), judgments, fines and settlement amounts reasonably incurred by such person in any action or proceeding, including any action by or in our right, on account of any services undertaken by such person on behalf of our company or that person's status as a member of our board of directors to the maximum extent allowed under Delaware law.

Policies for Approval of Related Party Transactions

Our board of directors reviews and approves transactions with directors, officers and holders of five percent or more of our voting securities and their affiliates, each a related party. Prior to this offering, the material facts as to the related party's relationship or interest in the transaction are disclosed to our board of directors prior to their consideration of such transaction, and the transaction is not considered approved by our board of directors unless a majority of the directors who are not interested in the transaction approve the transaction. Further, when stockholders are entitled to vote on a transaction with a related party, the material facts of the related party's relationship or interest in the transaction are disclosed to the stockholders, who must approve the transaction in good faith.

In connection with this offering, we expect to adopt a written related party transactions policy that such transactions must be approved by our audit committee. This policy will become effective on the date on which the registration statement of which this prospectus is part is declared effective by the SEC. Pursuant to this policy, the audit committee has the primary responsibility for reviewing and approving or disapproving "related party transactions," which are transactions between us and related persons in which the aggregate amount involved exceeds or may be expected to exceed $120,000 and in which a related person has or will have a direct or indirect material interest. For purposes of this policy, a related person will be defined as a director, executive officer, nominee for director, or greater than 5% beneficial owner of our common stock, in each case since the beginning of the most recently completed year, and their immediate family members.

PRINCIPAL STOCKHOLDERS

The following table sets forth certain information known to us regarding beneficial ownership of our capital stock as of March 31, 2018, as adjusted to reflect the sale of common stock offered by us in this offering, for:

- each person or group of affiliated persons known by us to be the beneficial owner of more than five percent of our capital stock;
- each of our named executive officers;
- each of our directors; and
- all of our executive officers and directors as a group.

Beneficial ownership is determined in accordance with the rules of the SEC and generally includes voting or investment power with respect to securities. Under those rules, beneficial ownership includes any shares as to which the individual or entity has sole or shared voting power or investment power, and includes securities that the individual or entity has the right to acquire, such as through the exercise of stock options, within 60 days of March 31, 2018. Except as noted by footnote, and subject to community property laws where applicable, we believe, based on the information provided to us, that the persons and entities named in the table below have sole voting and investment power with respect to all common stock shown as beneficially owned by them.

The percentage of beneficial ownership prior to this offering in the table below is based on 73,969,821 shares of common stock deemed to be outstanding as of March 31, 2018, assuming the conversion of all outstanding shares of our preferred stock upon the closing of this offering into an aggregate of 63,303,154 shares of common stock upon the completion of this offering, and the percentage of beneficial ownership at this offering in the table below is based on shares of common stock assumed to be outstanding after the closing of the offering. The information in the table below assumes no exercise of the underwriters' option to purchase additional shares.

Except as otherwise noted below, the address for persons listed in the table is c/o AVROBIO, Inc., One Kendall Square, Building 300, Suite 201, Cambridge, MA 02139.

NAME AND ADDRESS OF BENEFICIAL OWNER	NUMBER OF SHARES BENEFICIALLY OWNED PRIOR TO OFFERING	PERCENTAGE OF SHARES BENEFICIALLY OWNED	
		BEFORE OFFERING	AFTER OFFERING
5% Stockholders:			
Atlas Venture Fund X, L.P.(1)	19,653,771	26.57%	
Clarus Life Sciences III, L.P.(2)	12,240,329	16.55%	
Affiliates of SV Life Sciences Fund(3)	11,305,269	15.28%	
University Health Network(4)	4,800,000	6.49%	
Citadel Multi-Strategy Equities Master Fund Ltd(5)	5,610,360	7.58%	
Affiliates of Cormorant(6)	5,610,360	7.58%	
Named Executive Officers and Directors:			
Geoff MacKay(7)	2,787,500	3.75%	
Katina Dorton	—	—	
Nerissa Kreher, M.D.(8)	140,520	*	
Bruce Booth, D.Phil.	—	—	
Ian T. Clark	—	—	
Annalisa Jenkins, M.B.B.S., F.C.R.P.	—	—	
Christopher Paige, Ph.D.	—	—	
Scott G. Requadt	—	—	
Joshua Resnick, M.D.	—	—	
All executive officers and directors as a group (9 persons) (9)	2,928,020	3.93%	

* Less than 1%

(1) Consists of (i) 3,333,333 shares of common stock issuable upon conversion of Series Seed preferred stock, (ii) 12,580,199 shares of common stock issuable upon conversion of Series A preferred stock and (iii) 3,740,239 shares of common stock issuable upon conversion of Series B preferred stock. All shares are held directly by Atlas Venture Fund X, L.P., or Atlas Venture X. Atlas Venture Associates X, L.P., or AVA X LP, is the general partner of Atlas Venture X, and Atlas Venture Associates X, LLC, or AVA X LLC, is the general partner of AVA X LP. Bruce Booth is a member of AVA X LLC and a member of our board of directors. Dr. Booth disclaims beneficial ownership of such shares, except to the extent of his proportionate pecuniary interest therein, if any. The address for Atlas Venture X is 25 First Street, Suite 303, Cambridge, MA 02141.

(2) Consists of (i) 9,435,150 shares of common stock issuable upon conversion of Series A preferred stock and (ii) 2,805,179 shares of common stock issuable upon conversion of Series B preferred stock. All shares are held directly by Clarus Lifesciences III, L.P., or Clarus. Clarus Ventures III GP, L.P., or the GPLP, as the sole general partner of Clarus, may be deemed to beneficially own certain of the shares held by Clarus. The GPLP disclaims beneficial ownership of all shares held by Clarus in which the GPLP does not have an actual pecuniary interest. Clarus Ventures II, LLC, or the GPLLC, as the sole general partner of the GPLP, may be deemed to beneficially own certain of the shares held by Clarus. The GPLLC disclaims beneficial ownership of all shares held by Clarus in which it does not have an actual pecuniary interest. Each of Nicholas Galakatos, Dennis Henner, Robert Liptak, Scott Requadt, Nicholas Simon, and Kurt Wheeler, as individual managing directors of the GPLLC, may be deemed to beneficially own certain of the shares held of record by Clarus. Each of Messrs. Galakatos, Henner, Liptak, Requadt, Simon and Wheeler disclaims beneficial ownership of all shares held of record by Clarus in which he does not have an actual pecuniary interest. Scott G. Requadt is a member of the GPLLC and a member of our board of directors. Mr. Requadt disclaims beneficial ownership of such shares, except to the extent of his proportionate pecuniary interest therein, if any. The address for the entities is 101 Main Street, Suite 1210, Cambridge, MA 02142.

(3) Consists of (i) 9,122,809 shares of common stock issuable upon conversion of shares of Series A preferred stock held of record by SV Life Sciences Fund VI, L.P., (ii) 312,341 shares of common stock issuable upon conversion of shares of Series A preferred stock held of record by SV Life Sciences Fund VI, Strategic Partners L.P., (iii) 1,808,211 shares of common stock issuable upon conversion of shares of Series B preferred stock held of record by SV Life Sciences Fund VI, L.P. and (iv) 61,908 shares of common stock issuable upon conversion of shares of Series B preferred stock held of record by SV Life Sciences Fund VI, Strategic Partners L.P. SV Health Investors, LLC is the Manager of SV Life Sciences Fund VI, L.P. and SV Life Sciences Fund VI Strategic Partners, L.P. SV Life Sciences Fund VI (GP), LP, or SV Fund VI GP, is the general partner of SV Life Sciences Fund VI, L.P. and SV Life Sciences Fund VI Strategic Partners, L.P. The general partner of SV Fund VI GP is SVLSF VI, LLC. The members of the investment committee of SVLSF VI, LLC are Kate Bingham, Thomas Flynn, James Garvey, Eugene D. Hill, III, Paul LaViolette, and Michael Ross. Each of SV Fund VI GP, SVLSF VI, LLC and the SVLSF VI, LLC investment committee disclaims beneficial ownership of the shares owned directly by SV Life Sciences Fund VI, L.P. and SV Life Sciences Fund VI Strategic Partners, L.P. except to the extent of any pecuniary interest therein. The address for each of the entities and individuals listed above is One Boston Place, Suite 3900, 201 Washington Street, Boston, Massachusetts 02108.

(4) Consists of 4,800,000 shares of common stock. The address for University Health Network is 101 College Street, Toronto, Ontario, Canada M5G 1L7.

(5) Consists of 5,610,360 shares of common stock issuable upon conversion of Series B preferred stock. The address for Citadel Multi-Strategy Equities Master Fund Ltd. is c/o Citadel Advisors LLC, 601 Lexington Avenue, New York, NY 10022.

(6) Consists of (i) 4,366,543 shares of common stock issuable upon conversion of shares of Series B preferred stock held of record by Cormorant Private Healthcare Fund I, LP, or Cormorant Private Fund, (ii) 1,005,938 shares of common stock issuable upon conversion of shares of Series B preferred stock held of record by Cormorant Global Healthcare Master Fund, LP, or Cormorant Master Fund and (iii) 237,879 shares of common stock issuable upon conversion of shares of Series B preferred stock held of record by CRMA

SPV, L.P., or CRMA. The sole general partner of Cormorant Private Fund is Cormorant Private Healthcare GP, LLC and the sole general partner of Cormorant Master Fund is Cormorant Global Healthcare GP, LLC, and together Cormorant GP. Bihua Chen is the sole managing member of Cormorant GP, and may be deemed to have sole voting and investment power of the securities held by the Cormorant Private Fund and the Cormorant Master Fund. The sole investment manager of CRMA is Cormorant Asset Management, LLC, or the Manager. Bihua Chen is the sole managing member of the Manager, and may be deemed to have sole voting and investment power of the securities held by CRMA. The address of the Cormorant Private Fund, the Cormorant Master Fund and CRMA is 200 Clarendon Street, 52nd Floor, Boston, MA 02116.

(7) Consists of (i) 1,750,000 shares of common stock, (ii) 300,000 shares of common stock held by Mac MacKay, (iii), 300,000 shares of common stock held by Kali MacKay and (iv) 437,500 shares of common stock issuable upon exercise of options within 60 days of March 31, 2018. Mr. MacKay is the father of Mac MacKay and Kali MacKay. Mr. MacKay may be deemed to have voting and investment power over shares held by Mac MacKay and Kali MacKay.

(8) Includes 140,520 shares of common stock issuable upon exercise of options within 60 days of March 31, 2018.

(9) Includes an aggregate of 578,020 shares issuable upon exercise of stock options within 60 days of March 31, 2018 held by our executive officers and directors as a group.

DESCRIPTION OF CAPITAL STOCK

The following descriptions are summaries of the material terms of our amended and restated certificate of incorporation and amended and restated bylaws, which will be effective upon the closing of this offering. The descriptions of the common stock and preferred stock give effect to changes to our capital structure that will occur upon the completion of this offering. We refer in this section to our amended and restated certificate of incorporation as our certificate of incorporation, and we refer to our amended and restated bylaws as our bylaws.

General

Upon completion of this offering, our authorized capital stock will consist of shares of common stock, par value $0.0001 per share, and shares of preferred stock, par value $0.0001 per share, all of which shares of preferred stock will be undesignated.

As of March 31, 2018, 10,666,667 shares of our common stock, 3,333,333 shares of Series Seed preferred stock, 31,450,499 shares of Series A preferred stock and 28,519,322 shares of Series B preferred stock were outstanding and held by 24 stockholders of record.

Common Stock

The holders of our common stock are entitled to one vote for each share held on all matters submitted to a vote of the stockholders. The holders of our common stock do not have any cumulative voting rights. Holders of our common stock are entitled to receive ratably any dividends declared by our board of directors out of funds legally available for that purpose, subject to any preferential dividend rights of any outstanding preferred stock. Our common stock has no preemptive rights, conversion rights or other subscription rights or redemption or sinking fund provisions.

In the event of our liquidation, dissolution or winding up, holders of our common stock will be entitled to share ratably in all assets remaining after payment of all debts and other liabilities and any liquidation preference of any outstanding preferred stock. The shares to be issued by us in this offering will be, when issued and paid for, validly issued, fully paid and non-assessable.

Preferred Stock

Upon the completion of this offering, all outstanding shares of our preferred stock will be converted into shares of our common stock. Upon the consummation of this offering, our board of directors will have the authority, without further action by our stockholders, to issue up to shares of preferred stock in one or more series and to fix the rights, preferences, privileges and restrictions thereof. These rights, preferences and privileges could include dividend rights, conversion rights, voting rights, terms of redemption, liquidation preferences, sinking fund terms and the number of shares constituting, or the designation of, such series, any or all of which may be greater than the rights of common stock. The issuance of our preferred stock could adversely affect the voting power of holders of common stock and the likelihood that such holders will receive dividend payments and payments upon our liquidation. In addition, the issuance of preferred stock could have the effect of delaying, deferring or preventing a change in control of our company or other corporate action. Immediately after consummation of this offering, no shares of preferred stock will be outstanding, and we have no present plan to issue any shares of preferred stock.

Stock Options

As of March 31, 2018, there were outstanding options to purchase an aggregate of 7,391,214 shares of our common stock.

Registration Rights

Upon the completion of this offering, the holders of shares of our common stock, including those issuable upon the conversion of preferred stock, will be entitled to rights with respect to the registration of these securities under the Securities Act. These rights are provided under the terms of an investors' rights agreement between us and holders of our preferred stock. The investors' rights agreement includes demand registration rights, short-form registration rights and piggyback registration rights. All fees, costs and expenses of underwritten registrations under this agreement will be borne by us and all selling expenses, including underwriting discounts and selling commissions, will be borne by the holders of the shares being registered.

Demand Registration Rights

Beginning 180 days after the effective date of this registration statement, the holders of shares of our common stock, including those issuable upon the conversion of preferred stock upon closing of this offering, are entitled to demand registration rights. Under the terms of the investors' rights agreement, we will be required, upon the written request of holders of at least 50% of these securities that would result in an aggregate offering price of at least $10.0 million, to file a registration statement and use commercially reasonable efforts to effect the registration of all or a portion of these shares for public resale. We are required to effect only two registrations pursuant to this provision of the investors' rights agreement.

Short-Form Registration Rights

Pursuant to the investors' rights agreement, if we are eligible to file a registration statement on Form S-3, upon the written request of holders of at least 25% of these securities at an aggregate offer price of at least $3.0 million, we will be required to use commercially reasonable efforts to effect a registration of such shares. We are required to effect only two registrations in any twelve month period pursuant to this provision of the investors' rights agreement. The right to have such shares registered on Form S-3 is further subject to other specified conditions and limitations.

Piggyback Registration Rights

Pursuant to the investors' rights agreement, if we register any of our securities either for our own account or for the account of other security holders, the holders of these shares are entitled to include their shares in the registration. Subject to certain exceptions contained in the investors' rights agreement, we and the underwriters may limit the number of shares included in the underwritten offering to the number of shares which we and the underwriters determine in our sole discretion will not jeopardize the success of the offering.

Indemnification

Our investors' rights agreement contains customary cross-indemnification provisions, under which we are obligated to indemnify holders of registrable securities in the event of material misstatements or omissions in the registration statement attributable to us, and they are obligated to indemnify us for material misstatements or omissions attributable to them.

Expiration of Registration Rights

The demand registration rights and short form registration rights granted under the investors' rights agreement will terminate on the earliest of (i) a deemed liquidation event, as defined in the investors' rights agreement, (ii) the fifth anniversary of the completion of this offering and (iii) at such time after this offering when the holders' shares may be sold without restriction pursuant to Rule 144 within a three month period.

Anti-Takeover Effects of our Certificate of Incorporation and Bylaws and Delaware Law

Our amended and restated certificate of incorporation and amended and restated bylaws that will become effective upon the closing of this offering will include a number of provisions that may have the effect of

delaying, deferring or preventing another party from acquiring control of us and encouraging persons considering unsolicited tender offers or other unilateral takeover proposals to negotiate with our board of directors rather than pursue non-negotiated takeover attempts. These provisions include the items described below.

Board Composition and Filling Vacancies

Our amended and restated certificate of incorporation that will become effective upon the closing of this offering will provide for the division of our board of directors into three classes serving staggered three-year terms, with one class being elected each year. Our amended and restated certificate of incorporation will also provide that directors may be removed only for cause and then only by the affirmative vote of the holders of two-thirds or more of the shares then entitled to vote at an election of directors. Furthermore, any vacancy on our board of directors, however occurring, including a vacancy resulting from an increase in the size of our board, may only be filled by the affirmative vote of a majority of our directors then in office even if less than a quorum. The classification of directors, together with the limitations on removal of directors and treatment of vacancies, has the effect of making it more difficult for stockholders to change the composition of our board of directors.

No Written Consent of Stockholders

Our amended and restated certificate of incorporation that will become effective upon the closing of this offering will provide that all stockholder actions are required to be taken by a vote of the stockholders at an annual or special meeting, and that stockholders may not take any action by written consent in lieu of a meeting. This limit may lengthen the amount of time required to take stockholder actions and would prevent the amendment of our bylaws or removal of directors by our stockholders without holding a meeting of stockholders.

Meetings of Stockholders

Our amended and restated certificate of incorporation and amended and restated bylaws that will become effective upon the closing of this offering will provide that only a majority of the members of our board of directors then in office may call special meetings of stockholders and only those matters set forth in the notice of the special meeting may be considered or acted upon at a special meeting of stockholders. Our amended and restated bylaws will limit the business that may be conducted at an annual meeting of stockholders to those matters properly brought before the meeting.

Advance Notice Requirements

Our amended and restated bylaws that will become effective upon the closing of this offering will establish advance notice procedures with regard to stockholder proposals relating to the nomination of candidates for election as directors or new business to be brought before meetings of our stockholders. These procedures provide that notice of stockholder proposals must be timely given in writing to our corporate secretary prior to the meeting at which the action is to be taken. Generally, to be timely, notice must be received at our principal executive offices not less than 90 days nor more than 120 days prior to the first anniversary date of the annual meeting for the preceding year. Our bylaws specify the requirements as to form and content of all stockholders' notices. These requirements may preclude stockholders from bringing matters before the stockholders at an annual or special meeting.

Amendment to Certificate of Incorporation and Bylaws

Any amendment of our amended and restated certificate of incorporation that will become effective upon the closing of this offering must first be approved by a majority of our board of directors, and if required by law or our certificate of incorporation, must thereafter be approved by a majority of the outstanding shares entitled to vote on the amendment and a majority of the outstanding shares of each class entitled to vote thereon as a class, except that the amendment of the provisions relating to stockholder action, board composition, limitation of

liability and the amendment of our bylaws and certificate of incorporation must be approved by not less than two-thirds of the outstanding shares entitled to vote on the amendment, and not less than two-thirds of the outstanding shares of each class entitled to vote thereon as a class. Our bylaws may be amended by the affirmative vote of a majority of the directors then in office, subject to any limitations set forth in the bylaws; and may also be amended by the affirmative vote of at least two-thirds of the outstanding shares entitled to vote on the amendment, or, if our board of directors recommends that the stockholders approve the amendment, by the affirmative vote of the majority of the outstanding shares entitled to vote on the amendment, in each case voting together as a single class.

Undesignated Preferred Stock

Our amended and restated certificate of incorporation that will become effective upon the closing of this offering will provide for authorized shares of preferred stock. The existence of authorized but unissued shares of preferred stock may enable our board of directors to discourage an attempt to obtain control of us by means of a merger, tender offer, proxy contest or otherwise. For example, if in the due exercise of its fiduciary obligations, our board of directors were to determine that a takeover proposal is not in the best interests of our stockholders, our board of directors could cause shares of preferred stock to be issued without stockholder approval in one or more private offerings or other transactions that might dilute the voting or other rights of the proposed acquirer or insurgent stockholder or stockholder group. In this regard, our certificate of incorporation grants our board of directors broad power to establish the rights and preferences of authorized and unissued shares of preferred stock. The issuance of shares of preferred stock could decrease the amount of earnings and assets available for distribution to holders of shares of common stock. The issuance may also adversely affect the rights and powers, including voting rights, of these holders and may have the effect of delaying, deterring or preventing a change in control of us.

Choice of Forum

Our amended and restated certificate of incorporation that will become effective upon the closing of this offering will provide that, unless we consent in writing to the selection of an alternative form, the Court of Chancery of the State of Delaware will be the sole and exclusive forum for: (1) any derivative action or proceeding brought on our behalf; (2) any action asserting a claim of breach of a fiduciary duty or other wrongdoing by any of our directors, officers, employees or agents to us or our stockholders; (3) any action asserting a claim against us arising pursuant to any provision of the General Corporation Law of the State of Delaware or our certificate of incorporation or bylaws; (4) any action to interpret, apply, enforce or determine the validity of our certificate of incorporation or bylaws; or (5) any action asserting a claim governed by the internal affairs doctrine. Our certificate of incorporation also provides that any person or entity purchasing or otherwise acquiring any interest in shares of our capital stock will be deemed to have notice of and to have consented to this choice of forum provision. It is possible that a court of law could rule that the choice of forum provision contained in our amended and restated certificate of incorporation is inapplicable or unenforceable if it is challenged in a proceeding or otherwise.

In addition, our amended and restated certificate of incorporation that will become effective upon the closing of this offering will contain a provision by virtue of which unless we consent in writing to the selection of an alternative forum, the United States District Court for the District of Massachusetts will be the exclusive forum for any private action asserting violations by us or any of our directors or officers of the Securities Act or the Exchange Act, or the rules and regulations promulgated thereunder, and of all suits in equity and actions at law brought to enforce any liability or duty created by those statutes or the rules and regulations under such statutes. If any action the subject matter of which is within the scope of the preceding sentence is filed in a court other than the United States District Court for the District of Massachusetts, the plaintiff or plaintiffs shall be deemed by this provision of our certificate of incorporation (i) to have consented to removal of the action by us to the United States District Court for the District of Massachusetts, in the case of an action filed in a state court, and (ii) to have consented to transfer of the action to the United States District Court for the District of Massachusetts.

Section 203 of the Delaware General Corporation Law

Upon completion of this offering, we will be subject to the provisions of Section 203 of the Delaware General Corporation Law. In general, Section 203 prohibits a publicly held Delaware corporation from engaging in a "business combination" with an "interested stockholder" for a three-year period following the time that this stockholder becomes an interested stockholder, unless the business combination is approved in a prescribed manner. Under Section 203, a business combination between a corporation and an interested stockholder is prohibited unless it satisfies one of the following conditions:

- before the stockholder became interested, our board of directors approved either the business combination or the transaction which resulted in the stockholder becoming an interested stockholder;
- upon consummation of the transaction which resulted in the stockholder becoming an interested stockholder, the interested stockholder owned at least 85% of the voting stock of the corporation outstanding at the time the transaction commenced, excluding for purposes of determining the voting stock outstanding, shares owned by persons who are directors and also officers, and employee stock plans, in some instances, but not the outstanding voting stock owned by the interested stockholder; or
- at or after the time the stockholder became interested, the business combination was approved by our board of directors and authorized at an annual or special meeting of the stockholders by the affirmative vote of at least two-thirds of the outstanding voting stock which is not owned by the interested stockholder.

Section 203 defines a business combination to include:

- any merger or consolidation involving the corporation and the interested stockholder;
- any sale, transfer, lease, pledge or other disposition involving the interested stockholder of 10% or more of the assets of the corporation;
- subject to exceptions, any transaction that results in the issuance or transfer by the corporation of any stock of the corporation to the interested stockholder;
- subject to exceptions, any transaction involving the corporation that has the effect of increasing the proportionate share of the stock of any class or series of the corporation beneficially owned by the interested stockholder; and
- the receipt by the interested stockholder of the benefit of any loans, advances, guarantees, pledges or other financial benefits provided by or through the corporation.

In general, Section 203 defines an interested stockholder as any entity or person beneficially owning 15% or more of the outstanding voting stock of the corporation and any entity or person affiliated with or controlling or controlled by the entity or person.

Nasdaq Global Market Listing

We intend to apply to list our common stock on The Nasdaq Global Market under the trading symbol "AVRO."

Transfer Agent and Registrar

The transfer agent and registrar for our common stock will be .

SHARES ELIGIBLE FOR FUTURE SALE

Prior to this offering, there has been no public market for shares of our common stock. Future sales of our common stock in the public market, or the availability of such shares for sale in the public market, could adversely affect market prices prevailing from time to time. As described below, only a limited number of shares will be available for sale shortly after this offering due to contractual and legal restrictions on resale. Nevertheless, sales of our common stock in the public market after such restrictions lapse, or the perception that those sales may occur, could adversely affect the prevailing market price at such time and our ability to raise equity capital in the future.

Based on the number of shares outstanding as of March 31, 2018, upon the completion of this offering, shares of our common stock will be outstanding, assuming no exercise of the underwriters' option to purchase additional shares and no exercise of outstanding options. Of the outstanding shares, all of the shares sold in this offering will be freely tradable, except that any shares held by our affiliates, as that term is defined in Rule 144 under the Securities Act, may only be sold in compliance with the limitations described below, and shares of our common stock are restricted shares of common stock subject to time-based vesting terms. All remaining shares of common stock held by existing stockholders immediately prior to the completion of this offering will be "restricted securities" as such term is defined in Rule 144. These restricted securities were issued and sold by us, or will be issued and sold by us, in private transactions and are eligible for public sale only if registered under the Securities Act or if they qualify for an exemption from registration under the Securities Act, including the exemptions provided by Rule 144 or Rule 701, summarized below.

Rule 144

In general, a person who has beneficially owned restricted stock for at least six months would be entitled to sell their securities provided that (i) such person is not deemed to have been one of our affiliates at the time of, or at any time during the 90 days preceding, a sale and (ii) we are subject to the Securities Exchange Act of 1934, as amended, or the Exchange Act, periodic reporting requirements for at least 90 days before the sale. Persons who have beneficially owned restricted shares for at least six months but who are our affiliates at the time of, or any time during the 90 days preceding, a sale, would be subject to additional restrictions, by which such person would be entitled to sell within any three-month period only a number of securities that does not exceed the greater of either of the following:

- 1% of the number of shares then outstanding, which will equal approximately shares immediately after this offering, assuming no exercise of the underwriters' option to purchase additional shares, based on the number of shares outstanding as of March 31, 2018; or
- the average weekly trading volume of our common stock on The Nasdaq Global Market during the four calendar weeks preceding the filing of a notice on Form 144 with respect to the sale;

provided, in each case, that we are subject to the Exchange Act periodic reporting requirements for at least 90 days before the sale. Such sales both by affiliates and by non-affiliates must also comply with the manner of sale, current public information and notice provisions of Rule 144.

Rule 701

Rule 701 under the Securities Act, as in effect on the date of this prospectus, permits resales of shares in reliance upon Rule 144 but without compliance with certain restrictions of Rule 144, including the holding period requirement. Most of our employees, executive officers or directors who purchased shares under a written compensatory plan or contract may be entitled to rely on the resale provisions of Rule 701, but all holders of Rule 701 shares are required to wait until 90 days after the date of this prospectus before selling their shares.

However, substantially all Rule 701 shares are subject to lock-up agreements as described below and under "Underwriters" included elsewhere in this prospectus and will become eligible for sale upon the expiration of the restrictions set forth in those agreements.

Lock-Up Agreements

In connection with this offering, we and all of our directors, executive officers and substantially all of the holders of our stock and stock options have signed a lock-up agreement that prevents them from selling any of our common stock or any securities convertible into or exercisable or exchangeable for common stock for a period of not less than 180 days from the date of this prospectus without the prior written consent of Morgan Stanley & Co. LLC and Cowen and Company, LLC, subject to certain exceptions. See the section entitled “Underwriters” appearing elsewhere in this prospectus for more information.

Registration Rights

Upon completion of this offering, certain holders of our securities will be entitled to various rights with respect to registration of their shares under the Securities Act. Registration of these shares under the Securities Act would result in these shares becoming fully tradable without restriction under the Securities Act immediately upon the effectiveness of the registration. See the section entitled “Description of Capital Stock—Registration Rights” appearing elsewhere in this prospectus for more information.

Equity Incentive Plans

We intend to file one or more registration statements on Form S-8 under the Securities Act to register our shares issued or reserved for issuance under our equity incentive plans. The first such registration statement is expected to be filed soon after the date of this prospectus and will automatically become effective upon filing with the SEC. Accordingly, shares registered under such registration statement will be available for sale in the open market, unless such shares are subject to vesting restrictions with us or the lock-up restrictions described above. As of , 2018, we estimate that such registration statement on Form S-8 will cover approximately shares.

10b5-1 Plans

After the offering, certain of our employees, including our executive officers and/or directors may enter into written trading plans that are intended to comply with Rule 10b5-1 under the Exchange Act. Sales under these trading plans would not be permitted until the expiration of the lock-up agreements relating to the offering described above.

MATERIAL U.S. FEDERAL INCOME TAX CONSIDERATIONS FOR NON-U.S. HOLDERS OF COMMON STOCK

The following discussion is a summary of the material U.S. federal income tax considerations applicable to non-U.S. holders (as defined below) with respect to their ownership and disposition of shares of our common stock issued pursuant to this offering. For purposes of this discussion, a non-U.S. holder means a beneficial owner of our common stock that is for U.S. federal income tax purposes:

- a non-resident alien individual;
- a foreign corporation or any other foreign organization taxable as a corporation for U.S. federal income tax purposes; or
- a foreign estate or trust, the income of which is not subject to U.S. federal income tax on a net income basis.

This discussion does not address the tax treatment of partnerships or other entities that are pass-through entities for U.S. federal income tax purposes or persons that hold their common stock through partnerships or other pass-through entities. A partner in a partnership or other pass-through entity that will hold our common stock should consult his, her or its tax advisor regarding the tax consequences of acquiring, holding and disposing of our common stock through a partnership or other pass-through entity, as applicable.

This discussion is based on current provisions of the U.S. Internal Revenue Code of 1986, as amended, which we refer to as the Code, existing and proposed U.S. Treasury Regulations promulgated thereunder, current administrative rulings and judicial decisions, all as in effect as of the date of this prospectus and, all of which are subject to change or to differing interpretation, possibly with retroactive effect. Any such change or differing interpretation could alter the tax consequences to non-U.S. holders described in this prospectus. There can be no assurance that the Internal Revenue Service, which we refer to as the IRS, will not challenge one or more of the tax consequences described herein. We assume in this discussion that a non-U.S. holder holds shares of our common stock as a capital asset within the meaning of Section 1221 of the Code, generally property held for investment.

This discussion does not address all aspects of U.S. federal income taxation that may be relevant to a particular non-U.S. holder in light of that non-U.S. holder's individual circumstances nor does it address any aspects of any U.S. federal tax other than the income tax, U.S. state, local or non-U.S. taxes, the alternative minimum tax, rules regarding qualified small business stock within the meaning of Section 1202 of the Code or the Medicare tax on net investment income. This discussion also does not consider any specific facts or circumstances that may apply to a non-U.S. holder and does not address the special tax rules applicable to particular non-U.S. holders, such as:

- insurance companies;
- tax-exempt or governmental organizations;
- financial institutions;
- brokers or dealers in securities;
- regulated investment companies;
- pension plans;
- "controlled foreign corporations," "passive foreign investment companies," and corporations that accumulate earnings to avoid U.S. federal income tax;
- "qualified foreign pension funds," or entities wholly owned by a "qualified foreign pension fund";
- persons that have a functional currency other than the U.S. dollar;

- persons deemed to sell our common stock under the constructive sale provisions of the Code;
- persons that hold our common stock as part of a straddle, hedge, conversion transaction, synthetic security or other integrated investment;
- persons who hold or receive our common stock pursuant to the exercise of any employee stock option or otherwise as compensation; and
- certain U.S. expatriates.

This discussion is for general information only and is not tax advice. Accordingly, all prospective non-U.S. holders of our common stock should consult their tax advisors with respect to the U.S. federal, state, local and non-U.S. tax consequences of the purchase, ownership and disposition of our common stock.

Distributions on Our Common Stock

Distributions, if any, on our common stock will constitute dividends for U.S. federal income tax purposes to the extent paid from our current or accumulated earnings and profits, as determined under U.S. federal income tax principles. If a distribution exceeds our current and accumulated earnings and profits, the excess will be treated as a tax-free return of the non-U.S. holder's investment, up to such holder's tax basis in the common stock. Any remaining excess will be treated as capital gain, subject to the tax treatment described below in "Gain on Sale or Other Taxable Disposition of Our Common Stock." Any such distributions will also be subject to the discussions below under the sections titled "Backup Withholding and Information Reporting" and "Withholding and Information Reporting Requirements—FATCA."

Subject to the discussion in the following two paragraphs in this section, dividends paid to a non-U.S. holder generally will be subject to withholding of U.S. federal income tax at a 30% rate or such lower rate as may be specified by an applicable income tax treaty between the United States and such holder's country of residence.

Dividends that are treated as effectively connected with a trade or business conducted by a non-U.S. holder within the United States and, if an applicable income tax treaty so provides, that are attributable to a permanent establishment or a fixed base maintained by the non-U.S. holder within the United States, are generally exempt from the 30% withholding tax if the non-U.S. holder satisfies applicable certification and disclosure requirements. However, such U.S. effectively connected income, net of specified deductions and credits, is taxed at the same graduated U.S. federal income tax rates applicable to United States persons (as defined in the Code). Any U.S. effectively connected income received by a non-U.S. holder that is a corporation may also, under certain circumstances, be subject to an additional "branch profits tax" at a 30% rate or such lower rate as may be specified by an applicable income tax treaty between the United States and such holder's country of residence.

A non-U.S. holder of our common stock who claims the benefit of an applicable income tax treaty between the United States and such holder's country of residence generally will be required to provide a properly executed IRS Form W-8BEN or W-8BEN-E (or successor form) to the applicable withholding agent and satisfy applicable certification and other requirements. Non-U.S. holders are urged to consult their tax advisors regarding their entitlement to benefits under a relevant income tax treaty. A non-U.S. holder that is eligible for a reduced rate of U.S. withholding tax under an income tax treaty may obtain a refund or credit of any excess amounts withheld by timely filing a U.S. tax return with the IRS.

Gain on Sale or Other Taxable Disposition of Our Common Stock

Subject to the discussions below under "Backup Withholding and Information Reporting" and "Withholding and Information Reporting Requirements—FATCA," a non-U.S. holder generally will not be subject to any U.S. federal income tax on any gain realized upon such holder's sale or other taxable disposition of shares of our common stock unless:

- the gain is effectively connected with the non-U.S. holder's conduct of a U.S. trade or business and, if an applicable income tax treaty so provides, is attributable to a permanent establishment or a fixed-base

maintained by such non-U.S. holder in the United States, in which case the non-U.S. holder generally will be taxed on a net income basis at the graduated U.S. federal income tax rates applicable to United States persons (as defined in the Code) and, if the non-U.S. holder is a foreign corporation, the branch profits tax described above in "Distributions on Our Common Stock" also may apply;

- the non-U.S. holder is a nonresident alien individual who is present in the United States for 183 days or more in the taxable year of the disposition and certain other conditions are met, in which case the non-U.S. holder will be subject to a 30% tax (or such lower rate as may be specified by an applicable income tax treaty between the United States and such holder's country of residence) on the net gain derived from the disposition, which may be offset by certain U.S. source capital losses of the non-U.S. holder, if any (even though the individual is not considered a resident of the United States), provided that the non-U.S. holder has timely filed U.S. federal income tax returns with respect to such losses; or
- we are, or have been, at any time during the five-year period preceding such sale of other taxable disposition (or the non-U.S. holder's holding period, if shorter) a "U.S. real property holding corporation," unless our common stock is regularly traded on an established securities market and the non-U.S. holder holds no more than 5% of our outstanding common stock, directly or indirectly, actually or constructively, during the shorter of the 5-year period ending on the date of the disposition or the period that the non-U.S. holder held our common stock. Generally, a corporation is a U.S. real property holding corporation only if the fair market value of its U.S. real property interests equals or exceeds 50% of the sum of the fair market value of its worldwide real property interests plus its other assets used or held for use in a trade or business. Although there can be no assurance, we do not believe that we are, or have been, a U.S. real property holding corporation, or that we are likely to become one in the future. No assurance can be provided that our common stock will be regularly traded on an established securities market for purposes of the rules described above.

Backup Withholding and Information Reporting

We must report annually to the IRS and to each non-U.S. holder the gross amount of the distributions on our common stock paid to such holder and the tax withheld, if any, with respect to such distributions. Non-U.S. holders may have to comply with specific certification procedures to establish that the holder is not a United States person (as defined in the Code) in order to avoid backup withholding at the applicable rate with respect to dividends on our common stock. Dividends paid to non-U.S. holders subject to withholding of U.S. federal income tax, as described above in "Distributions on Our Common Stock," generally will be exempt from U.S. backup withholding.

Information reporting and backup withholding will generally apply to the proceeds of a disposition of our common stock by a non-U.S. holder effected by or through the U.S. office of any broker, U.S. or foreign, unless the holder certifies its status as a non-U.S. holder and satisfies certain other requirements, or otherwise establishes an exemption. Generally, information reporting and backup withholding will not apply to a payment of disposition proceeds to a non-U.S. holder where the transaction is effected outside the United States through a non-U.S. office of a broker. However, for information reporting purposes, dispositions effected through a non-U.S. office of a broker with substantial U.S. ownership or operations generally will be treated in a manner similar to dispositions effected through a U.S. office of a broker. Non-U.S. holders should consult their tax advisors regarding the application of the information reporting and backup withholding rules to them. Copies of information returns may be made available to the tax authorities of the country in which the non-U.S. holder resides or is incorporated under the provisions of a specific treaty or agreement. Backup withholding is not an additional tax. Any amounts withheld under the backup withholding rules from a payment to a non-U.S. holder can be refunded or credited against the non-U.S. holder's U.S. federal income tax liability, if any, provided that an appropriate claim is filed with the IRS in a timely manner.

Withholding and Information Reporting Requirements—FATCA

The Foreign Account Tax Compliance Act, or FATCA, generally imposes a U.S. federal withholding tax at a rate of 30% on payments of dividends on, or gross proceeds from the sale or other disposition of, our common stock paid to a foreign entity unless (i) if the foreign entity is a "foreign financial institution," such foreign entity undertakes certain due diligence, reporting, withholding, and certification obligations, (ii) if the foreign entity is not a "foreign financial institution," such foreign entity identifies certain of its U.S. investors, if any, or (iii) the foreign entity is otherwise exempt under FATCA. Under applicable U.S. Treasury regulations, withholding under FATCA currently applies to payments of dividends on our common stock, but will only apply to payments of gross proceeds from a sale or other disposition of our common stock made after December 31, 2018. Under certain circumstances, a non-U.S. holder may be eligible for refunds or credits of this withholding tax. An intergovernmental agreement between the United States and an applicable foreign country may modify the requirements described in this paragraph. Non-U.S. holders should consult their tax advisors regarding the possible implications of this legislation on their investment in our common stock and the entities through which they hold our common stock, including, without limitation, the process and deadlines for meeting the applicable requirements to prevent the imposition of the 30% withholding tax under FATCA.

UNDERWRITERS

Under the terms and subject to the conditions in an underwriting agreement dated the date of this prospectus, the underwriters named below, for whom Morgan Stanley & Co. LLC, Cowen and Company, LLC and Wells Fargo Securities, LLC are acting as representatives, have severally agreed to purchase, and we have agreed to sell to them, severally, the number of shares indicated below:

Name	Number of Shares
Morgan Stanley & Co. LLC	
Cowen and Company, LLC	
Wells Fargo Securities, LLC	
Wedbush Securities Inc.	
Total:	

The underwriters and the representatives are collectively referred to as the “underwriters” and the “representatives,” respectively. The underwriters are offering the shares of common stock subject to their acceptance of the shares from us and subject to prior sale. The underwriting agreement provides that the obligations of the several underwriters to pay for and accept delivery of the shares of common stock offered by this prospectus are subject to the approval of certain legal matters by their counsel and to certain other conditions. The underwriters are obligated to take and pay for all of the shares of common stock offered by this prospectus if any such shares are taken. However, the underwriters are not required to take or pay for the shares covered by the underwriters’ over-allotment option described below.

The underwriters initially propose to offer part of the shares of common stock directly to the public at the offering price listed on the cover page of this prospectus and part to certain dealers at a price that represents a concession not in excess of $ per share under the public offering price. After the initial offering of the shares of common stock, the offering price and other selling terms may from time to time be varied by the representatives.

We have granted to the underwriters an option, exercisable for 30 days from the date of this prospectus, to purchase up to additional shares of common stock at the public offering price listed on the cover page of this prospectus, less underwriting discounts and commissions. The underwriters may exercise this option solely for the purpose of covering over-allotments, if any, made in connection with the offering of the shares of common stock offered by this prospectus. To the extent the option is exercised, each underwriter will become obligated, subject to certain conditions, to purchase about the same percentage of the additional shares of common stock as the number listed next to the underwriter’s name in the preceding table bears to the total number of shares of common stock listed next to the names of all underwriters in the preceding table.

The following table shows the per share and total public offering price, underwriting discounts and commissions, and proceeds before expenses to us. These amounts are shown assuming both no exercise and full exercise of the underwriters’ option to purchase up to an additional shares of common stock.

	Per Share	Total	
		No Exercise	Full Exercise
Public offering price	$	$	$
Underwriting discounts and commissions to be paid by us:	$	$	$
Proceeds, before expenses, to us	$	$	$

The estimated offering expenses payable by us, exclusive of the underwriting discounts and commissions, are approximately $. We have agreed to reimburse the underwriters for expenses relating to clearance of this offering with the Financial Industry Regulatory Authority up to $.

The underwriters have informed us that they do not intend sales to discretionary accounts to exceed 5% of the total number of shares of common stock offered by them.

We intend to apply to list our common stock on The Nasdaq Global Market under the symbol “AVRO.”

We and all of our directors and officers and the holders of substantially all of our outstanding stock and stock options have agreed that, without the prior written consent of Morgan Stanley & Co. LLC and Cowen and Company, LLC, on behalf of the underwriters, we and they will not, during the period ending 180 days after the date of this prospectus (the “restricted period”):

- offer, pledge, sell, contract to sell, sell any option or contract to purchase, purchase any option or contract to sell, grant any option, right or warrant to purchase, lend or otherwise transfer or dispose of, directly or indirectly, any shares of common stock or any securities convertible into or exercisable or exchangeable for shares of common stock;
- file any registration statement with the Securities and Exchange Commission relating to the offering of any shares of common stock or any securities convertible into or exercisable or exchangeable for common stock; or
- enter into any swap or other arrangement that transfers to another, in whole or in part, any of the economic consequences of ownership of the common stock.

whether any such transaction described above is to be settled by delivery of common stock or such other securities, in cash or otherwise. In addition, we and each such person agrees that, without the prior written consent of Morgan Stanley & Co. LLC and Cowen and Company, LLC, on behalf of the underwriters, we or such other person will not, during the restricted period, make any demand for, or exercise any right with respect to, the registration of any shares of common stock or any security convertible into or exercisable or exchangeable for common stock.

The restrictions described in the immediately preceding paragraph to do not apply to:

- transactions relating to shares of common stock or other securities acquired in this offering or acquired in open market transactions after this offering
- transfers of shares of common stock or any security convertible into common stock as a bona fide gift;
- distributions of shares of common stock or any security convertible into common stock to limited partners or stockholders of the signatory;
- the establishment of a trading plan pursuant to Rule 10b5-1 under the Exchange Act for the transfer of shares of common stock, provided that such plan does not provide for the transfer of shares of common stock during the restricted period;
- transfers or dispositions of shares of common stock or other securities to any member of the immediate family of the signatory or any trust for the direct or indirect benefit of the signatory or the immediate family of the signatory in a transaction not involving a disposition for value;
- transfers or dispositions of shares of common stock or other securities to any corporation, partnership, limited liability company or other entity controlled or managed by the signatory, in a transaction not involving a disposition for value;
- transfers or dispositions of shares for common stock or other securities (i) by will, other testamentary document or intestate succession to the legal representative, heir, beneficiary or a member of the immediate family of the signatory upon the death of the signatory, or (ii) by operation of law pursuant to a domestic order or negotiated divorce settlement;
- transfers or dispositions of common stock or any security convertible into or exercisable or exchangeable for common stock to us pursuant to any contractual arrangement in effect prior to the

date of this prospectus and disclosed to Morgan Stanley & Co. LLC and Cowen and Company, LLC, that provides for the repurchase of common stock or other securities by us or in connection with the termination of employment with or service to us, provided that the repurchase price for any such shares of common stock or other securities shall not exceed the original purchase price (subject to appropriate adjustment in the event of any stock dividend, stock split, combination or other similar recapitalization) paid to us for such shares or securities, and, provided further that any public announcement or public filing under Section 16(a) of the Exchange Act required to be made during the restricted period in connection with such transfer or disposition shall clearly indicate in the footnotes thereto or comments section thereof that such transfer or disposition was made solely to us pursuant to the circumstances described above;

- the conversion of any convertible preferred stock described in this prospectus and outstanding as of the date of this prospectus into, or the exercise of any option or warrant described in the prospectus and outstanding as of the date hereof for, shares of common stock, provided that any such shares of common stock received by the signatory shall be subject to the terms of the lock-up agreement; provided, further, that any public filing or public announcement under Section 16(a) of the Exchange Act required during the restricted period in connection with the conversion of such preferred stock or the exercise of such stock option or warrant shall clearly indicate in the footnotes thereto or comments section thereof that the filing relates to the conversion of preferred stock or the exercise of a stock option or warrant, as the case may be, that no shares of common stock were sold by the reporting person and that the shares of common stock received upon exercise of the stock option or warrant are subject to a lock-up agreement with the underwriters of this offering;
- transfers or dispositions of title to (but not beneficial ownership of) shares of common stock or other securities to a nominee or custodian of a person or entity to whom a disposition or transfer would be permissible under any of the foregoing clauses; provided that any such shares of common stock or other securities shall remain subject to the terms of the lock-up agreement; or
- transfers or dispositions of shares of common stock or such other securities pursuant to a bona fide tender offer for shares of our capital stock, merger, consolidation or other similar transaction made to all holders of our securities involving a change of control of us that has been approved by our board of directors, provided that, in the event that the change of control transaction is not consummated, this clause shall not be applicable to the lock-up signatory's shares and other securities shall remain subject to the restrictions contained in the lock-up agreement;

provided that, in the case of any transfer or distribution as described in the second, third, fifth, sixth or seventh bullet point above, the transferee or distributee shall agree to be subject to the restrictions described in the immediately preceding paragraph and (ii) in the case of any transfer or distribution described in the first, second, third, fourth, fifth, sixth, seventh or tenth bullet point above, no public announcement or public filing under Section 16(a) of the Exchange Act relating to such transfer or distribution shall be required or shall be voluntarily made during the restricted period.

In addition, the restrictions described in the paragraph above relating to us do not apply to:

- the shares to be sold in this offering;
- our issuance of shares of common stock upon the exercise of an option or warrant or the conversion of a security outstanding on the date of this prospectus pursuant to stock plans disclosed in this prospectus; or
- the establishment of a trading plan pursuant to Rule 10b5-1 under the Exchange Act for the transfer of shares of common stock, provided that such plan does not provide for the transfer of shares of common stock during the restricted period and to the extent a public announcement or filing under the Exchange Act is required of or voluntarily made by the Company regarding the establishment of such plan, such announcement or filing shall include a statement to the effect that no transfer of shares of common stock may be made under such plan during the restricted period;

Morgan Stanley & Co. LLC and Cowen and Company, LLC, in their sole discretion, may release the common stock and other securities subject to the lock-up agreements described above in whole or in part at any time.

In order to facilitate the offering of the common stock, the underwriters may engage in transactions that stabilize, maintain or otherwise affect the price of the common stock. Specifically, the underwriters may sell more shares than they are obligated to purchase under the underwriting agreement, creating a short position. A short sale is covered if the short position is no greater than the number of shares available for purchase by the underwriters under the over-allotment option. The underwriters can close out a covered short sale by exercising the over-allotment option or purchasing shares in the open market. In determining the source of shares to close out a covered short sale, the underwriters will consider, among other things, the open market price of shares compared to the price available under the over-allotment option. The underwriters may also sell shares in excess of the over-allotment option, creating a naked short position. The underwriters must close out any naked short position by purchasing shares in the open market. A naked short position is more likely to be created if the underwriters are concerned that there may be downward pressure on the price of the common stock in the open market after pricing that could adversely affect investors who purchase in this offering. As an additional means of facilitating this offering, the underwriters may bid for, and purchase, shares of common stock in the open market to stabilize the price of the common stock. These activities may raise or maintain the market price of the common stock above independent market levels or prevent or retard a decline in the market price of the common stock. The underwriters are not required to engage in these activities and may end any of these activities at any time.

We and the underwriters have agreed to indemnify each other against certain liabilities, including liabilities under the Securities Act.

A prospectus in electronic format may be made available on websites maintained by one or more underwriters, or selling group members, if any, participating in this offering. The representatives may agree to allocate a number of shares of common stock to underwriters for sale to their online brokerage account holders. Internet distributions will be allocated by the representatives to underwriters that may make Internet distributions on the same basis as other allocations.

The underwriters and their respective affiliates are full service financial institutions engaged in various activities, which may include securities trading, commercial and investment banking, financial advisory, investment management, investment research, principal investment, hedging, financing and brokerage activities. Certain of the underwriters and their respective affiliates may, from time to time, perform various financial advisory and investment banking services for us, for which they will receive customary fees and expenses.

In addition, in the ordinary course of their various business activities, the underwriters and their respective affiliates may make or hold a broad array of investments and actively trade debt and equity securities (or related derivative securities) and financial instruments (including bank loans) for their own account and for the accounts of their customers and may at any time hold long and short positions in such securities and instruments. Such investment and securities activities may involve our securities and instruments. The underwriters and their respective affiliates may also make investment recommendations or publish or express independent research views in respect of such securities or instruments and may at any time hold, or recommend to clients that they acquire, long or short positions in such securities and instruments.

Pricing of the Offering

Prior to this offering, there has been no public market for our common stock. The initial public offering price will be determined by negotiations between us and the representatives. Among the factors to be considered in determining the initial public offering price are our future prospects and those of our industry in general, our sales, earnings and certain other financial and operating information in recent periods, and the price-earnings

ratios, price-sales ratios, market prices of securities, and certain financial and operating information of companies engaged in activities similar to ours.

Selling Restrictions

Canada

Shares of our common stock may be sold only to purchasers purchasing, or deemed to be purchasing, as principal that are accredited investors, as defined in National Instrument 45-106 *Prospectus Exemptions* or subsection 73.3(1) of the *Securities Act* (Ontario), and are permitted clients, as defined in National Instrument 31-103 *Registration Requirements, Exemptions and Ongoing Registrant Obligations*. Any resale of shares of our common stock must be made in accordance with an exemption from, or in a transaction not subject to, the prospectus requirements of applicable securities laws.

Securities legislation in certain provinces or territories of Canada may provide a purchaser with remedies for rescission or damages if this prospectus (including any amendment thereto) contains a misrepresentation, provided that the remedies for rescission or damages are exercised by the purchaser within the time limit prescribed by the securities legislation of the purchaser's province or territory. The purchaser should refer to any applicable provisions of the securities legislation of the purchaser's province or territory for particulars of these rights or consult with a legal advisor.

Pursuant to section 3A.3 (or, in the case of securities issued or guaranteed by the government of a non-Canadian jurisdiction, section 3A.4) of National Instrument 33-105 Underwriting Conflicts (NI 33-105), the underwriters are not required to comply with the disclosure requirements of NI 33-105 regarding underwriter conflicts of interest in connection with this offering.

European Economic Area

In relation to each Member State of the European Economic Area which has implemented the Prospectus Directive (each, a "Relevant Member State") an offer to the public of any shares of our common stock may not be made in that Relevant Member State, except that an offer to the public in that Relevant Member State of any shares of our common stock may be made at any time under the following exemptions under the Prospectus Directive, if they have been implemented in that Relevant Member State:

(a) to any legal entity which is a qualified investor as defined in the Prospectus Directive;

(b) to fewer than 100 or, if the Relevant Member State has implemented the relevant provision of the 2010 PD Amending Directive, 150, natural or legal persons (other than qualified investors as defined in the Prospectus Directive), as permitted under the Prospectus Directive, subject to obtaining the prior consent of the representatives for any such offer; or

(c) in any other circumstances falling within Article 3(2) of the Prospectus Directive, provided that no such offer of shares of our common stock shall result in a requirement for the publication by us or any underwriter of a prospectus pursuant to Article 3 of the Prospectus Directive.

For the purposes of this provision, the expression an "offer to the public" in relation to any shares of our common stock in any Relevant Member State means the communication in any form and by any means of sufficient information on the terms of the offer and any shares of our common stock to be offered so as to enable an investor to decide to purchase any shares of our common stock, as the same may be varied in that Member State by any measure implementing the Prospectus Directive in that Member State, the expression "Prospectus Directive" means Directive 2003/71/EC (and amendments thereto, including the 2010 PD Amending Directive, to the extent implemented in the Relevant Member State), and includes any relevant implementing measure in the Relevant Member State, and the expression "2010 PD Amending Directive" means Directive 2010/73/EU.

United Kingdom

Each underwriter has represented and agreed that:

(a) it has only communicated or caused to be communicated and will only communicate or cause to be communicated an invitation or inducement to engage in investment activity (within the meaning of Section 21 of the Financial Services and Markets Act 2000 ("FSMA")) received by it in connection with the issue or sale of the shares of our common stock in circumstances in which Section 21(1) of the FSMA does not apply to us; and

(b) it has complied and will comply with all applicable provisions of the FSMA with respect to anything done by it in relation to the shares of our common stock in, from or otherwise involving the United Kingdom.

LEGAL MATTERS

The validity of the shares of common stock offered by this prospectus will be passed upon for us by Goodwin Procter LLP, Boston, Massachusetts. Certain legal matters relating to this offering will be passed upon for the underwriters by Ropes & Gray LLP, Boston, Massachusetts.

EXPERTS

The consolidated financial statements of AVROBIO, Inc. at December 31, 2016 and 2017, and for the years then ended, appearing in this prospectus and registration statement have been audited by Ernst & Young LLP, independent registered public accounting firm, as set forth in their report thereon appearing elsewhere herein, and are included in reliance upon such report given on the authority of such firm as experts in accounting and auditing.

WHERE YOU CAN FIND MORE INFORMATION

We have filed with the SEC a registration statement on Form S-1 (File Number 333-) under the Securities Act with respect to the common stock we are offering by this prospectus. This prospectus does not contain all of the information included in the registration statement. For further information pertaining to us and our common stock, you should refer to the registration statement and to its exhibits. Whenever we make reference in this prospectus to any of our contracts, agreements or other documents, the references are not necessarily complete, and you should refer to the exhibits attached to the registration statement for copies of the actual contract, agreement or other document.

Upon the completion of the offering, we will be subject to the informational requirements of the Exchange Act and will file annual, quarterly and current reports, proxy statements and other information with the SEC. You can read our SEC filings, including the registration statement, at the SEC's website at www.sec.gov. You may also read and copy any document we file with the SEC at its public reference facility at 100 F Street, N.E., Room 1580, Washington, D.C. 20549. We also maintain a website at www.avrobio.com. Upon completion of the offering, you may access, free of charge, our annual reports on Form 10-K, quarterly reports on Form 10-Q, current reports on Form 8-K and any amendments to those reports, as soon as reasonably practicable after such material is electronically filed with, or furnished to, the SEC.

You may also obtain copies of the documents at prescribed rates by writing to the Public Reference Section of the SEC at 100 F Street, N.E., Washington, D.C. 20549. Please call the SEC at 1-800-SEC-0330 for further information on the operation of the public reference facilities.

AVROBIO, INC.
INDEX TO CONSOLIDATED FINANCIAL STATEMENTS

REPORT OF INDEPENDENT REGISTERED PUBLIC ACCOUNTING FIRM

To the Stockholders and the Board of Directors of AVROBIO, Inc.

Opinion on the Financial Statements

We have audited the accompanying consolidated balance sheets of AVROBIO, Inc. (the Company) as of December 31, 2016 and 2017, the related consolidated statements of operations and comprehensive loss, redeemable convertible preferred stock and stockholder's deficit and cash flows for the years then ended, and the related notes (collectively referred to as the "consolidated financial statements"). In our opinion, the consolidated financial statements present fairly, in all material respects, the financial position of the Company at December 31, 2016 and 2017, and the results of its operations and its cash flows for the years then ended in conformity with U.S. generally accepted accounting principles.

Basis for Opinion

These financial statements are the responsibility of the Company's management. Our responsibility is to express an opinion on the Company's financial statements based on our audits. We are a public accounting firm registered with the Public Company Accounting Oversight Board (United States) (PCAOB) and are required to be independent with respect to the Company in accordance with the U.S. federal securities laws and the applicable rules and regulations of the Securities and Exchange Commission and the PCAOB.

We conducted our audits in accordance with the standards of the PCAOB and in accordance with auditing standards generally accepted in the United States of America. Those standards require that we plan and perform the audit to obtain reasonable assurance about whether the financial statements are free of material misstatement, whether due to error or fraud. The Company is not required to have, nor were we engaged to perform, an audit of its internal control over financial reporting. As part of our audits we are required to obtain an understanding of internal control over financial reporting but not for the purpose of expressing an opinion on the effectiveness of the Company's internal control over financial reporting. Accordingly, we express no such opinion.

Our audits included performing procedures to assess the risks of material misstatement of the financial statements, whether due to error or fraud, and performing procedures that respond to those risks. Such procedures included examining, on a test basis, evidence regarding the amounts and disclosures in the financial statements. Our audits also included evaluating the accounting principles used and significant estimates made by management, as well as evaluating the overall presentation of the financial statements. We believe that our audits provide a reasonable basis for our opinion.

/s/ Ernst & Young LLP

We have served as the Company's auditor since 2018.

Boston, Massachusetts
April 6, 2018

AVROBIO, INC.
CONSOLIDATED BALANCE SHEETS
(amounts in thousands, except share and per share data)

	December 31,		Pro Forma December 31,
	2016	2017	2017 (unaudited)
Assets			
Current assets:			
Cash and cash equivalents	$ 5,357	$ 5,963	$ 5,963
Prepaid expenses and other current assets	19	345	345
Total current assets	5,376	6,308	6,308
Property and equipment, net	—	349	349
Other assets	24	365	365
Total assets	$ 5,400	$ 7,022	$ 7,022
Liabilities, redeemable convertible preferred stock and stockholders' (deficit) equity			
Current liabilities:			
Accounts payable	$ 340	$ 527	$ 527
Accrued expenses and other current liabilities	551	2,098	2,098
Total current liabilities	891	2,625	2,625
Warrant to purchase redeemable convertible preferred stock	—	35	—
Derivative liability	88	371	371
Deferred rent, net of current portion	—	126	126
Other long-term liability	—	500	500
Total liabilities	979	3,657	3,622
Commitments and contingencies (Note 14)			
Redeemable convertible preferred stock (Note 8)	9,000	26,500	—
Stockholders' (deficit) equity:			
Common stock, $0.0001 par value; 40,000,000 and 51,000,000 shares authorized as of December 31, 2016 and 2017, respectively; 10,666,667 shares issued as of December 31, 2016 and 2017; 8,975,000 and 9,524,999 shares outstanding as of December 31, 2016 and 2017, respectively; 44,992,165 shares issued and 44,308,831 shares outstanding, as of December 31, 2017 (pro forma)	1	1	4
Additional paid-in capital	247	339	26,871
Accumulated deficit	(4,827)	(23,475)	(23,475)
Total stockholders' (deficit) equity	(4,579)	(23,135)	3,400
Total liabilities, redeemable convertible preferred stock and stockholders' (deficit) equity	$ 5,400	$ 7,022	$ 7,022

The accompanying notes are an integral part of these consolidated financial statements.

AVROBIO, INC.
CONSOLIDATED STATEMENTS OF OPERATIONS AND COMPREHENSIVE LOSS
(amounts in thousands, except share and per share data)

	Year Ended December 31,	
	2016	2017
Operating expenses:		
Research and development	$ 2,663	$ 15,191
General and administrative	1,962	3,195
Total operating expenses	4,625	18,386
Loss from operations	(4,625)	(18,386)
Other income (expense):		
Interest income	6	57
Change in fair value of preferred stock warrant liability	—	(17)
Change in fair value of derivative liability	(39)	(283)
Other expense	(6)	(19)
Total other expense, net	(39)	(262)
Net loss	$ (4,664)	$ (18,648)
Comprehensive loss	$ (4,664)	$ (18,648)
Reconciliation of net loss to net loss attributable to common stockholders:		
Net loss	$ (4,664)	$ (18,648)
Accretion of issuance costs on redeemable convertible preferred stock	(305)	(85)
Net loss attributable to common stockholders—basic and diluted	$ (4,969)	$ (18,733)
Net loss per share attributable to common stockholders—basic and diluted (Note 13)	$ (0.59)	$ (2.03)
Weighted-average number of common shares used in computing net loss per share attributable to common stockholders—basic and diluted	8,421,130	9,238,612
Pro forma net loss per share attributable to common stockholders—basic and diluted (unaudited) (Note 2)		$ (0.65)
Pro forma weighted-average number of common shares used in computing pro forma net loss per share attributable to common stockholders—basic and diluted (unaudited)		28,602,468

The accompanying notes are an integral part of these consolidated financial statements.

AVROBIO, INC.
CONSOLIDATED STATEMENTS OF REDEEMABLE CONVERTIBLE PREFERRED STOCK AND STOCKHOLDERS' (DEFICIT) EQUITY
(amounts in thousands, except share data)

	Series Seed Redeemable Convertible Preferred Stock		Series A Redeemable Convertible Preferred Stock		Common Stock		Additional Paid-in Capital	Accumulated Deficit	Total Stockholders' (Deficit) Equity
	Shares	Amount	Shares	Amount	Shares	Amount			
Balance as of December 31, 2015	—	$ —	—	$ —	5,200,000	$ 1	$ —	$ (163)	$ (162)
Issuance of series Seed redeemable convertible preferred stock, net of issuance costs of $102	3,333,333	1,398	—	—	—	—	—	—	—
Issuance of common stock	—	—	—	—	4,800,000	—	480	—	480
Modification of founders common stock to include certain time-based vesting restricitions	—	—	—	—	(1,366,666)	—	—	—	—
Vesting of restricted stock awards	—	—	—	—	341,666	—	—	—	—
Issuance of series A redeemable convertible preferred stock, net of issuance costs of $203	—	—	5,714,286	7,297	—	—	—	—	—
Stock-based compensation expense	—	—	—	—	—	—	72	—	72
Accretion of issuance costs related to redeemable convertible preferred stock	—	102	—	203	—	—	(305)	—	(305)
Net loss	—	—	—	—	—	—	—	(4,664)	(4,664)
Balance as of December 31, 2016	3,333,333	1,500	5,714,286	7,500	8,975,000	1	247	(4,827)	(4,579)
Issuance of series A redeemable convertible preferred stock dividend	—	—	3,720,864	—	—	—	—	—	—
Issuance of series A redeemable convertible preferred stock, net of issuance costs of $85	—	—	22,015,349	17,415	—	—	—	—	—
Vesting of restricted stock awards	—	—	—	—	549,999	—	—	—	—
Stock-based compensation expense	—	—	—	—	—	—	177	—	177
Accretion of issuance costs related to redeemable convertible preferred stock	—	—	—	85	—	—	(85)	—	(85)
Net loss	—	—	—	—	—	—	—	(18,648)	(18,648)
Balance as of December 31, 2017	3,333,333	1,500	31,450,499	25,000	9,524,999	1	339	(23,475)	(23,135)
Reclassification of warrants to purchase shares of redeemable convertible preferred stock into warrants to purchase common stock (unaudited)	—	—	—	—	—	—	35	—	35
Conversion of redeemable convertible preferred stock into common stock (unaudited)	(3,333,333)	(1,500)	(31,450,499)	(25,000)	34,783,832	3	26,497	—	26,500
Pro forma balance as of December 31, 2017 (unaudited)	—	$ —	—	$ —	44,308,831	$ 4	$ 26,871	$ (23,475)	$ 3,400

The accompanying notes are an integral part of these consolidated financial statements.

AVROBIO, INC.
CONSOLIDATED STATEMENTS OF CASH FLOWS
(amounts in thousands)

	Year Ended December 31,	
	2016	2017
Cash flows from operating activities:		
Net loss	$(4,664)	$(18,648)
Adjustments to reconcile net loss to net cash used in operating activities:		
Stock-based compensation expense	72	177
Depreciation and amortization expense	—	45
Amortization of deferred offering costs	—	24
Non-cash license expense	480	—
Non-cash research and development expense related to derivative liability	49	—
Deferred rent expense	—	134
Change in fair value of preferred stock warrant liability	—	17
Change in fair value of derivative liability	39	283
Changes in operating assets and liabilities:		
Prepaid expenses and other current assets	(18)	(326)
Other assets	—	(218)
Accounts payable	177	176
Accrued expenses and other current liabilities	551	1,454
Other long-term liability	—	500
Net cash used in operating activities	(3,314)	(16,382)
Cash flows from investing activities:		
Purchases of property and equipment	—	(383)
Changes in restricted cash	(24)	—
Net cash used in investing activities	(24)	(383)
Cash flows from financing activities:		
Proceeds from issuance of redeemable convertible preferred stock, net of issuance costs	8,695	17,415
Payments of issuance costs on debt facility	—	(44)
Net cash provided by financing activities	8,695	17,371
Net increase in cash and cash equivalents	5,357	606
Cash and cash equivalents at beginning of period	—	5,357
Cash and cash equivalents at end of period	$ 5,357	$ 5,963
Supplemental disclosure of non-cash investing and financing activities:		
Purchases of property and equipment included in accounts payable	$ —	$ 11
Issuance of warrants associated with debt facility	$ —	$ 18
Deferred offering costs included in accrued expenses	$ —	$ 85
Accretion of issuance costs related to redeemable convertible preferred stock	$ 305	$ 85

The accompanying notes are an integral part of these consolidated financial statements.

AVROBIO, INC.

NOTES TO CONSOLIDATED FINANCIAL STATEMENTS
Years ended December 31, 2016 and 2017
(amounts in thousands, except share and per share data)

1. Nature of the Business

AVROBIO, Inc. (the "Company" or "AVROBIO") is a clinical stage gene therapy company focused on developing potentially curative *ex vivo* lentiviral gene therapies to treat rare diseases following a single dose.

The Company is subject to risks and uncertainties common to early-stage companies in the biotechnology industry, including but not limited to, risks associated with completing preclinical studies and clinical trials, receiving regulatory approvals for product candidates, development by competitors of new biopharmaceutical products, dependence on key personnel, protection of proprietary technology, compliance with government regulations and the ability to secure additional capital to fund operations. Product candidates currently under development will require significant additional research and development efforts, including preclinical and clinical testing and regulatory approval, prior to commercialization. These efforts require significant amounts of additional capital, adequate personnel and infrastructure and extensive compliance-reporting capabilities. Even if the Company's product development efforts are successful, it is uncertain when, if ever, the Company will realize revenue from product sales.

Through December 31, 2017, the Company has funded its operations primarily with proceeds from the sale of series Seed redeemable convertible preferred stock (the "Series Seed Preferred Stock") and series A redeemable convertible preferred stock (the "Series A Preferred Stock"), (the Series Seed Preferred Stock and the Series A Preferred Stock are collectively referred to as the "Preferred Stock"). The Company has incurred recurring losses since its inception, including net losses of $4,664 and $18,648 for the years ended December 31, 2016 and 2017, respectively. In addition, as of December 31, 2017, the Company had an accumulated deficit of $23,475. The Company expects to continue to generate operating losses for the near future. The future viability of the Company is dependent on its ability to raise additional capital to finance its operations. The Company's inability to raise capital as and when needed could have a negative impact on its financial condition and ability to pursue its business strategies. There can be no assurance that the current operating plan will be achieved or that additional funding will be available on terms acceptable to the Company, or at all.

The Company believes the cash and cash equivalents on hand as of December 31, 2017 of $5,963, together with the $60,500 of gross cash proceeds received from the Company's sale of series B redeemable convertible preferred stock (the "Series B Preferred Stock") in January 2018 (see Note 17) will be sufficient to fund its operations and capital expenditure requirements through at least April 6, 2019.

2. Summary of Significant Accounting Policies

Basis of Presentation

The accompanying consolidated financial statements have been prepared in conformity with accounting principles generally accepted in the United States of America ("GAAP"). Any reference in these notes to applicable guidance is meant to refer to the authoritative United States generally accepted accounting principles as found in the Accounting Standards Codification ("ASC") and Accounting Standards Update ("ASU") of the Financial Accounting Standards Board ("FASB").

Principles of Consolidation

The accompanying consolidated financial statements include the accounts of AVROBIO, Inc. and its wholly owned subsidiaries. All intercompany transactions and balances have been eliminated in consolidation.

AVROBIO, INC.

NOTES TO CONSOLIDATED FINANCIAL STATEMENTS (CONTINUED)

2. Summary of Significant Accounting Policies (continued)

Use of Estimates

The preparation of consolidated financial statements in conformity with GAAP requires management to make estimates and assumptions that affect the reported amounts of assets and liabilities, the disclosure of contingent assets and liabilities at the date of the consolidated financial statements and the reported amounts of revenue and expenses during the reporting periods. Significant estimates and assumptions reflected in these consolidated financial statements include, but are not limited to, the accrual for research and development expenses, stock-based compensation expense, the valuation of equity and derivative instruments and the recoverability of the Company's net deferred tax assets and related valuation allowance. Estimates are periodically reviewed in light of changes in circumstances, facts and experience. Changes in estimates are recorded in the period in which they become known. Actual results could differ materially from those estimates.

Unaudited Pro Forma Information

The accompanying unaudited pro forma consolidated balance sheet and statement of redeemable convertible preferred stock and stockholders' (deficit) equity as of December 31, 2017 has been prepared to give effect, upon the closing of a qualified initial public offering ("IPO"), to the conversion of all outstanding shares of redeemable convertible preferred stock into 34,783,832 shares of common stock and the conversion of the outstanding warrant to purchase shares of redeemable convertible preferred stock as of December 31, 2017 into a warrant to purchase shares of common stock as if the Company's proposed IPO had occurred on December 31, 2017.

In the accompanying consolidated statements of operations and comprehensive loss, the unaudited pro forma basic and diluted net loss per share attributable to common stockholders for the year ended December 31, 2017 has been computed using the weighted-average number of common shares outstanding after giving pro forma effect to the conversion of all outstanding shares of redeemable convertible preferred stock into shares of common stock and the conversion of the outstanding warrant to purchase shares of redeemable convertible preferred stock as of December 31, 2017 into a warrant to purchase shares of common stock, as if such conversion had occurred at the beginning of the period presented or the date of original issuance, whichever is later. Accordingly, the effect of the accretion to redemption value of the redeemable convertible preferred stock has been excluded from the determination of pro forma basic and diluted loss per share attributable to common stockholders. Additionally, the changes in the fair value of the warrant to purchase redeemable convertible preferred stock has been excluded from the determination of pro forma basic and diluted net loss per share attributable to common stockholders as these instruments are not required be recorded at fair value once it become a warrant to purchase common stock.

Cash and Cash Equivalents

The Company considers all highly liquid investments purchased with original maturities of 90 days or less at acquisition to be cash equivalents. Cash and cash equivalents include cash held in banks and amounts held in interest-bearing money market accounts. Cash equivalents are carried at cost, which approximates their fair market value.

Restricted Cash

As of December 31, 2016 and 2017, restricted cash consisted of $24 used to secure a letter of credit for the benefit of the landlord in connection with the Company's lease agreement (Note 14). These amounts are classified as other assets in the Company's consolidated balance sheets.

AVROBIO, INC.

NOTES TO CONSOLIDATED FINANCIAL STATEMENTS (CONTINUED)

2. Summary of Significant Accounting Policies (continued)

Concentrations of Credit Risk

The Company has no significant off-balance sheet risk, such as foreign exchange contracts, option contracts, or other foreign hedging arrangements. Financial instruments that potentially expose the Company to concentrations of credit risk consist primarily of cash, cash equivalents and restricted cash. Periodically, the Company maintains deposits in accredited financial institutions in excess of federally insured limits. The Company deposits its cash and cash equivalents in financial institutions that it believes have high credit quality and has not experienced any losses on such accounts and does not believe it is exposed to any unusual credit risk beyond the normal credit risk associated with commercial banking relationships.

Deferred Issuance Costs

The Company capitalizes certain legal, professional accounting and other third-party fees that are directly associated with in-process equity financings as deferred issuance costs until such financings are consummated. After consummation of the equity financing, these costs are recorded as a reduction of the proceeds generated as a result of the offering. Should the planned equity financing be abandoned, the deferred issuance costs will be expensed immediately as a charge to operating expenses in the consolidated statements of operations. As of December 31, 2017, the Company recorded deferred issuance costs of $85 within other assets on the consolidated balance sheet related to the Series B Preferred Stock offering which was consummated in January 2018 (Note 17). There were no amounts deferred as of December 31, 2016.

Property and Equipment

Property and equipment are recorded at cost. Depreciation and amortization is calculated using the straight-line method over the following estimated useful lives of the assets:

	Estimated Useful Life
Laboratory and office equipment	5 years
Computer equipment and software	2 years
Leasehold improvements	Lesser of lease term or 10 years

Upon disposal, retirement or sale, the cost of assets disposed of and the related accumulated depreciation are removed from the accounts and any resulting gain or loss is included in the results of operations. Expenditures for repairs and maintenance that do not improve or extend the lives of the respective assets are charged to expense as incurred.

Impairment of Long-Lived Assets

Long-lived assets consist of property and equipment. Long-lived assets to be held and used are tested for recoverability whenever events or changes in business circumstances indicate that the carrying amount of the assets may not be fully recoverable. Factors that the Company considers in deciding when to perform an impairment review include significant underperformance of the business in relation to expectations, significant negative industry or economic trends and significant changes or planned changes in the use of the assets. If an impairment review is performed to evaluate a long-lived asset group for recoverability, the Company compares forecasts of undiscounted cash flows expected to result from the use and eventual disposition of the long-lived asset group to its carrying value. An impairment loss would be recognized when estimated undiscounted future cash flows expected to result from the use of an asset group are less than its carrying amount. The impairment

AVROBIO, INC.

NOTES TO CONSOLIDATED FINANCIAL STATEMENTS (CONTINUED)

2. Summary of Significant Accounting Policies (continued)

loss would be based on the excess of the carrying value of the impaired asset group over its fair value, determined based on discounted cash flows. To date, the Company has not recorded any impairment losses on long-lived assets.

Fair Value Measurements

Certain assets and liabilities of the Company are carried at fair value under GAAP (see Note 3). Fair value is defined as the exchange price that would be received for an asset or paid to transfer a liability (an exit price) in the principal or most advantageous market for the asset or liability in an orderly transaction between market participants on the measurement date. Valuation techniques used to measure fair value must maximize the use of observable inputs and minimize the use of unobservable inputs. Financial assets and liabilities carried at fair value are to be classified and disclosed in one of the following three levels of the fair value hierarchy, of which the first two are considered observable and the last is considered unobservable:

- Level 1—Quoted prices in active markets for identical assets or liabilities.
- Level 2—Observable inputs (other than Level 1 quoted prices), such as quoted prices in active markets for similar assets or liabilities, quoted prices in markets that are not active for identical or similar assets or liabilities, or other inputs that are observable or can be corroborated by observable market data.
- Level 3—Unobservable inputs that are supported by little or no market activity that are significant to determining the fair value of the assets or liabilities, including pricing models, discounted cash flow methodologies and similar techniques.

Segment Information

Operating segments are identified as components of an enterprise about which separate discrete financial information is available for evaluation by the chief operating decision maker, or decision making group, in making decisions on how to allocate resources and assess performance. The Company's chief operating decision maker is the chief executive officer ("CEO"). The Company and the CEO view the Company's operations and manage its business as one operating segment. All material long-lived assets of the Company reside in the United States.

Research and Development Costs

Research and development costs are expensed as incurred. Research and development expenses consist of costs incurred in performing research and development activities, including salaries, stock-based compensation and benefits, facilities costs, depreciation, third-party license fees, and external costs of outside vendors engaged to conduct preclinical development activities and clinical trials as well as to manufacture research and development materials. Non-refundable prepayments for goods or services that will be used or rendered for future research and development activities are deferred and capitalized. Such amounts are recognized as an expense as the goods are delivered or the related services are performed or until it is no longer expected that the goods will be delivered or the services rendered.

The Company has entered into various research and development related contracts with parties both inside and outside of the United States. The payments to these agreements are recorded as research and development expenses as incurred. The Company records accrued liabilities for estimated ongoing research costs. When evaluating the adequacy of the accrued liabilities, the Company analyzes progress of the studies or clinical trials,

AVROBIO, INC.

NOTES TO CONSOLIDATED FINANCIAL STATEMENTS (CONTINUED)

2. Summary of Significant Accounting Policies (continued)

including the phase or completion of events, invoices received and contracted costs. Significant judgments and estimates are made in determining the accrued balances at the end of any reporting period. Actual results could differ from the Company's estimates. The Company's historical accrual estimates have not been materially different from the actual costs.

Stock-Based Compensation

For stock-based awards issued to employees and members of the Company's board of directors (the "Board") for their services on the Board, the Company measures the estimated fair value of the stock-based award on the date of grant and recognizes compensation expense for those awards over the requisite service period, which is generally the vesting period of the respective award. The Company issues stock-based awards with only service-based vesting conditions and records the expense for these awards using the straight-line method. The Company has not issued any stock-based awards with performance- or market-based vesting conditions. The Company accounts for forfeitures as they occur.

Stock-based awards issued to non-employees are recorded at their fair values, and are periodically revalued as the awards vest and are recognized as expense over the related service period. For stock-based awards granted to non-employees subject to graded vesting that only contain service conditions, the Company has elected to recognize stock-based compensation expense using the straight-line recognition method.

The Company classifies stock-based compensation expense in its consolidated statements of operations and comprehensive loss in the same manner in which the award recipient's cash compensation costs are classified.

Given the absence of an active market for the Company's common stock, the Company and the Board, the members of which the Company believes have extensive business, finance, and venture capital experience, were required to estimate the fair value of the Company's common stock at the time of each grant of a stock-based award. The Company and the Board determined the estimated fair value of the Company's equity instruments based on a number of factors, including external market conditions affecting the biotechnology industry sector. The Company and the Board utilized various valuation methodologies in accordance with the framework of the American Institute of Certified Public Accountants' Technical Practice Aid, *Valuation of Privately-Held Company Equity Securities Issued as Compensation*, to estimate the fair value of its common stock. Each valuation methodology includes estimates and assumptions that require the Company's judgment. These estimates and assumptions include a number of objective and subjective factors in determining the value of the Company's common stock at each grant date, including: (1) prices paid for the Company's redeemable convertible preferred stock, which the Company had sold to outside investors in arm's-length transactions, and the rights, preferences, and privileges of the Company's redeemable convertible preferred stock and common stock; (2) valuations performed by an independent valuation specialist; (3) the Company's stage of development; (4) the fact that the grants of stock-based awards involved illiquid securities in a private company; and (5) the likelihood of achieving a liquidity event for the common stock underlying the stock-based awards, such as an IPO or sale of the Company, given prevailing market conditions.

The fair value of each stock option award is estimated on the date of grant using the Black-Scholes option pricing model. As there is no public market for its common stock, the Company determined the volatility for awards granted based on an analysis of reported data for a group of guideline companies that issued options with substantially similar terms. The expected volatility has been determined using a weighted-average of the historical volatility measures of this group of guideline companies. The Company expects to continue to do so until such time as it has adequate historical data regarding the volatility of its own traded stock price. The

AVROBIO, INC.

NOTES TO CONSOLIDATED FINANCIAL STATEMENTS (CONTINUED)

2. Summary of Significant Accounting Policies (continued)

expected term of the Company's stock options has been determined utilizing the "simplified" method for awards that qualify as "plain-vanilla" options. The risk-free interest rate is determined by reference to the U.S. Treasury yield curve in effect at the time of grant of the award for time periods approximately equal to the expected term of the award. The Company has not paid, and does not anticipate paying, cash dividends on its common stock; therefore, the expected dividend yield is assumed to be zero.

See Note 10 for the assumptions used by the Company in determining the grant date fair value of stock-based awards granted, as well as a summary of the stock-based award activity under the Company's stock-based compensation plan for the year ended December 31, 2017.

Warrant to Purchase Preferred Stock

The Company classifies the warrant for the purchase of shares of its redeemable convertible preferred stock (see Note 7) as a liability on its consolidated balance sheets as the warrant is a free-standing financial instrument that may require the Company to transfer assets upon exercise. The preferred stock warrant liability was initially recorded at fair value upon the date of issuance and is subsequently remeasured to fair value at each reporting date. Changes in the fair value of the warrant to purchase preferred stock are recognized as a component of other income (expense), net in the consolidated statements of operations and comprehensive loss. Changes in the fair value of the warrant to purchase preferred stock will continue to be recognized until the warrant is exercised, expires or qualifies for equity classification.

The Company utilizes the Black-Scholes option-pricing model, which incorporates assumptions and estimates, to value the warrant. The Company assesses these assumptions and estimates on a quarterly basis as additional information impacting the assumptions is obtained. Estimates and assumptions impacting the fair value measurement include the fair value per share of the underlying redeemable convertible preferred stock issuable upon exercise of the warrant, the remaining contractual term of the warrant, the risk-free interest rate, the expected dividend yield and the expected volatility of the price of the underlying redeemable convertible preferred stock.

Comprehensive Income (Loss)

Comprehensive income (loss) is defined as the change in stockholders' equity of a business enterprise during a period from transactions and other events and circumstances from non-owner sources. Comprehensive income (loss) includes net income (loss) as well as other changes in stockholders' (deficit) equity which includes certain changes in equity that are excluded from net income (loss). Comprehensive loss has been disclosed in the accompanying statements of operations and comprehensive loss and equals the Company's net loss for all periods presented.

Foreign Currency Translation

The functional currency of the Company's international operations in Canada and Australia is the U.S. dollar. Accordingly, all operating assets and liabilities of these international subsidiaries are remeasured into U.S. dollars using the exchange rates in effect at the balance sheet date or historical rates, as appropriate, while expenses are remeasured into U.S. dollars at the average rates in effect during the period. Any differences resulting from the remeasurement of assets, liabilities, and operations of the Canadian and Australian subsidiaries are recorded within other income (expense), net in the consolidated statements of operations and comprehensive loss. During the years ended December 31, 2016 and 2017, the Company recorded foreign exchange losses of $6 and $19, respectively, in other expense.

AVROBIO, INC.

NOTES TO CONSOLIDATED FINANCIAL STATEMENTS (CONTINUED)

2. Summary of Significant Accounting Policies (continued)

Income Taxes

Deferred tax assets and liabilities are determined on the basis of the differences between the consolidated financial statements and tax basis of assets and liabilities using enacted tax rates in effect for the year in which the differences are expected to reverse. Changes in deferred tax assets and liabilities are recorded in the provision for income taxes. The Company assesses the likelihood that its deferred tax assets will be recovered from future taxable income and, to the extent it believes, based upon the weight of available evidence, that it is more likely than not that all or a portion of the deferred tax assets will not be realized, a valuation allowance is established.

The Company accounts for uncertain tax positions recognized in the consolidated financial statements by prescribing a more-likely-than-not threshold for financial statement recognition and measurement of a tax position taken or expected to be taken in a tax return. The provision for income taxes includes the effects of any resulting tax reserves, or unrecognized tax benefits, that are considered appropriate as well as the related net interest and penalties.

Leases

The Company categorizes leases at their inception as either operating or capital leases. On certain lease arrangements, the Company may receive rent holidays or other incentives. The Company recognizes lease costs on a straight-line basis once control of the space is achieved, without regard to deferred payment terms, such as rent holidays, that defer the commencement date of required payments or escalating payment amounts. The difference between required lease payments and rent expense has been recorded as deferred rent and other accrued expenses and other current liabilities in the accompanying consolidated balance sheets. Additionally, incentives received are treated as a reduction of costs over the term of the agreement, as they are considered an inseparable part of the lease agreement.

Net Income (Loss) per Share Attributable to Common Stockholders

Net income (loss) per share attributable to common stockholders is determined using the two-class method, which includes the weighted-average number of shares of common stock outstanding during the period and other securities that participate in dividends (a participating security). In periods of income, the redeemable convertible preferred stock would be considered participating securities because the shares include rights to participate in dividends with the common stock; however, the redeemable convertible preferred stock is not considered a participating security in periods of loss as they do not have an obligation to share in the Company's net losses.

Under the two-class method, basic net income (loss) per share attributable to common stockholders is computed by dividing the net income (loss) attributable to common stockholders by the weighted-average number of shares of common stock outstanding during the period. Diluted net income (loss) per share attributable to common stockholders is computed using the more dilutive of (1) the two-class method or (2) the if-converted method. The Company allocates net income first to the holders of Preferred Stock based on dividend rights under the Company's certificate of incorporation and then to preferred and common stockholders based on ownership interests.

Subsequent Event Considerations

The Company considers events or transactions that occur after the balance sheet date but prior to the issuance of the consolidated financial statements to provide additional evidence for certain estimates or to identify matters that require additional disclosure. Subsequent events have been evaluated as required. See Note 17.

AVROBIO, INC.

NOTES TO CONSOLIDATED FINANCIAL STATEMENTS (CONTINUED)

2. Summary of Significant Accounting Policies (continued)

Emerging Growth Company Status

The Company is an "emerging growth company," as defined in the Jumpstart Our Business Startups Act, or JOBS Act, and may take advantage of certain exemptions from various reporting requirements that are applicable to other public companies that are not emerging growth companies. The Company may take advantage of these exemptions until the Company is no longer an "emerging growth company." Section 107 of the JOBS Act provides that an "emerging growth company" can take advantage of the extended transition period afforded by the JOBS Act for the implementation of new or revised accounting standards. The Company has elected to use the extended transition period for complying with new or revised accounting standards and as a result of this election, its consolidated financial statements may not be comparable to companies that comply with public company effective dates. The Company may take advantage of these exemptions up until the last day of the fiscal year following the fifth anniversary of an offering or such earlier time that it is no longer an "emerging growth company".

Recently Issued Accounting Pronouncements

In July 2017, the FASB issued ASU 2017-11, *Earnings Per Share (Topic 260), Distinguishing Liabilities from Equity (Topic 480), Derivatives and Hedging (Topic 815) I. Accounting for Certain Financial Instruments with Down Round Features II. Replacement of the Indefinite Deferral for Mandatorily Redeemable Financial Instruments of Certain Nonpublic Entities and Certain Mandatorily Redeemable Noncontrolling Interests with a Scope Exception.* Part I applies to entities that issue financial instruments such as warrants, convertible debt or convertible preferred stock that contain down-round features. Part II replaces the indefinite deferral for certain mandatorily redeemable noncontrolling interests and mandatorily redeemable financial instruments of nonpublic entities contained within ASC Topic 480 with a scope exception and does not impact the accounting for these mandatorily redeemable instruments. For public entities, the amendments in Part I of this update are effective for fiscal years, and interim periods within those fiscal years, beginning after December 15, 2018. For all other entities, the amendments in Part I of this update are effective for fiscal years beginning after December 15, 2019, and interim periods within fiscal years beginning after December 15, 2020. Early adoption is permitted for all entities, including adoption in an interim period. The Company is currently evaluating the impact that the adoption of ASU 2017-11 will have on its consolidated financial statements.

In May 2017, the FASB issued ASU No. 2017-09, *Compensation—Stock Compensation (Topic 718): Scope of Modification Accounting* ("ASU 2017-09"), which clarifies when to account for a change to the terms or conditions of a share-based payment award as a modification. Under the new guidance, modification accounting is required only if the fair value, the vesting conditions, or the classification of the award (as equity or liability) changes as a result of the change in terms or conditions. The standard is effective for annual periods beginning after December 15, 2017. Early adoption is permitted, including adoption in any interim period, for (1) public business entities for reporting periods for which financial statements have not yet been issued and (2) all other entities for reporting periods for which financial statements have not yet been made available for issuance. The Company is currently evaluating the impact that the adoption of ASU 2017-09 will have on its consolidated financial statements.

In November 2016, the FASB issued ASU No. 2016-18, *Statement of Cash Flows (Topic 230): Restricted Cash* ("ASU 2016-18"), which requires restricted cash to be presented with cash and cash equivalents on the statement of cash flows and disclosure of how the statement of cash flows reconciles to the balance sheet if restricted cash is shown separately from cash and cash equivalents on the balance sheet. For public entities, the standard is effective for annual periods beginning after December 15, 2017, including interim periods within those fiscal years. For all other entities, the standard is effective for annual periods beginning after December 15,

AVROBIO, INC.

NOTES TO CONSOLIDATED FINANCIAL STATEMENTS (CONTINUED)

2. Summary of Significant Accounting Policies (continued)

2018, including interim periods within fiscal years beginning after December 15, 2019. Early adoption is permitted. The Company is currently evaluating the impact that the adoption of ASU 2016-18 will have on its consolidated financial statements.

In August 2016, the FASB issued ASU No. 2016-15, *Statement of Cash Flows: Classification of Certain Cash Receipts and Cash Payments* ("ASU 2016-15"), to address diversity in practice in how certain cash receipts and cash payments are presented and classified in the statement of cash flows. For public entities, the standard is effective for annual periods beginning after December 15, 2017, including interim periods within those fiscal years. For all other entities, the standard is effective for fiscal years beginning after December 15, 2018, and interim periods within fiscal years beginning after December 15, 2019. The Company is currently evaluating the impact that the adoption of ASU 2016-15 will have on its consolidated financial statements.

In February 2016, the FASB issued ASU No. 2016-02, *Leases (Topic 842)* ("ASU 2016-02"), which sets out the principles for the recognition, measurement, presentation and disclosure of leases for both parties to a contract (i.e., lessees and lessors). The new standard requires lessees to apply a dual approach, classifying leases as either finance or operating leases based on the principle of whether or not the lease is effectively a financed purchase by the lessee. This classification will determine whether lease expense is recognized based on an effective interest method or on a straight-line basis over the term of the lease. A lessee is also required to record a right-of-use asset and a lease liability for all leases with a term of greater than 12 months regardless of their classification. Leases with a term of 12 months or less may be accounted for similar to existing guidance for operating leases today. ASU 2016-02 supersedes the previous leases standard, ASC 840, *Leases*. For public entities, not-for-profit entities and an employee benefit plan that files financial statements with the U.S. Securities and Exchange Commission (SEC), the standard is effective for public entities for annual periods beginning after December 15, 2018 including interim periods within those fiscal years. For all other entities, the standard is effective for fiscal years beginning after December 15, 2019, and interim periods within fiscal years beginning after December 15, 2020. Early adoption is permitted.

In September 2017, the FASB issued ASU No. 2017-13, *Revenue Recognition (Topic 605), Revenue from Contracts with Customers (Topic 606), Leases (Topic 840), and Leases (Topic 842)*, which provides additional clarification and implementation guidance related to ASU 2016-02 and has the same effective date and transition requirements as ASU 2016-02. The Company is currently evaluating the impact that the adoption of ASU 2016-02 will have on its consolidated financial statements.

3. Fair Value of Financial Assets and Liabilities

The following table presents information about the Company's financial assets and liabilities measured at fair value on a recurring basis and indicate the level of the fair value hierarchy utilized to determine such fair values as of December 31, 2016 and 2017:

	Fair Value Measurements as of December 31, 2016 Using:			
	Level 1	Level 2	Level 3	Total
Assets:				
Restricted cash	$ 24	$ —	$ —	$ 24
	$ 24	$ —	$ —	$ 24
Liabilities:				
Derivative liability	$ —	$ —	$ 88	$ 88
	$ —	$ —	$ 88	$ 88

AVROBIO, INC.

NOTES TO CONSOLIDATED FINANCIAL STATEMENTS (CONTINUED)

3. Fair Value of Financial Assets and Liabilities (continued)

	Fair Value Measurements as of December 31, 2017 Using:			
	Level 1	Level 2	Level 3	Total
Assets:				
Money market funds	$5,684	$ —	$ —	$5,684
Restricted cash	24	—	—	24
	$5,708	$ —	$ —	$5,708
Liabilities:				
Derivative liability	$ —	$ —	$ 371	$ 371
Warrant to purchase redeemable convertible preferred stock	—	—	35	35
	$ —	$ —	$ 406	$ 406

During the years ended December 31, 2016 and 2017, there were no transfers between Level 1, Level 2 and Level 3.

Valuation of the Warrant to Purchase Preferred Stock

The warrant to purchase redeemable convertible preferred stock liability in the table above is composed of the fair value of a warrant to purchase shares of Series A Preferred Stock that was issued to a lender in connection with a loan and security agreement in 2017 (the "Loan Agreement") (Note 7). The fair value of the warrant to purchase preferred stock was determined based on significant inputs not observable in the market, which represents a Level 3 measurement within the fair value hierarchy.

In order to determine the fair value of the warrant to purchase preferred stock, the Company utilizes available facts and circumstances to estimate the number of shares of Series A Preferred Stock for which the warrant will ultimately be exercisable. The Company then used the Black-Scholes option-pricing model, which incorporates assumptions and estimates, to value the warrant to purchase preferred stock. Estimates and assumptions impacting the fair value measurement include the fair value of the underlying shares of Series A Preferred Stock, the remaining contractual term of the warrant, risk-free interest rate, expected dividend yield and expected volatility of the price of the underlying preferred stock. The Company determined the fair value of the underlying preferred stock based on various valuation methodologies. The Company lacks company-specific historical and implied volatility information of its stock. Therefore, it estimates its expected stock volatility based on the historical volatility of publicly traded guideline companies for a term equal to the remaining contractual term of the warrant. The risk-free interest rate is determined by reference to the U.S. Treasury yield curve for time periods approximately equal to the remaining contractual term of the warrant. The Company estimated no expected dividend yield based on the fact that the Company has never paid or declared dividends and does not intend to do so in the foreseeable future.

The assumptions that the Company used to determine the fair value of the warrant to purchase preferred stock are as follows:

	June 23, 2017 (Date of issuance)	December 31, 2017
Remaining contractual term (years)	10.00	9.48
Risk-free interest rate	2.15%	2.40%
Expected volatility	80.00%	82.00%
Expected dividend yield	—%	—%
Fair value of Series A Preferred Stock per share	$0.79	$1.42

AVROBIO, INC.

NOTES TO CONSOLIDATED FINANCIAL STATEMENTS (CONTINUED)

3. Fair Value of Financial Assets and Liabilities (continued)

The following table sets forth a summary of changes in the fair value of the Company's preferred stock warrant liability for which fair value is determined by Level 3 inputs:

	Warrant Liability
Balance as of December 31, 2016	$ —
Initial fair value of warrant to purchase redeemable convertible preferred stock	18
Change in fair value	17
Balance as of December 31, 2017	$ 35

Valuation of Derivative

In January 2016, in connection with a license agreement entered into with University Health Network ("UHN"), and as part of the initial consideration for the license, the Company issued 4,800,000 shares of common stock to UHN pursuant to a stock purchase agreement (the "Stock Purchase Agreement"). See Note 11 for further discussion on the license agreement. The shares were fully vested on the date of issuance and did not contain any restrictions. The Stock Purchase Agreement contains a provision requiring the Company to make a cash payment to UHN of up to $2,000 if UHN's fully diluted ownership is reduced within specified percentages as part of an IPO by the Company. The Company concluded the anti-dilution feature represented a derivative instrument and should be measured at fair value, with changes in fair value recognized as a gain or loss to other income (expense), net in the consolidated statements of operations and comprehensive loss. The initial fair value of the derivative of $49 was recorded as research and development expense in January 2016.

On December 31, 2016 and 2017, the Company remeasured the fair value of the derivative, using current assumptions, resulting in an increase in fair value of $39 and $283, respectively, which was recorded in other expense in the accompanying consolidated statements of operations and comprehensive loss for the years ended December 31, 2016 and 2017. The Company will continue to re-measure the fair value of the liability at the end of each reporting period until the completion of an IPO.

The following table sets forth a summary of changes in the fair value of the Company's derivative liability for which fair value is determined by Level 3 inputs:

	Derivative Liability
Balance as of December 31, 2015	$ —
Initial fair value of derivative liability	49
Change in fair value	39
Balance as of December 31, 2016	88
Change in fair value	283
Balance as of December 31, 2017	$ 371

AVROBIO, INC.

NOTES TO CONSOLIDATED FINANCIAL STATEMENTS (CONTINUED)

4. Prepaid Expenses and Other Current Assets

Prepaid expenses and other current assets consisted of the following:

	December 31,	
	2016	2017
Prepaid research and development costs	$ —	$ 163
Prepaid rent	15	122
Other current assets	4	60
	$ 19	$ 345

5. Property and Equipment, Net

Property and equipment, net consisted of the following:

	December 31, 2017
Laboratory and office equipment	$ 126
Leasehold improvements	240
Computer equipment and software	28
	394
Less: Accumulated depreciation and amortization	(45)
	$ 349

As of December 31, 2016, the Company did not hold any property and equipment. Depreciation and amortization expense for the year ended December 31, 2017 was $45.

6. Accrued Expenses

Accrued expenses consisted of the following:

	December 31,	
	2016	2017
Compensation and benefit costs	$374	$ 794
Research and development costs	—	831
Consulting and professional fees	89	267
Preferred stock issuance cost	—	85
Other liabilities	88	121
	$551	$2,098

7. Loan Agreement and Warrant to Purchase Preferred Stock

On June 23, 2017, the Company entered into the Loan Agreement with a lender, which provided for the issuance of term loans of up to $10,000, subject to the achievement of various development and corporate milestones. Any outstanding principal amounts under the Loan Agreement will accrue interest at a floating per annum rate equal to the greater of 1% and the “prime rate,” as defined in the Loan Agreement, minus 3%.

AVROBIO, INC.

NOTES TO CONSOLIDATED FINANCIAL STATEMENTS (CONTINUED)

7. Loan Agreement and Warrant to Purchase Preferred Stock (continued)

Payments on the Loan Agreement are interest only, payable monthly in arrears, until November 1, 2018, which can be extended by six months if the third tranche is drawn. Thereafter, principal and interest amounts are repayable over a 30-month period, unless the third tranche is funded and the initial interest-only period is extended by six months, in which case principal and interest amounts are repayable over a 24-month period. As of December 31, 2017, the Company had not drawn down from the facility and $3,500 was available to the Company.

The Loan Agreement contains customary indemnification obligations and customary events of default. In the event of default by the Company under the Loan Agreement, the lender would be entitled to exercise their remedies thereunder, including the right to accelerate the debt, upon which the Company may be required to repay all amounts then outstanding under the Loan Agreement or the lender may take possession of the collateral securing the Loan Agreement. No events of default had occurred through December 31, 2017.

The Loan Agreement also includes certain restrictions on, among other things, the Company's ability to incur additional indebtedness, change the name or location of its business, merge with or acquire other entities, pay dividends or make other distributions to holders of the Company's capital stock, make certain investments, engage in transactions with affiliates, create liens, open new deposit accounts, sell assets or pay subordinated debt.

In connection with the Loan Agreement, the Company agreed to issue a warrant to the lender for the purchase of up to 188,702 shares of the Company's Series A Preferred Stock with an exercise price of $0.7949 per share. The warrant expires on June 22, 2027. The warrant is initially exercisable for the purchase of up to 28,305 shares of Series A Preferred Stock and can become exercisable for up to an additional 160,397 shares of Series A Preferred Stock based on the amounts drawn under the Loan Agreement. On the issuance date of the warrant, the Company recorded a deferred financing cost and a liability for the warrant to purchase preferred stock in the Company's consolidated balance sheet equal to the issuance-date fair value of the warrant. As of December 31, 2017, the warrant is exercisable for up to 28,305 shares of Series A Preferred Stock.

On the date of issuance, the fair value of the warrant was determined to be $18. The Company remeasured the liability associated with the warrant as of December 31, 2017 and determined that the fair value of the preferred stock warrant liability was $35. The Company recognized a loss of $17 in the consolidated statements of operations and comprehensive loss for the year ended December 31, 2017, related to the change in fair value of the warrant.

8. Redeemable Convertible Preferred Stock

As of December 31, 2016, the authorized capital stock of the Company included 22,380,952 shares of $0.0001 par value preferred stock, of which 3,333,333 shares have been designated as Series Seed Preferred Stock and 19,047,619 shares have been designated as Series A Preferred Stock. As of December 31, 2017, the authorized capital stock of the Company included 34,972,535 shares of $0.0001 par value preferred stock, of which 3,333,333 shares have been designated as Series Seed Preferred Stock and 31,639,202 shares have been designated as Series A Preferred Stock.

In January 2016, the Company issued and sold 3,333,333 shares of Series Seed Preferred Stock at a price of $0.45 per share, for total proceeds of $1,398, net of issuance costs of $102.

AVROBIO, INC.

NOTES TO CONSOLIDATED FINANCIAL STATEMENTS (CONTINUED)

8. Redeemable Convertible Preferred Stock (continued)

In July 2016, the Company issued and sold 5,714,286 shares of Series A Preferred Stock, at a price of $1.3125 per share, for total proceeds of $7,297, net of issuance costs of $203. The terms of the Series A Preferred Stock Purchase Agreement included the obligation of the investors to purchase, and the Company to sell, up to 13,333,333 additional shares of Series A Preferred Stock at $1.3125 per share contingent upon the achievement of certain specified milestones or at the election of a required vote by the investors and the Board. The Company concluded that the right to participate in the future issuance of Series A Preferred Stock did not meet the definition of a freestanding financial instrument, as the rights were not legally detachable from the Series A Preferred Stock.

In March 2017, the Company amended certain provisions of the Series A Preferred Stock. The changes included issuing additional instruments through the preferred stock dividend in the amount of 3,720,864 shares of Series A Preferred Stock, which effectively repriced the outstanding shares of Series A Preferred Stock, changing the purchase price for future shares, and decreasing the redemption price per share such that total redemption value was not affected. Concurrent with the amendment, the Company issued 4,403,070 additional shares of Series A Preferred Stock at a purchase price of $0.7949 per share, for total proceeds of $3,452, net of issuance costs of $48. Additionally, the number of shares of Series A Preferred Stock which could be issued in the future was changed to 17,612,279 shares. The Company assessed the changes to the terms and concluded that it represented a material change to substantive terms of the instrument, and therefore represented, for accounting purposes, an extinguishment and re-issuance of the Series A Preferred Stock outstanding at the time. As the carrying value of the outstanding shares of Series A Preferred Stock prior to the extinguishment was deemed to equal the aggregate fair value of the reissued shares and the shares issued as a dividend, no gain or loss was recognized on extinguishment of the Series A Preferred Stock.

In October 2017, the Company issued and sold an additional 17,612,279 shares of Series A Preferred Stock, at a price of $0.7949 per share, for total proceeds of $13,963, net of issuance costs of $37.

As of each balance sheet date, the Preferred Stock consisted of the following:

	December 31, 2016				
	Preferred Shares Authorized	Preferred Shares Issued and Outstanding	Carrying Value	Liquidation Preference	Common Stock Issuable Upon Conversion
Series Seed preferred stock	3,333,333	3,333,333	$1,500,000	$1,500,000	3,333,333
Series A preferred stock	19,047,619	5,714,286	7,500,000	7,500,000	5,714,286
	22,380,952	9,047,619	$9,000,000	$9,000,000	9,047,619

	December 31, 2017				
	Preferred Shares Authorized	Preferred Shares Issued and Outstanding	Carrying Value	Liquidation Preference	Common Stock Issuable Upon Conversion
Series Seed preferred stock	3,333,333	3,333,333	$ 1,500,000	$ 1,500,000	3,333,333
Series A preferred stock	31,639,202	31,450,499	25,000,000	25,000,000	31,450,499
	34,972,535	34,783,832	$ 26,500,000	$ 26,500,000	34,783,832

AVROBIO, INC.

NOTES TO CONSOLIDATED FINANCIAL STATEMENTS (CONTINUED)

8. Redeemable Convertible Preferred Stock (continued)

As of December 31, 2017, the holders of the Preferred Stock have the following rights and preferences:

Voting Rights—

The holders of the Preferred Stock are entitled to vote, together with the holders of common stock, on all matters submitted to the stockholders for a vote and are entitled to the number of votes equal to the number of whole shares of common stock into which such holders of Preferred Stock could convert on the record date for determination of stockholders entitled to vote. Except for the actions requiring the approval or consent of the majority of the holders of Preferred Stock, the holders of Preferred Stock shall vote together with the holders of common stock and vote as a single class.

Dividends—

The holders of the Preferred Stock are entitled to receive noncumulative dividends when, as and if declared by the Board. The Company may not pay any dividends on shares of common stock of the Company unless the holders of Preferred Stock then outstanding simultaneously receive dividends at least equal to a fixed percentage of Preferred Stock. Through December 31, 2017, no cash dividends have been declared or paid.

Liquidation Rights—

In the event of any voluntary or involuntary liquidation event, dissolution, winding up of the Company or upon the occurrence of certain events designated by a majority of the holders of the Preferred Stock to be a deemed liquidation event, each holder of the then outstanding Series A Preferred Stock will be entitled to receive, prior and in preference to any distributions to the holders of Series Seed Preferred Stock and common stock, an amount equal to the greater of (i) $0.7949 per share (adjusted in the event of any stock dividend, stock split, combination or other similar activity) plus any declared but unpaid dividends thereon, or (ii) the amount such holder would have received if such holder had converted its shares into common stock immediately prior to such liquidation event.

After the payment of all preferential amounts to the holders of Series A Preferred Stock, each holder of the then outstanding Series Seed Preferred Stock will be entitled to receive, prior and in preference to any distributions to the holders of common stock, an amount equal to the greater of (i) $0.45 per share (adjusted in the event of any stock dividend, stock split, combination or other similar activity) plus any declared but unpaid dividends thereon, or (ii) the amount such holder would have received if such holder had converted its shares into common stock immediately prior to such liquidation event.

After payments have been made in full to the holders of the Preferred Stock, then, to the extent available, the remaining amounts will be distributed among the holders of the shares of common stock, pro rata based on the number of shares held by each holder.

Conversion—

Each share of Preferred Stock is convertible into common stock, at any time, at the option of the holder, and without the payment of additional consideration, at the applicable conversion ratio then in effect for each series of Preferred Stock, initially set to be one-for-one, and subject to adjustment in accordance with anti-dilution provisions. In addition, each share of Preferred Stock will be automatically converted into common stock at the applicable conversion ratio then in effect for each series of Preferred Stock upon the earlier of a qualified IPO

AVROBIO, INC.

NOTES TO CONSOLIDATED FINANCIAL STATEMENTS (CONTINUED)

8. Redeemable Convertible Preferred Stock (continued)

which results in net proceeds of at least $50,000 and the listing of the Company's common stock on the New York Stock Exchange or the Nasdaq Stock Market, or upon a vote of the holders of a majority of the outstanding Preferred Stock. As of December 31, 2017, each share of Preferred Stock was convertible into one share of common stock and can be adjusted in the event of any stock dividend, stock split, combination or other similar recapitalization with respect to the Preferred Stock.

The Company evaluated each series of its Preferred Stock and determined that each individual series is considered an equity host. In making this determination, the Company's analysis followed the whole instrument approach which compares an individual feature against the entire preferred stock instrument which includes that feature. The Company's analysis was based on a consideration of the economic characteristics and risks of each series of Preferred Stock. More specifically, the Company evaluated all of the stated and implied substantive terms and features, including: (1) whether the Preferred Stock included redemption features, (2) how and when any redemption features could be exercised, (3) whether the holders of Preferred Stock were entitled to dividends, (4) the voting rights of the Preferred Stock and (5) the existence and nature of any conversion rights. As a result of the Company's conclusion that the Preferred Stock represents an equity host, the conversion feature of all series of Preferred Stock is considered to be clearly and closely related to the associated Preferred Stock host instrument. Accordingly, the conversion feature of all series of Preferred Stock is not considered an embedded derivative that requires bifurcation.

The Company accounts for potential beneficial conversion features at the time of issuance. The Company's common stock into which each series of the Company's Preferred Stock is convertible had an estimated fair value less than the effective conversion prices of the Preferred Stock at the time of each of the issuances of Preferred Stock. Therefore, there was no intrinsic value on the respective commitment dates. In addition, the Company considered the other features included within the Preferred Stock and determined that none of the other features required bifurcation and separate accounting.

Redemption—

The Series Seed Preferred Stock and Series A Preferred Stock are redeemable at $0.45 per share and $0.7949 per share, respectively, (adjusted in the event of any stock dividend, stock split, combination or other similar activity) plus any declared but unpaid dividends, on or after July 21, 2021 at the written election of at least a majority of the holders of Preferred Stock voting together as a single class. The redemption is paid in three annual installments. No bifurcation of the redemption feature was required as the feature does not contain the characteristics of a derivative instrument.

As the Preferred Stock is redeemable upon the passage of time, the Preferred Stock has been classified outside of permanent equity. The Company has elected to record the changes in the redemption value immediately as they occur.

9. Common Stock

As of December 31, 2016 and 2017, the authorized capital stock of the Company included 40,000,000 and 51,000,000 shares of common stock, $0.0001 par value, respectively. The voting, dividend and liquidation rights of the holders of the Company's common stock are subject to and qualified by the rights, powers and preferences of the holders of the Preferred Stock set forth above.

On January 27, 2016, the Company modified the terms of 1,366,666 shares of common stock which were issued to four employees in November 17, 2015 to add a vesting condition. The restrictions lapse according to

AVROBIO, INC.

NOTES TO CONSOLIDATED FINANCIAL STATEMENTS (CONTINUED)

9. Common Stock (continued)

the time-based vesting conditions of each award. During each of the years ended December 31, 2016 and 2017, 341,666 shares of these restricted common stock awards vested.

Each share of common stock entitles the holder to one vote, together with the holders of the Preferred Stock, on all matters submitted to the stockholders for a vote. The holders of the Preferred Stock, voting as a single class, are entitled to elect three directors of the Company. The holders of common stock, together with the holders of the Preferred Stock and voting as a single class, are entitled to elect two directors of the Company. The holders of common stock and of any other class or series of voting stock (including the Preferred Stock), voting together as a single class, are entitled to elect the remaining directors of the Company. Common stockholders are entitled to receive dividends, as may be declared by the Board, if any, subject to the preferential dividend rights of the Preferred Stock. Through December 31, 2017, no cash dividends have been declared or paid.

At December 31, 2016 and 2017, the Company has reserved the following shares of common stock for future issuance:

	December 31,	
	2016	2017
Shares reserved for Series Seed Preferred Stock outstanding	3,333,333	3,333,333
Shares reserved for Series A Preferred Stock outstanding	5,714,286	31,450,499
Shares reserved for vesting of restricted stock awards	1,691,667	1,141,668
Shares reserved for exercise of outstanding stock options	2,476,906	4,276,504
Shares reserved for issuance under the 2015 Stock Option and Grant Plan	217,772	593,795
Total shares of authorized common stock reserved for future issuance	13,433,964	40,795,799

10. Stock-Based Compensation

Amended and Restated 2015 Stock Option and Grant Plan

The Company's Amended and Restated 2015 Stock Option and Grant Plan, (the "2015 Plan") provides for the Company to issue restricted stock awards and restricted stock units, or to grant incentive stock options or non-statutory stock options. Incentive stock options may be granted only to the Company's employees including officers and members of the Board who are also employees. Restricted stock awards and restricted stock units and non-statutory stock options may be granted to employees, members of the Board, outside advisors, and consultants of the Company.

The total number of common shares that may be issued under the 2015 Plan was 5,536,966 shares as of December 31, 2017, of which 593,795 shares remained available for future grant.

Shares that expire, are terminated, surrendered or canceled under the 2015 Plan without having been fully exercised will be available for future awards. In addition, shares of common stock that are tendered to the Company by a participant to exercise an award are added to the number of shares of common stock available for future awards.

The 2015 Plan is administered by the Board. Equity awards granted to employees and members of the Board typically vest over four years.

During the years ended December 31, 2016 and 2017, the Company granted options to purchase 2,476,906 shares and 1,789,598 shares, respectively, of common stock to employees and members of the Board.

AVROBIO, INC.

NOTES TO CONSOLIDATED FINANCIAL STATEMENTS (CONTINUED)

10. Stock-Based Compensation (continued)

During the year ended December 31, 2017, the Company granted options to purchase 10,000 shares of common stock to a non-employee. The stock-based compensation expense for options granted to non-employees is nominal during the year ended December 31, 2017. The Company did not grant options to purchase shares of common stock to non-employees during the year ended December 31, 2016.

Stock Option Valuation

The assumptions that the Company used to determine the grant-date fair value of stock options granted to employees and members of the Board were as follows, presented on a weighted-average basis:

	Year Ended December 31,	
	2016	2017
Expected option life (years)	6.00	6.08
Risk-free interest rate	1.39%	1.93%
Expected volatility	86.00%	84.54%
Expected dividend yield	—%	—%

The following table summarizes the Company's stock option activity for the year ended December 31, 2017:

	Number of Options	Weighted-Average Exercise Price	Weighted-Average Remaining Contractual Term (Years)	Aggregate Intrinsic Value
Outstanding as of December 31, 2016	2,476,906	$ 0.17	9.47	$ 307
Granted	1,799,598	$ 0.22		
Exercised	—	$ —		
Cancelled or forfeited	—	$ —		
Outstanding as of December 31, 2017	4,276,504	$ 0.19	8.94	$ 3,427
Exercisable as of December 31, 2017	766,284	$ 0.16	8.46	$ 633
Unvested as of December 31, 2017	3,510,220	$ 0.19	9.04	$ 2,794

The aggregate intrinsic value of stock options is calculated as the difference between the exercise price of the underlying stock options and the estimated fair value of the Company's common stock for those stock options that had exercise prices lower than the estimated fair value of the Company's common stock at December 31, 2017.

The weighted-average grant-date fair value of the Company's stock options granted during the years ended December 31, 2016 and 2017 was $0.12 and $0.36, respectively.

Restricted Common Stock

The Company has granted restricted common stock with time-based vesting conditions to certain employees of the Company. The purchase price of the restricted stock awards are determined by the Board. The Company also, in January 2016, modified 1,366,666 shares of common stock which were issued to four employees in

AVROBIO, INC.

NOTES TO CONSOLIDATED FINANCIAL STATEMENTS (CONTINUED)

10. Stock-Based Compensation (continued)

November 17, 2015 to add a vesting condition (see Note 9). Unvested shares of restricted common stock may not be sold or transferred by the holder. These restrictions lapse according to the time-based vesting conditions of each award. The Company has the option to repurchase the restricted stock awards at the original purchase price if the grantee terminates its working relationship with the Company prior to the vesting date.

The following table summarizes the Company's restricted common stock activity for the year ended December 31, 2017:

	Number of Shares	Weighted-Average Grant Date Fair Value	Aggregate Intrinsic value
Issued and unvested as of December 31, 2016	1,691,667	$ 0.10	$ 1,675
Vested	(549,999)	$ 0.10	$ 544
Forfeited, canceled or expired	—	$ —	$ —
Issued and unvested as of December 31, 2017	1,141,668	$ 0.10	$ 1,130

The weighted-average grant date fair value of restricted common stock awards granted during the year ended December 31, 2016 was $0.10 per share. The total fair value of restricted common stock vested during the years ended December 31, 2016 and 2017 was $34 and $55, respectively.

Stock-Based Compensation

Stock-based compensation expense was allocated as follows:

	Year Ended December 31,	
	2016	2017
Research and development	$ 32	$ 80
General and administrative	40	97
Total stock based compensation expense	$ 72	$ 177

As of December 31, 2017, total unrecognized compensation cost related to the unvested stock-based awards was $897, which is expected to be recognized over a weighted-average period of 3.26 years.

11. License Agreements

Agreements with UHN

Fabry License Agreement—

On January 27, 2016, the Company entered into an agreement with UHN, pursuant to which UHN granted the Company an option to enter into an exclusive license under the UHN intellectual property related to Fabry disease in accordance with the pre-negotiated licensing terms. On November 4, 2016, the Company exercised its option and entered into a license agreement with UHN, pursuant to which UHN granted the Company an exclusive worldwide license under certain intellectual property rights and a non-exclusive worldwide license under certain know-how, in each case subject to certain retained rights, to develop, commercialize and sell products for use in the treatment of Fabry disease. In addition, for three years following the execution of the agreement, UHN granted the Company an exclusive option to obtain a license under certain improvements to the licensed intellectual property rights as well as an option to negotiate a license under certain other improvements.

AVROBIO, INC.

NOTES TO CONSOLIDATED FINANCIAL STATEMENTS (CONTINUED)

11. License Agreements (continued)

Under this agreement, the Company paid an option fee of CAD $20, an upfront license fee of CAD $75, plus the annual license maintenance fee for the first year. Thereafter, the Company is also required to pay UHN future annual license maintenance fees until the first sale of a licensed product in certain markets. The Company is also obligated to make future milestone payments in an aggregate amount of up to CAD $2,450 upon the achievement of specified milestones as well as royalties on a country-by-country basis of a low to mid-single-digit percentage of annual net sales of licensed products and a lower single-digit royalty percentage in certain circumstances. Additionally, the Company has agreed to pay a low double-digit royalty percentage of all sublicensing revenue.

The agreement requires the Company to meet certain performance milestones within specified timeframes. UHN may terminate the agreement if the Company fails to meet these performance milestones despite using commercially reasonable efforts and the Company is unable to reach agreement with UHN on revised timeframes. The Company's royalty obligation expires on a licensed product-by-licensed product and country-by-country basis upon the latest to occur of the expiration or termination of the last valid claim under the licensed intellectual property rights in such country, the tenth anniversary of the first commercial sale of such licensed product in such country and the expiration of any applicable regulatory exclusivity in such country.

Unless terminated earlier, the agreement expires upon the expiration of the Company's royalty obligation for all licensed products. UHN can terminate the agreement if the Company fails to make any payments within a specified period after receiving written notice of such failure, or in the event that the Company fails to obtain or maintain insurance. Either the Company or UHN may terminate the license agreement in the event of a material breach by the other party and failure to cure such breach within a certain period of time. The Company can voluntarily terminate the agreement with prior notice to UHN.

For the years ended December 31, 2016 and 2017, the Company recorded research and development expense of $87 and $16, respectively, which consists of the license option fee, the upfront fee and maintenance fees.

Interleukin 12 License Agreement—

On January 27, 2016, the Company entered into an exclusive license agreement with UHN, pursuant to which UHN granted the Company a license to certain patent rights for the commercial development, manufacture, distribution and use of any products or processes resulting from development of those patent rights related to Interleukin 12. Upon execution of this agreement, the Company paid an upfront license fee of CAD $264. In addition, as part of the initial consideration for the license, the Company issued to UHN 4,800,000 shares of the Company's common stock. The fair value of the shares issued to UHN of $480 and the upfront fee was expensed upon the execution of the agreement. In addition, the Company agreed to pay UHN up to $2,000 upon the closing of an IPO if certain criteria are met. This obligation is considered a derivative instrument and was initially recorded at fair value of $49. The Company is also required to pay UHN future annual license maintenance fees of CAD $50 on each anniversary of the effective date of the license agreement prior to expiration or termination and potential future milestone payments of up to CAD $19,275 upon the achievement of specified clinical and regulatory milestones. The Company also agreed to pay UHN royalties of a low single-digit percentage of net sales of licensed products sold by the Company. If the Company grants any sublicense rights under the license agreement, the Company has agreed to pay UHN a low double-digit royalty percentage of any sublicense income received by the Company.

The agreement requires the Company to meet certain due diligence requirements based upon specified milestones. The agreement expires on the later of the date the last patent rights expire in the last country or ten

AVROBIO, INC.

NOTES TO CONSOLIDATED FINANCIAL STATEMENTS (CONTINUED)

11. License Agreements (continued)

years from the date of first sale. UHN can terminate the agreement if the Company fails to make any payments within a specified period after receiving written notice of such failure, or in the event that the Company fails to obtain or maintain insurance. The Company can voluntarily terminate the agreement with prior notice to UHN. Either the Company or UHN may terminate the license agreement in the event of a material breach by the other party and failure to cure such breach within a certain period of time.

For the years ended December 31, 2016 and 2017, the Company recorded research and development expense related to this agreement with UHN of $785 and $151, respectively, which consists of upfront fees, the fair value of the shares and derivative instrument issued to UHN, and license maintenance fees and development milestone payments.

Agreement with BioMarin Pharmaceutical Inc. ("BioMarin")

On August 31, 2017, the Company entered into a license agreement with BioMarin, pursuant to which BioMarin granted the Company an exclusive worldwide license under certain intellectual property rights owned or controlled by BioMarin to develop, commercialize and sell products for use in the treatment of Pompe disease. As consideration for this agreement, the Company paid an upfront license fee of $500 in cash and issued 233,765 shares of Series B Preferred Stock to BioMarin at the time of our Series B Preferred Stock financing in January 2018. Both the upfront cash payment of $500 and the value of the shares Series B Preferred Stock issued of $500 were recorded as research and development expense during the year ended December 31, 2017. The Company is also obligated to make future milestone payments of up to $13,000 upon the achievement of certain specified milestones and agreed to pay BioMarin royalties of a low single-digit percentage of net sales of licensed products sold by the Company or its affiliates covered by patent rights in a relevant country.

Unless terminated earlier, the agreement expires upon the expiration of the Company's royalty obligation for all licensed products throughout the world. BioMarin and the Company can terminate the agreement in the event of a material breach by the other party and failure to cure such breach within a certain period of time. The Company may terminate the agreement at will upon written notice to BioMarin. BioMarin has the right to terminate the agreement upon the Company's bankruptcy or insolvency, or in the event of any challenge or opposition to the licensed patent rights or related actions brought by the Company or its affiliates or sublicensees, or if the Company, its affiliates or sublicensees knowingly assist a third-party in challenging or otherwise opposing the licensed patent rights, except as required under a court order or subpoena.

Agreement with GenStem Therapeutics, Inc. ("GenStem")

On October 2, 2017, the Company entered into a license agreement with GenStem, pursuant to which GenStem granted the Company an exclusive worldwide license, subject to certain retained rights, under certain intellectual property rights owned or controlled by GenStem to develop, commercialize and sell products for use in the treatment of cystinosis. Under this agreement, the Company paid an upfront license fee of $1,000 and is required to make payments upon completion of certain milestones up to an aggregate of $16,000. The Company also agreed to pay GenStem a tiered mid to high single-digit royalty percentage on annual net sales of licensed products as well as a low double-digit percentage of sublicense income received from certain third party licensees. The Company's royalty obligation expires on a licensed product-by-licensed product and country-by-country basis on the eleventh anniversary of the first commercial sale of such licensed product in such country or the expiration of the last valid claim under the licensed patent rights covering such licensed product in such country, whichever is later. Unless terminated earlier, the agreement expires upon the expiration of the Company's royalty obligation for all licensed products throughout the world. GenStem and the Company

11. License Agreements (continued)

can terminate the agreement in the event of a material breach by the other party and failure to cure such breach within a certain period of time. The Company may terminate the agreement at will upon the specified prior written notice to GenStem. The Company recorded research and development expense of $1,000 for the year ended December 31, 2017, which consisted of upfront fees related to the license.

Agreement with Lund University Rights Holders

On November 17, 2016, the Company entered into a license agreement with affiliates of Lund University, along with certain other relevant rights holders that may be added from time to time, pursuant to which such rights holders granted to the Company an exclusive worldwide license, subject to certain retained rights, under certain intellectual property rights to develop, commercialize and sell products in any and all uses relevant to Gaucher disease. As consideration for the license, the Company is required to make payments in connection with the achievement of certain milestones up to an aggregate of $550. The agreement expires on the latest of (i) the twentieth anniversary of the end of a certain research project the Company is funding pursuant to an agreement with Lund University, (ii) the expiration of the term of any patent filed on the licensed rights that covers a licensed product, (iii) the expiration of any applicable marketing exclusivity right and (iv) such time that neither the Company nor any sublicensees, partners or contractors are commercializing a licensed product. Either the Company or the rights holders acting together may terminate the license agreement if the other such party commits a material breach and fails to cure such breach within a certain period of time, or if the other party enters into liquidation, becomes insolvent, or enters into composition or statutory reorganization proceedings.

12. Income Taxes

For the years ended December 31, 2016 and 2017, the Company did not record a current or deferred income tax expense or (benefit) due to current and historical losses incurred by the Company. The Company's operations are predominantly based in the United States and the Company's foreign subsidiaries generated de minimis profit for the years ended December 31, 2016 and 2017.

The enactment of the Tax Cuts and Jobs Act ("TCJA") in December 2017, as further described below, resulted in a remeasurement of the Company's net deferred tax asset due to the reduction in the corporate income tax rate from 35% to a 21% flat tax, which is included in the Company's 2017 rate reconciliation.

A reconciliation of income tax expense (benefit) computed at the statutory federal income tax rate to income taxes as reflected in the consolidated financial statements is as follows:

	Year Ended December 31,	
	2016	2017
Federal income tax expense at statutory rate	34.0%	34.0%
State income taxes, net of federal benefit	5.1	4.9
Permanent differences	(0.8)	(0.3)
U.S.—TCJA	—	(14.8)
Foreign rate differential	—	(0.2)
Research and development tax credits	2.3	1.3
Change in valuation allowance	(40.6)	(24.9)
Effective income tax rate	—%	—%

AVROBIO, INC.

NOTES TO CONSOLIDATED FINANCIAL STATEMENTS (CONTINUED)

12. Income Taxes (continued)

Deferred taxes are recognized for temporary differences between the basis of assets and liabilities for financial statement and income tax purposes. The significant components of the Company's deferred tax assets and liabilities are comprised of the following:

	December 31,	
	2016	2017
Deferred tax assets:		
U.S., foreign, and state net operating loss carryforwards	$ 1,435	$ 5,183
Research and development credits	19	95
Capitalized start up and organizational costs	60	39
Equity based compensation	18	29
Derivative liability	35	101
Licensing agreements	331	800
Accruals and other	—	239
Total deferred tax assets	1,898	6,486
Valuation allowance	(1,898)	(6,466)
Net deferred tax assets	$ —	$ 20
Deferred tax liabilities:		
Property and equipment	$ —	$ (20)
Total deferred tax liabilities	$ —	$ (20)

The Company has evaluated the positive and negative evidence bearing upon the realizability of its deferred tax assets. As of December 31, 2016 and 2017, based on the Company's history of operating losses, the Company has concluded that it is not more likely than not that the benefit of its deferred tax assets will be realized. Accordingly, the Company has provided a full valuation allowance for deferred tax assets as of December 31, 2016 and 2017. The valuation allowance increased $1,898 and $4,568 during the years ended December 31, 2016 and 2017, respectively, due primarily to net operating losses generated.

As of December 31, 2016 and 2017, the Company had U.S. federal net operating loss carryforwards of $3,659 and $19,007, respectively, that may be available to offset future income tax liabilities. The TCJA will generally allow losses incurred after 2017 to be carried over indefinitely, but will generally limit the net operating loss deduction to the lesser of the net operating loss carryover or 80% of a corporation's taxable income. Also, there will be no carryback for net operating losses incurred after 2017. Net operating losses incurred prior to 2018 will generally be deductible to the extent of the lesser of a corporation's net operating loss carryover or 100% of a corporation's taxable income, and be available to offset future taxable income for a period of twenty years.

The Company has early adopted the provisions of ASU 2016-09, *Compensation—Stock Compensation (Topic 718 Improvements to Employee Share-Based Payment Accounting)*, for its year ended December 31, 2016. ASU 2016-09 requires companies to include the benefit of an option deduction in its net operating loss carryforward deferred tax asset. The Company did not have any deductions associated with stock-based payments, and therefore the adoption of ASU 2016-09 did not impact the Company's deferred tax asset for net operating loss carryforwards. Furthermore, since the Company has historically maintained a full valuation allowance on its net worldwide deferred tax asset, there is no net impact to retained earnings from the adoption of ASU 2016-09.

AVROBIO, INC.

NOTES TO CONSOLIDATED FINANCIAL STATEMENTS (CONTINUED)

12. Income Taxes (continued)

As of December 31, 2016 and 2017, the Company also had U.S. state net operating loss carryforwards of $3,619 and $18,866, respectively, which may be available to offset future taxable income. These losses expire at various dates through 2037.

As of December 31, 2016 and 2017, the Company does not have federal research and development tax credit carryforwards, as the Company qualifies for, and has elected to, apply such federal research credits against its payroll tax liability in accordance with certain provisions of the Internal Revenue Code. As of December 31, 2016 and 2017, the Company had state research and development tax credit carryforwards of approximately $30 and $119, respectively, available to reduce future tax liabilities which expire at various dates through 2032. For all years through December 31, 2017, the Company generated research credits but has not conducted a study to document the qualified activities. This study may result in an adjustment to the Company's research and development credit carryforwards.

Under the provisions of the Internal Revenue Code, the net operating loss and tax credit carryforwards are subject to review and possible adjustment by the Internal Revenue Service and state tax authorities. Net operating loss and tax credit carryforwards may become subject to an annual limitation in the event of certain cumulative changes in the ownership interest of significant shareholders over a three-year period in excess of 50 percent, as defined under Sections 382 and 383 of the Internal Revenue Code, respectively, as well as similar state provisions. This could limit the amount of tax attributes that can be utilized annually to offset future tax liabilities. The amount of the annual limitation is determined based on the value of the Company immediately prior to the ownership change. Subsequent ownership changes may further affect the limitation in future years. The Company has completed numerous financings since its inception, which may have resulted in a change in control as defined by Sections 382 and 383 of the Internal Revenue Code, or could result in a change in control in the future.

The Company files income tax returns in Australia, Canada, the United States, and in several states. The foreign, federal and state income tax returns are generally subject to tax examinations for the tax years ended December 31, 2015 through December 31, 2017. To the extent the Company has tax attribute carryforwards, the tax years in which the attribute was generated may still be adjusted upon examination by foreign tax authorities, the Internal Revenue Service, or state tax authorities to the extent utilized in a future period.

The TCJA was enacted in December 2017. Among other things, the TCJA reduces the U.S. federal corporate tax rate from 35% to 21% for tax years beginning in 2018, and requires companies to pay a one-time transition tax on previously unremitted earnings of non-U.S. subsidiaries that were previously tax deferred and creates new taxes on certain foreign sourced earnings. The SEC staff issued Staff Accounting Bulletin ("SAB") 118, that provides guidance on accounting for enactment effects of the TCJA. SAB 118 provides a measurement period of up to one year from the TCJA's enactment date for companies to complete their accounting under ASC 740. In accordance with SAB 118, to the extent that a company's accounting for certain income tax effects of the TCJA is incomplete but it is able to determine a reasonable estimate, it must record a provisional estimate in its consolidated financial statements. If a company cannot determine a provisional estimate to be included in its consolidated financial statements, it should continue to apply ASC 740 on the basis of the provisions of the tax laws that were in effect immediately before the enactment of the TCJA.

In connection with the Company's initial analysis of the impact of the enactment of the TCJA, the Company has not recorded an income tax expense. For various reasons that are discussed more fully below, the Company has not completed its accounting for the income tax effects of certain elements of the TCJA. However, with

AVROBIO, INC.

NOTES TO CONSOLIDATED FINANCIAL STATEMENTS (CONTINUED)

12. Income Taxes (continued)

respect to the remeasurement of deferred tax assets and liabilities, the Company has remeasured its deferred tax assets and liabilities based on the rates at which they are expected to reverse in the future, which is generally 21% under the TCJA. The impact of the remeasurement of the Company's deferred tax assets and liabilities is included in the rate reconciliation above.

The Company is still analyzing certain aspects of the TCJA, including considering additional technical guidance and refining its calculations, that could potentially affect the measurement of these balances or potentially give rise to new deferred tax amounts. This includes the potential impacts of the global low-taxed income ("GILTI") provision within the TCJA on deferred tax assets and liabilities. The Company has not yet elected a policy as to whether it will recognize deferred taxes for basis differences expected to reverse as GILTI or whether the Company will account for GILTI as a period cost if and when incurred. Additionally, with respect to the transition tax, which is a tax on previously untaxed accumulated and current earnings and profits (E&P) of certain of the Company's non-U.S. subsidiaries. The Company is currently evaluating the impact of this issue, and has not finalized a conclusion at this time and therefore cannot determine a provisional estimate to be included in its consolidated financial statements, and in accordance with SAB 118 it will continue to apply ASC 740 on the basis of the provisions of the tax laws that were in effect immediately before the enactment of the TCJA.

13. Net Loss per Share and Unaudited Pro Forma Net Loss per Share

Net Loss per Share Attributable to Common Stockholders

For purposes of the diluted net loss per share calculation, stock options, unvested restricted stock, Preferred Stock and the warrant to purchase shares of Series A Preferred Stock are considered to be common stock equivalents but have been excluded from the calculation of diluted net loss per share, as their effect would be anti-dilutive for all periods presented. Therefore, the weighted-average number of common shares outstanding used to calculate both basic and diluted net loss per share attributable to common stockholders is the same.

The following potentially dilutive common stock equivalents, presented based on amounts outstanding at each period end, were excluded from the computation of diluted net loss per share attributable to common stockholders for the periods indicated because including them would have had an anti-dilutive effect:

	Year Ended December 31,	
	2016	2017
Options to purchase common stock	2,476,906	4,276,504
Restricted common stock	1,691,667	1,141,668
Redeemable convertible preferred stock (as converted to common stock)	9,047,619	34,783,832
Warrants to purchase redeemable convertible preferred stock (as converted to common stock)	—	28,305

Unaudited Pro Forma Net Loss per Share Attributable to Common Stockholders

The unaudited pro forma basic and diluted net loss per share attributable to common stockholders for the year ended December 31, 2017 has been prepared to give effect to adjustments arising upon the closing of a

AVROBIO, INC.

NOTES TO CONSOLIDATED FINANCIAL STATEMENTS (CONTINUED)

13. Net Loss per Share and Unaudited Pro Forma Net Loss per Share (continued)

qualified IPO. The unaudited pro forma net loss attributable to common stockholders used in the calculation of unaudited pro forma basic and diluted net loss per share attributable to common stockholders does not include the effects of the accretion of Preferred Stock to redemption value or the change in fair value of the warrant to purchase shares of Series A Preferred Stock because the calculation gives effect to the conversion of shares of Preferred Stock outstanding as of December 31, 2017 into common stock and the conversion of the warrant to purchase shares of Series A Preferred Stock outstanding as of December 31, 2017 into a warrant to purchase shares of common stock, as if such conversion had occurred at the beginning of the period presented or the date of original issuance, whichever is later.

A reconciliation of pro forma net loss and the pro forma weighted-average number of common shares used in computing pro forma basic and diluted net loss per share applicable to common stockholders is as follows:

	Year Ended December 31, 2017 (unaudited)
Numerator:	
Net loss attributable to common stockholders	$ (18,733)
Accretion of issuance costs on redeemable convertible preferred stock	85
Change in the fair value of preferred stock warrant liability	17
Pro forma net loss attributable to common stockholders	$ (18,631)
Denominator:	
Weighted-average number of common shares used in computing net loss per share attributable to common stockholders—basic and diluted	9,238,612
Pro forma adjustment to reflect assumed conversion of redeemable convertible preferred stock into common stock	19,363,856
Pro forma weighted-average number of common shares used in computing pro forma net loss per share attributable to common stockholders—basic and diluted	28,602,468
Pro forma net loss per share attributable to common stockholders—basic and diluted	$ (0.65)

14. Commitments and Contingencies

Lease Agreements

In January 2016, the Company entered into a sub-lease agreement for office space located in Cambridge Massachusetts, United States, which was a month to month rental. In February 2017, the Company terminated the office lease agreement.

In September 2016, the Company entered into a lease agreement for office space located in Cambridge Massachusetts, United States, which expires on March 31, 2024. The base rent will be increased by 3% annually. The Company recognizes rent expense on a straight-line basis over the lease period and has recorded deferred rent for rent expense incurred but not yet paid. The Company received a tenant incentive allowance of $100 in 2017. Such incentive allowance is being amortized as a reduction of rent expense on a straight-line basis over the lease period. In accordance with the lease agreement, the Company was required to maintain a security deposit of $24. The Company issued a letter of credit to the landlord related to the security deposit and the letter of credit is secured by restricted cash, which is recorded in other assets on the accompanying consolidated balance sheets.

AVROBIO, INC.

NOTES TO CONSOLIDATED FINANCIAL STATEMENTS (CONTINUED)

14. Commitments and Contingencies (continued)

In August 2017, the Company entered into a sub-lease agreement for laboratory space located in Cambridge Massachusetts, United States, which expires in August 2020. The annual lease payments are subject to a 3% increase each year. The Company recognizes rent expense on a straight-line basis over the lease period and has recorded deferred rent for rent expense incurred but not yet paid.

The Company recorded rent expense of $78 and $335 during the years ended December 31, 2016 and 2017, respectively.

The following table summarizes the future minimum lease payments due under operating leases as of December 31, 2017:

Year Ending December 31,	
2018	$ 395
2019	380
2020	302
2021	168
2022	173
Thereafter	223
	$1,641

Legal Proceedings

The Company, from time to time, may be party to litigation arising in the ordinary course of business. The Company was not subject to any material legal proceedings during the years ended December 31, 2016 and 2017, and, to the best of its knowledge, no material legal proceedings are currently pending or threatened.

Other

The Company is also party to various agreements, principally relating to licensed technology, that require future payments relating to milestones not met at December 31, 2016 and 2017, or royalties on future sales of specified products. No milestone or royalty payments under these agreements are expected to be payable in the immediate future. See Note 11 for discussion of these arrangements.

The Company enters into standard indemnification agreements in the ordinary course of business. Pursuant to the agreements, the Company agrees to indemnify, hold harmless, and to reimburse the indemnified party for losses suffered or incurred by the indemnified party, generally the Company's business partners, in connection with any U.S. patent or any copyright or other intellectual property infringement claim by any third-party with respect to the Company's products. The term of these indemnification agreements is generally perpetual any time after execution of the agreement. The maximum potential amount of future payments the Company could be required to make under these indemnification agreements is unlimited. The Company has never incurred costs to defend lawsuits or settle claims related to these indemnification agreements.

15. Related Party Transactions

UHN

In connection with the Company's entry into a license agreement with UHN (Note 11) on January 27, 2016, the Company issued UHN 4,800,000 shares of its common stock. As a result of the issuance of common stock,

AVROBIO, INC.

NOTES TO CONSOLIDATED FINANCIAL STATEMENTS (CONTINUED)

15. Related Party Transactions (continued)

UHN owned 21.63% and 9.65% of the Company's fully diluted equity as of December 31, 2016 and 2017, respectively. Upon the closing of the sale of shares of common stock in an IPO, if UHN's fully-diluted percentage ownership of the Company is reduced within a range of specified percentages, then the Company is obligated to pay UHN an amount up to $2,000. See Note 3 for further discussion on the accounting treatment for this provision.

During the years ended December 31, 2016 and 2017, the Company recognized $872 and $167 respectively, of research and development expense related to the license agreements with UHN. Refer to Note 11 for additional information regarding the UHN license agreements.

The Company recorded research and development expenses of $7 and $3 related to participation on the scientific advisory board and consulting services performed by a member of the Board who is affiliated with UHN during the years ended December 31, 2016 and 2017, respectively. As of December 31, 2016 and 2017, there was $7 and $10, respectively, included in accrued expenses on the Company's consolidated balance sheets related to these services.

For the years ended December 31, 2016 and 2017 the Company recorded expenses of $13 and $86, respectively, related to consulting services provided by an entity affiliated with an officer of the Company and a member of the Board. The entity is also a shareholder of the Company and owned 2.25% and 1.00% of the Company's fully diluted equity as of December 31, 2016 and 2017, respectively.

Others

For the years ended December 31, 2016 and 2017, the Company recorded expenses of $78 and $15, respectively, related to services provided by an entity affiliated with a member of the Board and the use of office space.

In August 2017, the Company entered into a sub-lease agreement with an entity affiliated with the Company's CEO. The executive resigned from the affiliated entity in September 2017. The Company recorded rent expense of $31 under this sub-lease agreement prior to such resignation for the two month period in 2017.

See Note 14 for additional information on the terms of these sublease agreements.

16. Benefit Plans

The Company established a defined contribution savings plan under Section 401(k) of the Internal Revenue Code. This plan covers substantially all employees who meet minimum age and service requirements and allows participants to defer a portion of their annual compensation on a pre-tax basis. Matching contributions to the plan may be made at the discretion of the Company's Board. The Company made no contributions to the plan during the years ended December 31, 2016 and 2017.

17. Subsequent Events

The Company has completed an evaluation of all subsequent events after the audited balance sheet date of December 31, 2017 through April 6, 2018, the date these consolidated financial statements were submitted to the SEC, to ensure that these consolidated financial statements include appropriate disclosure of events both recognized in the consolidated financial statements as of December 31, 2017, and events which occurred subsequently but were not recognized in the consolidated financial statements. The Company has concluded that no subsequent events have occurred that require disclosure, except as disclosed within these consolidated financial statements and except as described below.

On January 12, 2018, the Company entered into a lease agreement for office space located in Cambridge Massachusetts, United States, which expires in January 2023, with a landlord who is an affiliate of the landlord

AVROBIO, INC.

NOTES TO CONSOLIDATED FINANCIAL STATEMENTS (CONTINUED)

17. Subsequent Events (continued)

of the Company's current lease facility. In accordance with the lease agreement, the Company is required to maintain a security deposit of $209. In contemplation of this agreement, the Company terminated its existing lease agreement.

On January 19, 2018, the Company entered into a stock purchase agreement for the sale of 28,285,557 shares of Series B Preferred Stock for $2.1389 per share. The total gross proceeds received were $60,500. In addition, the Company issued 233,765 shares of Series B Preferred Stock to BioMarin as required by the Company's license agreement with BioMarin (Note 11). The rights and preferences of the Series B Preferred Stock are similar to the Company's Series A Preferred Stock, in that holders of outstanding Series B Preferred Stock have priority and preference to Series Seed Preferred Stock and common stock in the case of a liquidation or redemption event. The issue price and conversion price of the Series B Preferred Stock is $2.1389 per share, and each share of Series B Preferred Stock is convertible into common stock on a one-for-one basis.

In January 2018, the Company granted 3,114,710 stock options with an exercise price of $1.21 per share.

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Shares

Common Stock

PRELIMINARY PROSPECTUS

MORGAN STANLEY
COWEN
WELLS FARGO SECURITIES
WEDBUSH PACGROW

, 2018

PART II

Information Not Required in Prospectus

Item 13. Other Expenses of Issuance and Distribution.

The following table sets forth the fees and expenses, other than underwriting discounts and commissions, payable in connection with the registration of the common stock hereunder. All amounts are estimates except the SEC registration fee.

	AMOUNT TO BE PAID
SEC registration fee	$ *
FINRA filing fee	*
Nasdaq Global Market listing fee	*
Printing and mailing	*
Legal fees and expenses	*
Accounting fees and expenses	*
Transfer agent and registrar fees and expenses	*
Miscellaneous	*
Total	$ *

* To be completed by amendment.

Item 14. Indemnification of Directors and Officers.

Section 145 of the Delaware General Corporation Law, or the DGCL, authorizes a corporation to indemnify its directors and officers against liabilities arising out of actions, suits and proceedings to which they are made or threatened to be made a party by reason of the fact that they have served or are currently serving as a director or officer to a corporation. The indemnity may cover expenses (including attorneys' fees) judgments, fines and amounts paid in settlement actually and reasonably incurred by the director or officer in connection with any such action, suit or proceeding. Section 145 permits corporations to pay expenses (including attorneys' fees) incurred by directors and officers in advance of the final disposition of such action, suit or proceeding. In addition, Section 145 provides that a corporation has the power to purchase and maintain insurance on behalf of its directors and officers against any liability asserted against them and incurred by them in their capacity as a director or officer, or arising out of their status as such, whether or not the corporation would have the power to indemnify the director or officer against such liability under Section 145.

We have adopted provisions in our certificate of incorporation and bylaws to be in effect upon the closing of this offering that limit or eliminate the personal liability of our directors to the fullest extent permitted by the DGCL, as it now exists or may in the future be amended. Consequently, a director will not be personally liable to us or our stockholders for monetary damages or breach of fiduciary duty as a director, except for liability for:

- any breach of the director's duty of loyalty to us or our stockholders;
- any act or omission not in good faith or that involves intentional misconduct or a knowing violation of law;
- any unlawful payments related to dividends or unlawful stock purchases, redemptions or other distributions; or
- any transaction from which the director derived an improper personal benefit.

These limitations of liability do not alter director liability under the federal securities laws and do not affect the availability of equitable remedies such as an injunction or rescission.

In addition, our bylaws provide that:

- we will indemnify our directors, officers and, in the discretion of our board of directors, certain employees to the fullest extent permitted by the DGCL, as it now exists or may in the future be amended; and
- we will advance reasonable expenses, including attorneys' fees, to our directors and, in the discretion of our board of directors, to our officers and certain employees, in connection with legal proceedings relating to their service for or on behalf of us, subject to limited exceptions.

We have entered into indemnification agreements with each of our directors and intend to enter into such agreements with our executive officers. These agreements provide that we will indemnify each of our directors, certain of our executive officers and, at times, their affiliates to the fullest extent permitted by Delaware law. We will advance expenses, including attorneys' fees (but excluding judgments, fines and settlement amounts), to each indemnified director or executive officer in connection with any proceeding in which indemnification is available and we will indemnify our directors and officers for any action or proceeding arising out of that person's services as a director or officer brought on behalf of us or in furtherance of our rights. Additionally, certain of our directors or officers may have certain rights to indemnification, advancement of expenses or insurance provided by their affiliates or other third parties, which indemnification relates to and might apply to the same proceedings arising out of such director's or officer's services as a director referenced herein. Nonetheless, we have agreed in the indemnification agreements that our obligations to those same directors or officers are primary and any obligation of such affiliates or other third parties to advance expenses or to provide indemnification for the expenses or liabilities incurred by those directors are secondary.

We also maintain general liability insurance which covers certain liabilities of our directors and officers arising out of claims based on acts or omissions in their capacities as directors or officers, including liabilities under the Securities Act of 1933, as amended, or the Securities Act.

The underwriting agreement filed as Exhibit 1.1 to this registration statement provides for indemnification of us and our directors and officers by the underwriters against certain liabilities under the Securities Act and the Securities Exchange Act of 1934.

Item 15. Recent Sales of Unregistered Securities.

In the three years preceding the filing of this registration statement, we have issued the following securities that were not registered under the Securities Act:

(a) Issuances of Capital Stock

In November 2015, we sold an aggregate of 5,200,000 shares of common stock to our three founders and a consultant for nominal value.

In January 2016, we sold an aggregate of 4,800,000 shares of common stock to one stockholder for nominal value.

In January 2016, we sold an aggregate of 3,333,333 shares of our Series Seed preferred stock to one investor for aggregate consideration of approximately $1.5 million.

In July 2016, with subsequent closings in March 2017 and October 2017, we sold an aggregate of 31,450,499 shares of our Series A preferred stock to 4 investors for aggregate consideration of approximately $25 million.

In January 2018, we sold an aggregate of 28,285,557 shares of our Series B preferred stock to 15 investors for aggregate consideration of approximately $60.5 million and issued an additional 233,765 shares of our Series B preferred stock to one investor as partial consideration under a license agreement.

No underwriters were involved in the foregoing sales of securities. The sales of securities described above were deemed to be exempt from registration pursuant to Section 4(a)(2) of the Securities Act, including Regulation D and Rule 506 promulgated thereunder, as transactions by an issuer not involving a public offering. All of the purchasers in these transactions represented to us in connection with their purchase that they were acquiring the securities for investment and not distribution, that they could bear the risks of the investment and could hold the securities for an indefinite period of time. Such purchasers received written disclosures that the securities had not been registered under the Securities Act and that any resale must be made pursuant to a registration or an available exemption from such registration. All of the foregoing securities are deemed restricted securities for the purposes of the Securities Act.

(b) Grants and Exercises of Stock Options and Restricted Stock Awards

We have granted stock options to purchase an aggregate of 7,391,214 shares of our common stock, with exercise prices ranging from $0.01 to $1.21 per share, to employees, directors and consultants pursuant to the Amended and Restated 2015 Stock Option and Grant Plan, or the 2015 Plan. No shares of common stock have been issued upon the exercise of stock options pursuant to the 2015 Plan.

In April 2016, we issued an aggregate of 666,667 shares of restricted stock to one employee under the 2015 Plan.

The issuances of the securities described above were deemed to be exempt from registration pursuant to Section 4(a)(2) of the Securities Act or Rule 701 promulgated under the Securities Act as transactions pursuant to compensatory benefit plans. The shares of common stock issued upon the exercise of options are deemed to be restricted securities for purposes of the Securities Act.

(c) Issuance of Warrant

In June 2017, we issued a warrant to purchase an aggregate of 28,305 shares of our Series A preferred stock, with an exercise price of $0.7949 per share, to Silicon Valley Bank. No shares of Series A preferred stock have been issued upon the exercise of this warrant. The issuance of this warrant was deemed to be exempt from registration pursuant to Section 4(a)(2) of the Securities Act.

Item 16. Exhibits and Financial Statement Schedules.

EXHIBIT NO.	EXHIBIT INDEX
1.1*	Form of Underwriting Agreement
3.1	Third Amended and Restated Certificate of Incorporation of the Registrant, as currently in effect
3.2*	Amendment to Third Amended and Restated Certificate of Incorporation of the Registrant (to be adopted prior to the effectiveness of this registration statement)
3.3*	Form of Fourth Amended and Restated Certificate of Incorporation of the Registrant (to be effective upon the closing of this offering)
3.4	By-laws of the Registrant, as currently in effect
3.5*	Form of Amended and Restated By-laws (to be effective upon the closing of this offering)
4.1*	Form of Specimen Common Stock Certificate
4.2	Second Amended and Restated Investors' Rights Agreement among the Registrant and certain of its stockholders, dated January 9, 2018
4.3	Warrant to Purchase Stock issued to Silicon Valley Bank, dated June 23, 2017

EXHIBIT NO.	EXHIBIT INDEX
5.1*	Opinion of Goodwin Procter LLP
10.1#	2015 Amended and Restated Stock Option and Grant Plan, as amended, and forms of award agreements thereunder
10.2#*	2018 Stock Option and Incentive Plan and forms of award agreements thereunder (to be effective upon the effectiveness of this registration statement)
10.3#*	Senior Executive Cash Incentive Bonus Plan
10.4#*	Form of Indemnification Agreement
10.5†	Exclusive License Agreement, by and between the Registrant and University Health Network, dated November 4, 2016, as amended
10.6†	License Agreement, by and between the Registrant and BioMarin Pharmaceutical Inc., dated August 31, 2017
10.7†	Exclusive License Agreement, by and among the Registrant, Stefan Karlsson and Maria Dahl, dated January 30, 2017
10.8†	License Agreement, by and between the Registrant and GenStem Therapeutics, Inc., dated October 2, 2017
10.9#*	Amended and Restated Employment Agreement, by and between the Registrant and Geoff MacKay (to be entered into in connection with this offering)
10.10#*	Amended and Restated Employment Agreement, by and between the Registrant and Nerissa Kreher, M.D. (to be entered into in connection with this offering)
10.11#*	Amended and Restated Employment Agreement, by and between the Registrant and Katina Dorton (to be entered into in connection with this offering)
10.12	Lease Agreement, dated as of January 12, 2018, by and between the Registrant and ARE-MA Region No. 59, LLC
10.13	Loan and Security Agreement, by and among the Registrant and Silicon Valley Bank, dated June 23, 2017
10.14#*	2018 Employee Stock Purchase Plan (to be effective upon the effectiveness of this registration statement)
21.1	Subsidiaries of the Registrant
23.1*	Consent of Ernst & Young LLP, Independent Registered Public Accounting Firm
23.2*	Consent of Goodwin Procter LLP (included in Exhibit 5.1)
24.1*	Power of Attorney (included in page II-6)

* To be included by amendment

† Application has been made to the Securities and Exchange Commission for confidential treatment of certain provisions. Omitted material for which confidential treatment has been requested has been filed separately with the Securities and Exchange Commission.

# Indicates a management contract or any compensatory plan, contract or arrangement

Item 17. Undertakings.

Insofar as indemnification for liabilities arising under the Securities Act may be permitted to directors, officers and controlling persons of the Registrant pursuant to the foregoing provisions, or otherwise, the Registrant has been advised that in the opinion of the Securities and Exchange Commission such indemnification is against public policy as expressed in the Securities Act and is therefore unenforceable. In the event that a claim for indemnification against such liabilities (other than the payment by the Registrant of expenses incurred or paid by a director, officer or controlling person of the Registrant in the successful defense of any action, suit or proceeding) is asserted by such director, officer or controlling person in connection with the securities being registered, the Registrant will, unless in the opinion of its counsel the matter has been settled by controlling precedent, submit to a court of appropriate jurisdiction the question whether such indemnification by it is against public policy as expressed in the Securities Act and will be governed by the final adjudication of such issue.

The Registrant hereby undertakes that:

(a) The Registrant will provide to the underwriter at the closing as specified in the underwriting agreement, certificates in such denominations and registered in such names as required by the underwriter to permit prompt delivery to each purchaser.

(b) For purposes of determining any liability under the Securities Act of 1933, as amended, the information omitted from a form of prospectus filed as part of this registration statement in reliance upon Rule 430A and contained in the form of prospectus filed by the Registrant pursuant to Rule 424(b)(1) or (4) or 497(h) under the Securities Act of 1933, as amended, shall be deemed to be part of this registration statement as of the time it was declared effective.

(c) For the purpose of determining any liability under the Securities Act of 1933, as amended, each post-effective amendment that contains a form of prospectus shall be deemed to be a new registration statement relating to the securities offered therein, and the offering of such securities at that time shall be deemed to be the initial bona fide offering thereof.

SIGNATURES

Pursuant to the requirements of the Securities Act of 1933, the registrant has duly caused this Registration Statement on Form S-1 to be signed on its behalf by the undersigned, thereunto duly authorized, in the City of Cambridge, Commonwealth of Massachusetts, on the day of , 2018.

AVROBIO, INC.

By: _____

Geoff MacKay
President, Chief Executive Officer, and Principal Executive Officer

POWER OF ATTORNEY AND SIGNATURES

Each individual whose signature appears below hereby constitutes and appoints each of Geoff MacKay and Katina Dorton as such person's true and lawful attorney-in-fact and agent with full power of substitution and resubstitution, for such person in such person's name, place and stead, in any and all capacities, to sign any and all amendments (including post-effective amendments) to this Registration Statement (or any Registration Statement for the same offering that is to be effective upon filing pursuant to Rule 462(b) under the Securities Act of 1933), and to file the same, with all exhibits thereto, and all documents in connection therewith, with the Securities and Exchange Commission granting unto each said attorney-in-fact and agent full power and authority to do and perform each and every act and thing requisite and necessary to be done in and about the premises, as fully to all intents and purposes as such person might or could do in person, hereby ratifying and confirming all that any said attorney-in-fact and agent, or any substitute or substitutes of any of them, may lawfully do or cause to be done by virtue hereof.

Pursuant to the requirements of the Securities Act of 1933, as amended, this Registration Statement and Power of Attorney has been signed by the following person in the capacities and on the date indicated.

NAME	TITLE	DATE
Geoff MacKay	*Director, President, Chief Executive Officer, and Principal Executive Officer*	
Katina Dorton	*Chief Financial Officer and Principal Financial and Accounting Officer*	
Bruce Booth, D.Phil.	*Chairman of the Board of Director*s	
Ian T. Clark	*Director*	
Annalisa Jenkins, M.B.B.S., F.C.R.P.	*Director*	

NAME	TITLE	DATE
Christopher Paige, Ph.D.	*Director*	
Scott G. Requadt	*Director*	
Joshua Resnick, M.D.	*Director*	

Exhibit 3.1

THIRD AMENDED AND RESTATED CERTIFICATE OF INCORPORATION OF AVROBIO, INC.

(Pursuant to Sections 242 and 245 of the
General Corporation Law of the State of Delaware)

AvroBio, Inc., a corporation organized and existing under and by virtue of the provisions of the General Corporation Law of the State of Delaware (the "**General Corporation Law**"),

DOES HEREBY CERTIFY:

1. That the name of this corporation is AVROBIO, Inc., and that this corporation was originally incorporated pursuant to the General Corporation Law on November 17, 2015 under the name AvroBio, Inc.

2. That the Board of Directors of the Corporation (the "Board of Directors") duly adopted resolutions proposing to amend and restate the Second Amended and Restated Certificate of Incorporation of this corporation, declaring said amendment and restatement to be advisable and in the best interests of this corporation and its stockholders, and authorizing the appropriate officers of this corporation to solicit the consent of the stockholders therefor, which resolution setting forth the proposed amendment and restatement is as follows:

RESOLVED, that the Second Amended and Restated Certificate of Incorporation of this corporation be amended and restated in its entirety to read as follows:

FIRST: The name of this corporation is AVROBIO, Inc. (the "**Corporation**").

SECOND: The address of the registered office of the Corporation in the State of Delaware is 251 Little Falls Drive, in the City of Wilmington, County of New Castle, 19808, and its registered agent at such address is: Corporation Service Company.

THIRD: The nature of the business or purposes to be conducted or promoted is to engage in any lawful act or activity for which corporations may be organized under the General Corporation Law.

FOURTH: The total number of shares of all classes of stock which the Corporation shall have authority to issue is (i) 82,000,000 shares of Common Stock, $0.0001 par value per share ("**Common Stock**"), and (ii) 63,491,857 of Preferred Stock, $0.0001 par value per share ("**Preferred Stock**").

The following is a statement of the designations and the powers, privileges and rights, and the qualifications, limitations or restrictions thereof in respect of each class of capital stock of the Corporation.

A. COMMON STOCK

1. General. The voting, dividend and liquidation rights of the holders of the Common Stock are subject to and qualified by the rights, powers and preferences of the holders of the Preferred Stock set forth herein.

2. Voting. The holders of the Common Stock are entitled to one vote for each share of Common Stock held at all meetings of stockholders (and written actions in lieu of meetings); provided, however, that, except as otherwise required by law, holders of Common Stock, as such, shall not be entitled to vote on any amendment to this Third Amended and Restated Certificate of Incorporation (the "**Certificate of Incorporation**") that relates solely to the terms of one or more outstanding series of Preferred Stock if the holders of such affected series are entitled, either separately or together with the holders of one or more other such series, to vote thereon pursuant to the Certificate of Incorporation or pursuant to the General Corporation Law. There shall be no cumulative voting. The number of authorized shares of Common Stock may be increased or decreased (but not below the number of shares thereof then outstanding) by (in addition to any vote of the holders of one or more series of Preferred Stock that may be required by the terms of the Certificate of Incorporation) the affirmative vote of the holders of shares of capital stock of the Corporation representing a majority of the votes represented by all outstanding shares of capital stock of the Corporation entitled to vote, irrespective of the provisions of Section 242(b)(2) of the General Corporation Law.

B. PREFERRED STOCK

3,333,333 shares of the authorized Preferred Stock of the Corporation are hereby designated "**Series Seed Preferred Stock**", 31,639,202 shares of the authorized Preferred Stock of the Corporation are hereby designated "**Series A Preferred Stock**", and 28,519,322 shares of the authorized Preferred Stock of the Corporation are hereby designated "**Series B Preferred Stock**". The rights, preferences, powers, privileges and restrictions, qualifications and limitations of each series of Preferred Stock are set forth below. Unless otherwise indicated, references to "sections" or "subsections" in this Part B of this Article Fourth refer to sections and subsections of Part B of this Article Fourth.

1. Dividends.

The Corporation shall not declare, pay or set aside any dividends on shares of any other class or series of capital stock of the Corporation (other than dividends on shares of Common Stock payable in shares of Common Stock) unless (in addition to the obtaining of any consents required elsewhere in the Certificate of Incorporation) (i) the holders of the Series B Preferred Stock then outstanding shall first receive, or simultaneously receive, a dividend on each outstanding share of Series B Preferred Stock in an amount at least equal to $0.171112, (ii) the holders of the Series A Preferred Stock then outstanding shall first receive, or simultaneously receive, a dividend on each outstanding share of Series A Preferred Stock in an amount at least equal to $0.0636 and (iii) the holders of the Series Seed Preferred Stock then outstanding shall first receive, or simultaneously receive, a dividend on each outstanding share of Series Seed Preferred Stock in an amount at least equal to $0.0225, in each case subject to appropriate adjustment in the event of any stock dividend, stock split, combination or other similar recapitalization with respect to the Series A Preferred Stock, the Series B Preferred Stock or the Series Seed Preferred Stock, as applicable. The "**Series B Original Issue Price**" shall mean

$2.1389 per share, subject to appropriate adjustment in the event of any stock dividend, stock split, combination or other similar recapitalization with respect to the Series B Preferred Stock. The "**Series A Original Issue Price**" shall mean $0.7949 per share, subject to appropriate adjustment in the event of any stock dividend, stock split, combination or other similar recapitalization with respect to the Series A Preferred Stock. The "**Series Seed Original Issue Price**" (and collectively with the Series A Original Issue Price and the Series B Original Issue Price, the "**Original Issue Price**") shall mean $0.45 per share, subject to appropriate adjustment in the event of any stock dividend, stock split, combination or other similar recapitalization with respect to the Series Seed Preferred Stock.

2. Liquidation, Dissolution or Winding Up; Certain Mergers, Consolidations and Asset Sales.

2.1 Preferential Payments to Holders of Series A and Series B Preferred Stock. In the event of any voluntary or involuntary liquidation, dissolution or winding up of the Corporation or Deemed Liquidation Event (as defined below), the holders of shares of Series A Preferred Stock and Series B Preferred Stock then outstanding shall be entitled to be paid out of the assets of the Corporation available for distribution to its stockholders, on a *pari passu* basis, before any payment shall be made to the holders of Series Seed Preferred Stock or Common Stock by reason of their ownership thereof, an amount per share equal to (a) in the case of the holders of shares of Series A Preferred Stock, the greater of (i) one (1) times the Series A Original Issue Price, plus any dividends declared but unpaid thereon, or (ii) such amount per share as would have been payable had all shares of Series A Preferred Stock been converted into Common Stock pursuant to Section 4 immediately prior to such liquidation, dissolution, winding up or Deemed Liquidation Event (the amount payable pursuant to this sentence is hereinafter referred to as the "**Series A Liquidation Amount**"), and (b) in the case of the holders of shares of Series B Preferred Stock, the greater of (i) one (1) times the Series B Original Issue Price, plus any dividends declared but unpaid thereon, or (ii) such amount per share as would have been payable had all shares of Series B Preferred Stock been converted into Common Stock pursuant to Section 4 immediately prior to such liquidation, dissolution, winding up or Deemed Liquidation Event (the amount payable pursuant to this sentence is hereinafter referred to as the "**Series B Liquidation Amount**"). If upon any such liquidation, dissolution or winding up of the Corporation or Deemed Liquidation Event, the assets of the Corporation available for distribution to its stockholders shall be insufficient to pay the holders of shares of Series A Preferred Stock and Series B Preferred Stock the full amount to which they shall be entitled under this Subsection 2.1, the holders of shares of Series A Preferred Stock and Series B Preferred Stock shall share ratably in any distribution of the assets available for distribution in proportion to the respective amounts which would otherwise be payable in respect of the shares held by them upon such distribution if all amounts payable on or with respect to such shares were paid in full.

2.2 Preferential Payments to Holders of Series Seed Preferred Stock. In the event of any voluntary or involuntary liquidation, dissolution or winding up of the Corporation or Deemed Liquidation Event, the holders of shares of Series Seed Preferred Stock then outstanding shall be entitled to be paid out of the assets of the Corporation available for distribution to its stockholders after payment of the Series A Liquidation Amount and the Series B Liquidation Amount and before any payment shall be made to the holders of Common Stock by reason of their ownership thereof, an amount per share equal to the greater of (i) one (1) times

the Series Seed Original Issue Price, plus any dividends declared but unpaid thereon, or (ii) such amount per share as would have been payable had all shares of Series Seed Preferred Stock been converted into Common Stock pursuant to Section 4 immediately prior to such liquidation, dissolution, winding up or Deemed Liquidation Event (the amount payable pursuant to this sentence is hereinafter referred to as the "**Series Seed Liquidation Amoun**t"). If upon any such liquidation, dissolution or winding up of the Corporation or Deemed Liquidation Event, the assets of the Corporation available for distribution to its stockholders shall be insufficient to pay the holders of shares of Series Seed Preferred Stock the full amount to which they shall be entitled under this Subsection 2.2, the holders of shares of Series Seed Preferred Stock shall share ratably in any distribution of the assets available for distribution in proportion to the respective amounts which would otherwise be payable in respect of the shares held by them upon such distribution if all amounts payable on or with respect to such shares were paid in full.

2.3 Payments to Holders of Common Stock. In the event of any voluntary or involuntary liquidation, dissolution or winding up of the Corporation or Deemed Liquidation Event, after the payment of all preferential amounts required to be paid to the holders of shares of Preferred Stock as set forth in Subsections 2.1 and 2.2 above, the remaining assets of the Corporation available for distribution to its stockholders shall be distributed among the holders of shares of Common Stock, pro rata based on the number of shares held by each such holder.

2.4 Deemed Liquidation Events.

2.4.1 Definition. Each of the following events shall be considered a "**Deemed Liquidation Event**" unless the Requisite Preferred Holders (as defined below) (and, in the case of any of the following events do not result in the holders of the Series B Preferred Stock receiving, in connection with such event, an amount equal to or greater than the Series B Original Issue Price for each outstanding share of their Series B Preferred Stock, then also the Requisite Series B Preferred (as defined below)) elect otherwise by written notice sent to the Corporation at least 15 days prior to the effective date of any such event:

(a) a merger or consolidation in which

(i) the Corporation is a constituent party or

(ii) a subsidiary of the Corporation is a constituent party and the Corporation issues shares of its capital stock pursuant to such merger or consolidation,

except any such merger or consolidation involving the Corporation or a subsidiary in which the shares of capital stock of the Corporation outstanding immediately prior to such merger or consolidation continue to represent, or are converted into or exchanged for shares of capital stock that represent, immediately following such merger or consolidation, at least a majority, by voting power, of the capital stock of (1) the surviving or resulting corporation; or (2) if the surviving or resulting corporation is a wholly owned subsidiary of another corporation immediately following such merger or consolidation, the parent corporation of such surviving or resulting corporation; or

(b) the sale, lease, transfer, exclusive license or other disposition, in a single transaction or series of related transactions, by the Corporation or any subsidiary of the Corporation of all or substantially all the assets of the Corporation and its subsidiaries taken as a whole, or the sale or disposition (whether by merger, consolidation or otherwise) of one or more subsidiaries of the Corporation if substantially all of the assets of the Corporation and its subsidiaries taken as a whole are held by such subsidiary or subsidiaries, except where such sale, lease, transfer, exclusive license or other disposition is to a wholly owned subsidiary of the Corporation.

For purposes of this Certificate of Incorporation, any actions requiring the approval or consent of the "**Requisite Preferred Holders**" shall require the affirmative written consent or vote of the holders of at least 66.67% of the then outstanding shares of Preferred Stock, voting as a single class on an as-converted basis.

2.4.2 Effecting a Deemed Liquidation Event.

(a) The Corporation shall not have the power to effect a Deemed Liquidation Event referred to in Subsection 2.4.1(a)(i) unless the agreement or plan of merger or consolidation for such transaction (the "**Merger Agreement**") provides that the consideration payable to the stockholders of the Corporation shall be allocated among the holders of capital stock of the Corporation in accordance with Subsections 2.1, 2.2 and 2.3.

(b) In the event of a Deemed Liquidation Event referred to in Subsection 2.4.1(a)(ii) or 2.4.1(b), if the Corporation does not effect a dissolution of the Corporation under the General Corporation Law within ninety (90) days after such Deemed Liquidation Event, then (i) the Corporation shall send a written notice (a "**Liquidation Redemption Notice**") to each holder of Preferred Stock no later than the ninetieth (90th) day after the Deemed Liquidation Event (the "**Redemption Deadline**") advising such holders of their right (and the requirements to be met to secure such right) pursuant to the terms of the following clause; (ii) to require the redemption of such shares of Preferred Stock, and (iii) if the Requisite Preferred Holders so request in a written instrument delivered to the Corporation not later than one hundred twenty (120) days after such Deemed Liquidation Event (the "**Liquidation Redemption Date**"), the Corporation shall use the consideration received by the Corporation for such Deemed Liquidation Event (net of any retained liabilities associated with the assets sold or technology licensed, as determined in good faith by the Board of Directors)**,** together with any other assets of the Corporation available for distribution to its stockholders, all to the extent permitted by Delaware law governing distributions to stockholders (the "**Available Proceeds**"), on the one hundred fiftieth (150th) day after such Deemed Liquidation Event, to redeem all outstanding shares of (i) Series B Preferred Stock at a price per share equal to the Series B Liquidation Amount, (ii) Series A Preferred Stock at a price per share equal to the Series A Liquidation Amount and (iii) Series Seed Preferred Stock at a price per share equal to the Series Seed Liquidation Amount. Notwithstanding the foregoing, in the event of a redemption pursuant to the preceding sentence, if the Available Proceeds are not sufficient to redeem all outstanding shares of Preferred Stock, the Corporation shall ratably redeem each holder's shares of Preferred Stock, in accordance with the priorities set forth in Sections 2.1 and 2.2, to the fullest extent of such Available Proceeds, and shall redeem the remaining shares as soon as it may lawfully do so under Delaware law governing distributions to stockholders. The provisions of Section 6 shall apply, with such necessary changes in the details thereof as are necessitated by the context, to the

redemption of the Preferred Stock pursuant to this Subsection 2.4.2. Prior to the distribution or redemption provided for in this Subsection 2.4.2(b), the Corporation shall not expend or dissipate the consideration received for such Deemed Liquidation Event, except to discharge expenses incurred in connection with such Deemed Liquidation Event.

(c) Each Liquidation Redemption Notice shall state:

(i) The number of shares of Preferred Stock that the Corporation may be obligated to redeem pursuant to Subsection 2.4.2(b);

(ii) The Redemption Deadline and the Liquidation Redemption Date;

(iii) The Series B Liquidation Amount, the Series A Liquidation Amount and the Series Seed Liquidation Amount; and

(iv) The manner and place designated for the holder to surrender his, her or its certificate or certificates representing the shares of Preferred Stock.

2.4.3 Amount Deemed Paid or Distributed. The amount deemed paid or distributed to the holders of capital stock of the Corporation upon any such merger, consolidation, sale, transfer, exclusive license, other disposition or redemption shall be the cash or the value of the property, rights or securities paid or distributed to such holders by the Corporation or the acquiring person, firm or other entity. The value of such property, rights or securities shall be determined in good faith by the Board of Directors (including a majority of the Preferred Directors (as defined below)).

2.4.4 Allocation of Escrow and Contingent Consideration. In the event of a Deemed Liquidation Event pursuant to Subsection 2.4.1(a)(i), if any portion of the consideration payable to the stockholders of the Corporation is payable only upon satisfaction of contingencies (the "**Additional Consideration**"), the Merger Agreement shall provide that (a) the portion of such consideration that is not Additional Consideration (such portion, the "**Initial Consideration**") shall be allocated among the holders of capital stock of the Corporation in accordance with Subsections 2.1, 2.2 and 2.3 as if the Initial Consideration were the only consideration payable in connection with such Deemed Liquidation Event; and (b) any Additional Consideration which becomes payable to the stockholders of the Corporation upon satisfaction of such contingencies shall be allocated among the holders of capital stock of the Corporation in accordance with Subsections 2.1, 2.2 and 2.3 after taking into account the previous payment of the Initial Consideration as part of the same transaction. For the purposes of this Subsection 2.4.4, consideration placed into escrow or retained as holdback to be available for satisfaction of indemnification or similar obligations in connection with such Deemed Liquidation Event shall be deemed to be Additional Consideration.

3. Voting.

3.1 General. On any matter presented to the stockholders of the Corporation for their action or consideration at any meeting of stockholders of the Corporation (or by written consent of stockholders in lieu of meeting), each holder of outstanding shares of Preferred Stock shall be entitled to cast the number of votes equal to the number of whole shares of Common Stock into which the shares of Preferred Stock held by such holder are convertible as of the record date for determining stockholders entitled to vote on such matter. Except as explicitly provided by the other provisions of the Certificate of Incorporation, holders of Preferred Stock, to the maximum extent permitted by the General Corporation Law, shall vote together with the holders of Common Stock as a single class.

3.2 Election of Directors. The holders of record of the shares of Preferred Stock exclusively and as a separate class, shall be entitled to elect three (3) directors of the Corporation (the "**Preferred Directors**") and the holders of record of the shares of Common Stock, exclusively and as a separate class, shall be entitled to elect two (2) directors of the Corporation. Any director elected as provided in the preceding sentence may be removed without cause by, and only by, the affirmative vote of the holders of the shares of the class or series of capital stock entitled to elect such director or directors, given either at a special meeting of such stockholders duly called for that purpose or pursuant to a written consent of stockholders. If the holders of shares of Preferred Stock or Common Stock, as the case may be, fail to elect a sufficient number of directors to fill all directorships for which they are entitled to elect directors, voting exclusively and as a separate class, pursuant to the first sentence of this Subsection 3.2, then any directorship not so filled shall remain vacant until such time as the holders of the Preferred Stock or Common Stock, as the case may be, elect a person to fill such directorship by vote or written consent in lieu of a meeting; and no such directorship may be filled by stockholders of the Corporation other than by the stockholders of the Corporation that are entitled to elect a person to fill such directorship, voting exclusively and as a separate class. The holders of record of the shares of Common Stock and of any other class or series of voting stock (including the Series B Preferred Stock, Series A Preferred Stock and Series Seed Preferred Stock), exclusively and voting together as a single class, shall be entitled to elect the balance of the total number of directors of the Corporation. At any meeting held for the purpose of electing a director, the presence in person or by proxy of the holders of a majority of the outstanding shares of the class or series entitled to elect such director shall constitute a quorum for the purpose of electing such director. Except as otherwise provided in this Subsection 3.2, a vacancy in any directorship filled by the holders of any class or series shall be filled only by vote or written consent in lieu of a meeting of the holders of such class or series or by any remaining director or directors elected by the holders of such class or series pursuant to this Subsection 3.2.

3.3 Preferred Stock Protective Provisions. At any time when any shares of Preferred Stock are outstanding, the Corporation shall not, either directly or indirectly by amendment, merger, consolidation or otherwise, do any of the following without (in addition to any other vote required by law or the Certificate of Incorporation) the written consent or affirmative vote of the Requisite Preferred Holders, given in writing or by vote at a meeting, consenting or voting (as the case may be) separately as a class, and any such act or transaction entered into without such consent or vote shall be null and void *ab initio*, and of no force or effect:

3.3.1 liquidate, dissolve or wind-up the affairs of the Corporation, or effect any merger or consolidation or any other Deemed Liquidation Event;

3.3.2 amend, alter, or repeal any provision of the Certificate of Incorporation or the Corporation's Bylaws;

3.3.3 create or authorize the creation of or issue any other security convertible into or exercisable for any equity security, having rights, preferences or privileges senior to or on parity with the Series B Preferred Stock or the Series A Preferred Stock, or increase the authorized number of shares of Preferred Stock, Series B Preferred Stock, Series A Preferred Stock or Series Seed Preferred Stock;

3.3.4 reclassify, alter or amend any existing security of the Corporation that is junior to the Series B Preferred Stock or the Series A Preferred Stock in respect of the distribution of assets on the liquidation, dissolution or winding up of the Corporation, the payment of dividends or rights of redemption, if such reclassification, alteration or amendment would render such other security senior to or pari passu with either the Series B Preferred Stock or the Series A Preferred Stock in respect of any such right, preference or privilege;

3.3.5 purchase or redeem (or permit any subsidiary to purchase or redeem) or pay any dividend on any capital stock prior to the Series B Preferred Stock or the Series A Preferred Stock, other than (i) redemptions of or dividends or distributions on Preferred Stock as expressly authorized herein, and (ii) stock repurchased from former employees or consultants in connection with the cessation of their employment/services, at the lower of fair market value or cost, as approved by the Board of Directors (including a majority of the Preferred Directors);

3.3.6 create or authorize the creation of any debt security (x) other than equipment leases in the ordinary course of business or (y) indebtedness for borrowed money not to exceed $200,000 in original principal amount, in each case as approved by the Board of Directors (including a majority of the Preferred Directors);

3.3.7 create or hold capital stock in any subsidiary (other than a wholly-owned subsidiary; provided that such wholly-owned subsidiary (including any in existence on the Series B Original Issue Date (as defined below) has the same board of directors as the Corporation, unless approved by the Board of Directors (including a majority of the Preferred Directors)) or dispose of any subsidiary stock or all or substantially all of any subsidiary assets;

3.3.8 increase or decrease the size of the Board of Directors; or

3.3.9 grant or create any lien on or security interests in any of the assets of the Corporation or any subsidiary.

3.4 Series B Preferred Stock Protective Provisions. At any time when any shares of Series B Preferred Stock are outstanding, the Corporation shall not, either directly or indirectly by amendment, merger, consolidation or otherwise, without (in addition to any other vote required by law or the Certificate of Incorporation) the written consent or affirmative vote

of the holders of a majority of the then outstanding shares of Series B Preferred Stock (the "**Requisite Series B Preferred**"), given in writing or by vote at a meeting, consenting or voting (as the case may be) separately as a class, and any such act or transaction entered into without such consent or vote shall be null and void *ab initio*, and of no force or effect:

3.4.1 waive, amend or alter the rights, preferences or privileges of the Series B Preferred Stock adversely in a different and disproportionate manner than any other series of the Preferred Stock;

3.4.2 waive, amend, alter or repeal any provision of the Certificate of Incorporation or Bylaws of the Corporation in a manner that adversely affects the powers, preferences or rights of the Series B Preferred Stock in a different and disproportionate manner than any other series of Preferred Stock;

3.4.3 amend, waive, alter or repeal the definition of Requisite Series B Preferred or the use thereof in Section 2.4.1, Section 4.4.2, Section 5.1.1 or Section 8;

3.4.4 waive, amend, alter or repeal (a) the Series B Original Issue Price, the Conversion Price (to the extent such action would reduce the rights, privileges and protections applicable to the Series B Preferred Stock) or the Series B Liquidation Amount, provided that no consent shall be required for (x) any alteration of the Conversion Price that results from the automatic operation of the provisions of Section 4 hereof and (y) any alteration of the Series B Original Issue Price that results from the automatic operation of the provisions of Section 1 hereof; or (b) Section 5.1 to the extent such action would reduce the rights, privileges and protections applicable to the Series B Preferred Stock as in effect on the date hereof; or

3.4.5 increase the authorized number of shares of Series B Preferred Stock.

4. Optional Conversion.

The holders of the Preferred Stock shall have conversion rights as follows (the "**Conversion Rights**"):

4.1 Right to Convert.

4.1.1 Conversion Ratio. Each share of Preferred Stock shall be convertible, at the option of the holder thereof, at any time and from time to time, and without the payment of additional consideration by the holder thereof, into such number of fully paid and non-assessable shares of Common Stock as is determined by dividing the Original Issue Price for such series of Preferred Stock by the Conversion Price (as defined below) for such series of Preferred Stock in effect at the time of conversion. The "**Conversion Price**" per share for the Series B Preferred Stock, Series A Preferred Stock and Series Seed Preferred Stock shall initially be equal to Original Issue Price of such series of Preferred Stock. Such initial Conversion Price, and the rate at which shares of Preferred Stock may be converted into shares of Common Stock, shall be subject to adjustment as provided below.

4.1.2 Termination of Conversion Rights. In the event of a liquidation, dissolution or winding up of the Corporation or a Deemed Liquidation Event, the Conversion Rights shall terminate at the close of business on the last full day preceding the date fixed for the payment of any such amounts distributable on such event to the holders of Preferred Stock.

4.2 Fractional Shares. No fractional shares of Common Stock shall be issued upon conversion of the Preferred Stock. In lieu of any fractional shares to which the holder would otherwise be entitled, the Corporation shall pay cash equal to such fraction multiplied by the fair market value of a share of Common Stock as determined in good faith by the Board of Directors of the Corporation. Whether or not fractional shares would be issuable upon such conversion shall be determined on the basis of the total number of shares of Preferred Stock the holder is holding at the time converting into Common Stock and the aggregate number of shares of Common Stock issuable upon such conversion.

4.3 Mechanics of Conversion.

4.3.1 Notice of Conversion. In order for a holder of Preferred Stock to voluntarily convert shares of Preferred Stock into shares of Common Stock, such holder shall (a) provide written notice to the Corporation's transfer agent at the office of the transfer agent for the Preferred Stock (or at the principal office of the Corporation if the Corporation serves as its own transfer agent) that such holder elects to convert all or any number of such holder's shares of Preferred Stock and, if applicable, any event on which such conversion is contingent and (b), if such holder's shares are certificated, surrender the certificate or certificates for such shares of Preferred Stock (or, if such registered holder alleges that such certificate has been lost, stolen or destroyed, a lost certificate affidavit and agreement reasonably acceptable to the Corporation to indemnify the Corporation against any claim that may be made against the Corporation on account of the alleged loss, theft or destruction of such certificate), at the office of the transfer agent for the Preferred Stock (or at the principal office of the Corporation if the Corporation serves as its own transfer agent). If required by the Corporation, any certificates surrendered for conversion shall be endorsed or accompanied by a written instrument or instruments of transfer, in form satisfactory to the Corporation, duly executed by the registered holder or his, her or its attorney duly authorized in writing. The close of business on the date of receipt by the transfer agent (or by the Corporation if the Corporation serves as its own transfer agent) of such notice and, if applicable, certificates (or lost certificate affidavit and agreement) shall be the time of conversion (the "**Conversion Time**"), and the shares of Common Stock issuable upon conversion of the specified shares shall be deemed to be outstanding of record as of such date. The Corporation shall, as soon as practicable after the Conversion Time (i) issue and deliver to such holder of Preferred Stock, a certificate or certificates for the number of full shares of Common Stock issuable upon such conversion in accordance with the provisions hereof and a certificate for the number (if any) of the shares of Preferred Stock represented by the surrendered certificate that were not converted into Common Stock, (ii) pay in cash such amount as provided in Subsection 4.2 in lieu of any fraction of a share of Common Stock otherwise issuable upon such conversion and (iii) pay all declared but unpaid dividends on the shares of Preferred Stock converted.

4.3.2 Reservation of Shares. The Corporation shall at all times when the Preferred Stock shall be outstanding, reserve and keep available out of its authorized but unissued capital stock, for the purpose of effecting the conversion of the Preferred Stock, such number of its duly authorized shares of Common Stock as shall from time to time be sufficient to effect the conversion of all outstanding Preferred Stock; and if at any time the

number of authorized but unissued shares of Common Stock shall not be sufficient to effect the conversion of all then outstanding shares of the Preferred Stock, the Corporation shall take such corporate action as may be necessary to increase its authorized but unissued shares of Common Stock to such number of shares as shall be sufficient for such purposes, including, without limitation, engaging in best efforts to obtain the requisite stockholder approval of any necessary amendment to the Certificate of Incorporation. Before taking any action which would cause an adjustment reducing the Conversion Price of any series of Preferred Stock below the then par value of the shares of Common Stock issuable upon conversion of the Preferred Stock, the Corporation will take any corporate action which may, in the opinion of its counsel, be necessary in order that the Corporation may validly and legally issue fully paid and non-assessable shares of Common Stock at such adjusted Conversion Price.

4.3.3 Effect of Conversion. All shares of Preferred Stock which shall have been surrendered for conversion as herein provided shall no longer be deemed to be outstanding and all rights with respect to such shares shall immediately cease and terminate at the Conversion Time, except only the right of the holders thereof to receive shares of Common Stock in exchange therefor, to receive payment in lieu of any fraction of a share otherwise issuable upon such conversion as provided in Subsection 4.2 and to receive payment of any dividends declared but unpaid thereon. Any shares of Preferred Stock so converted shall be retired and cancelled and may not be reissued as shares of such series, and the Corporation may thereafter take such appropriate action (without the need for stockholder action) as may be necessary to reduce the authorized number of shares of Preferred Stock accordingly.

4.3.4 No Further Adjustment. Upon any such conversion, no adjustment to Conversion Price shall be made for any declared but unpaid dividends on the Preferred Stock surrendered for conversion or on the Common Stock delivered upon conversion.

4.3.5 Taxes. The Corporation shall pay any and all issue and other similar taxes that may be payable in respect of any issuance or delivery of shares of Common Stock upon conversion of shares of Preferred Stock pursuant to this Section 4. The Corporation shall not, however, be required to pay any tax which may be payable in respect of any transfer involved in the issuance and delivery of shares of Common Stock in a name other than that in which the shares of Preferred Stock so converted were registered, and no such issuance or delivery shall be made unless and until the person or entity requesting such issuance has paid to the Corporation the amount of any such tax or has established, to the satisfaction of the Corporation, that such tax has been paid.

4.4 Conversion Price for Diluting Issues.

4.4.1 Special Definitions. For purposes of this Article Fourth, the following definitions shall apply:

(a) "**Option**" shall mean rights, options or warrants to subscribe for, purchase or otherwise acquire Common Stock or Convertible Securities.

(b) "**Series B Original Issue Date**" shall mean the date on which the first share of Series B Preferred Stock was issued.

(c) "**Convertible Securities**" shall mean any evidences of indebtedness, shares or other securities directly or indirectly convertible into or exchangeable for Common Stock, but excluding Options.

(d) "**Additional Shares of Common Stock**" shall mean all shares of Common Stock issued (or, pursuant to Subsection 4.4.3 below, deemed to be issued) by the Corporation after the Series B Original Issue Date, other than (1) the following shares of Common Stock and (2) shares of Common Stock deemed issued pursuant to the following Options and Convertible Securities (clauses (1) and (2), collectively, "**Exempted Securities**"):

(i) shares of Common Stock, Options or Convertible Securities issued as a dividend or distribution on Preferred Stock;

(ii) shares of Common Stock, Options or Convertible Securities issued by reason of a dividend, stock split, split-up or other distribution on shares of Common Stock that is covered by Subsection 4.5, 4.6, 4.7 or 4.8**;**

(iii) shares of Common Stock or Options issued to employees or directors of, or consultants or advisors to, the Corporation or any of its subsidiaries pursuant to a plan, agreement or arrangement approved by the Board of Directors of the Corporation and the Requisite Preferred Holders (including, in each case, the number of shares of Common Stock issuable thereunder);

(iv) shares of Common Stock or Convertible Securities actually issued upon the exercise of Options or shares of Common Stock actually issued upon the conversion or exchange of Convertible Securities, in each case provided such issuance is pursuant to the terms of such Option or Convertible Security;

(v) shares of Common Stock, Options or Convertible Securities issued to banks, equipment lessors or other financial institutions, or to real property lessors, pursuant to a debt financing, equipment leasing or real property leasing transaction approved by the Board of Directors of the Corporation, including a majority of the Preferred Directors;

(vi) shares of Common Stock, Options or Convertible Securities issued to suppliers or third party service providers in connection with the provision of goods or services pursuant to transactions approved by the Board of Directors of the Corporation, including a majority of the Preferred Directors; or

(vii) shares of Common Stock, Options or Convertible Securities issued in connection with sponsored research, collaboration, technology license, development, OEM, marketing or other similar agreements or strategic partnerships approved by the Board of Directors of the Corporation, including a majority of the Preferred Directors.

4.4.2 No Adjustment of Conversion Price. No adjustment in the Conversion Price for a series of Preferred Stock shall be made as the result of the issuance or deemed issuance of Additional Shares of Common Stock if the Corporation receives (i) in the case of the Series Seed Preferred Stock, written notice from the holders of at least 50% of the then outstanding shares of Series Seed Preferred Stock agreeing that no such adjustment shall be made as the result of the issuance or deemed issuance of such Additional Shares of Common Stock, (ii) in the case of the Series A Preferred Stock, written notice from the holders of a majority of the then outstanding shares of Series A Preferred Stock agreeing that no such adjustment shall be made as the result of the issuance or deemed issuance of such Additional Shares of Common Stock, and (iii) in the case of the Series B Preferred Stock, written notice from the Requisite Series B Preferred agreeing that no such adjustment shall be made as the result of the issuance or deemed issuance of such Additional Shares of Common Stock.

4.4.3 Deemed Issue of Additional Shares of Common Stock.

(a) If the Corporation at any time or from time to time after the Series B Original Issue Date shall issue any Options or Convertible Securities (excluding Options or Convertible Securities which are themselves Exempted Securities) or shall fix a record date for the determination of holders of any class of securities entitled to receive any such Options or Convertible Securities, then the maximum number of shares of Common Stock (as set forth in the instrument relating thereto, assuming the satisfaction of any conditions to exercisability, convertibility or exchangeability but without regard to any provision contained therein for a subsequent adjustment of such number) issuable upon the exercise of such Options or, in the case of Convertible Securities and Options therefor, the conversion or exchange of such Convertible Securities, shall be deemed to be Additional Shares of Common Stock issued as of the time of such issue or, in case such a record date shall have been fixed, as of the close of business on such record date.

(b) If the terms of any Option or Convertible Security, the issuance of which resulted in an adjustment to the Conversion Price for a series of Preferred Stock pursuant to the terms of Subsection 4.4.4, are revised as a result of an amendment to such terms or any other adjustment pursuant to the provisions of such Option or Convertible Security (but excluding automatic adjustments to such terms pursuant to anti-dilution or similar provisions of such Option or Convertible Security) to provide for either (1) any increase or decrease in the number of shares of Common Stock issuable upon the exercise, conversion and/or exchange of any such Option or Convertible Security or (2) any increase or decrease in the consideration payable to the Corporation upon such exercise, conversion and/or exchange, then, effective upon such increase or decrease becoming effective, the Conversion Price for a series of Preferred Stock computed upon the original issue of such Option or Convertible Security (or upon the occurrence of a record date with respect thereto) shall be readjusted to such Conversion Price as would have obtained had such revised terms been in effect upon the original date of issuance of such Option or Convertible Security. Notwithstanding the foregoing, no readjustment pursuant to this clause (b) shall have the effect of increasing the Conversion Price for a series of Preferred Stock to an amount which exceeds the lower of (i) the Conversion Price for such series of Preferred Stock in effect immediately prior to the original adjustment made as a result of the issuance of such Option or Convertible Security, or (ii) the Conversion Price for such series of Preferred Stock that would have resulted from any issuances of Additional Shares of Common Stock (other than deemed issuances of Additional Shares of Common Stock as a result of the issuance of such Option or Convertible Security) between the original adjustment date and such readjustment date.

(c) If the terms of any Option or Convertible Security (excluding Options or Convertible Securities which are themselves Exempted Securities), the issuance of which did not result in an adjustment to the Conversion Price pursuant to the terms of Subsection 4.4.4 (either because the consideration per share (determined pursuant to Subsection 4.4.5) of the Additional Shares of Common Stock subject thereto was equal to or greater than the Conversion Price then in effect, or because such Option or Convertible Security was issued before the Series B Original Issue Date), are revised after the Series B Original Issue Date as a result of an amendment to such terms or any other adjustment pursuant to the provisions of such Option or Convertible Security (but excluding automatic adjustments to such terms pursuant to anti-dilution or similar provisions of such Option or Convertible Security) to provide for either (1) any increase in the number of shares of Common Stock issuable upon the exercise, conversion or exchange of any such Option or Convertible Security or (2) any decrease in the consideration payable to the Corporation upon such exercise, conversion or exchange, then such Option or Convertible Security, as so amended or adjusted, and the Additional Shares of Common Stock subject thereto (determined in the manner provided in Subsection 4.4.3(a)) shall be deemed to have been issued effective upon such increase or decrease becoming effective.

(d) Upon the expiration or termination of any unexercised Option or unconverted or unexchanged Convertible Security (or portion thereof) which resulted (either upon its original issuance or upon a revision of its terms) in an adjustment to the Conversion Price pursuant to the terms of Subsection 4.4.4, the applicable Conversion Price shall be readjusted to such Conversion Price as would have obtained had such Option or Convertible Security (or portion thereof) never been issued.

(e) If the number of shares of Common Stock issuable upon the exercise, conversion and/or exchange of any Option or Convertible Security, or the consideration payable to the Corporation upon such exercise, conversion and/or exchange, is calculable at the time such Option or Convertible Security is issued or amended but is subject to

adjustment based upon subsequent events, any adjustment to the Conversion Price provided for in this Subsection 4.4.3 shall be effected at the time of such issuance or amendment based on such number of shares or amount of consideration without regard to any provisions for subsequent adjustments (and any subsequent adjustments shall be treated as provided in clauses (b) and (c) of this Subsection 4.4.3). If the number of shares of Common Stock issuable upon the exercise, conversion and/or exchange of any Option or Convertible Security, or the consideration payable to the Corporation upon such exercise, conversion and/or exchange, cannot be calculated at all at the time such Option or Convertible Security is issued or amended, any adjustment to the Conversion Price that would result under the terms of this Subsection 4.4.3 at the time of such issuance or amendment shall instead be effected at the time such number of shares and/or amount of consideration is first calculable (even if subject to subsequent adjustments), assuming for purposes of calculating such adjustment to the Conversion Price that such issuance or amendment took place at the time such calculation can first be made.

4.4.4 Adjustment of Conversion Price Upon Issuance of Additional Shares of Common Stock. In the event the Corporation shall at any time after the Series B Original Issue Date issue Additional Shares of Common Stock (including Additional Shares of Common Stock deemed to be issued pursuant to Subsection 4.4.3), without consideration or for a consideration per share less than the Conversion Price for a series of Preferred Stock in effect immediately prior to such issue, then the Conversion Price for such series shall be reduced, concurrently with such issue, to a price (calculated to the nearest one-hundredth of a cent) determined in accordance with the following formula:

$$CP_2 = CP_1 * (A + B) \div (A + C).$$

For purposes of the foregoing formula, the following definitions shall apply:

(a) “CP2” shall mean the Conversion Price for a series of Preferred Stock in effect immediately after such issue of Additional Shares of Common Stock;

(b) “CP_1” shall mean the Conversion Price for a series of Preferred Stock in effect immediately prior to such issue of Additional Shares of Common Stock;

(c) “A” shall mean the number of shares of Common Stock outstanding immediately prior to such issue of Additional Shares of Common Stock (treating for this purpose as outstanding all shares of Common Stock issuable upon exercise of Options outstanding immediately prior to such issue or upon conversion or exchange of Convertible Securities (including the Preferred Stock) outstanding (assuming exercise of any outstanding Options therefor) immediately prior to such issue);

(d) “B” shall mean the number of shares of Common Stock that would have been issued if such Additional Shares of Common Stock had been issued at a price per share equal to CP_1 (determined by dividing the aggregate consideration received by the Corporation in respect of such issue by CP_1); and

(e) “C” shall mean the number of such Additional Shares of Common Stock issued in such transaction.

4.4.5 Determination of Consideration. For purposes of this Subsection 4.4, the consideration received by the Corporation for the issue of any Additional Shares of Common Stock shall be computed as follows:

(a) Cash and Property: Such consideration shall:

(i) insofar as it consists of cash, be computed at the aggregate amount of cash received by the Corporation, excluding amounts paid or payable for accrued interest;

(ii) insofar as it consists of property other than cash, be computed at the fair market value thereof at the time of such issue, as determined in good faith by the Board of Directors; and

(iii) in the event Additional Shares of Common Stock are issued together with other shares or securities or other assets of the Corporation for consideration which covers both, be the proportion of such consideration so received, computed as provided in clauses (i) and (ii) above, as determined in good faith by the Board of Directors.

(b) Options and Convertible Securities. The consideration per share received by the Corporation for Additional Shares of Common Stock deemed to have been issued pursuant to Subsection 4.4.3, relating to Options and Convertible Securities, shall be determined by dividing:

(i) The total amount, if any, received or receivable by the Corporation as consideration for the issue of such Options or Convertible Securities, plus the minimum aggregate amount of additional consideration (as set forth in the instruments relating thereto, without regard to any provision contained therein for a subsequent adjustment of such consideration) payable to the Corporation upon the exercise of such Options or the conversion or exchange of such Convertible Securities, or in the case of Options for Convertible Securities, the exercise of such Options for Convertible Securities and the conversion or exchange of such Convertible Securities, by

(ii) the maximum number of shares of Common Stock (as set forth in the instruments relating thereto, without regard to any provision contained therein for a subsequent adjustment of such number) issuable upon the exercise of such Options or the conversion or exchange of such Convertible Securities, or in the case of Options for Convertible Securities, the exercise of such Options for Convertible Securities and the conversion or exchange of such Convertible Securities.

4.4.6 Multiple Closing Dates. In the event the Corporation shall issue on more than one date Additional Shares of Common Stock that are a part of one transaction or a series of related transactions and that would result in an Conversion Price pursuant to the terms of Subsection 4.4.4, and such issuance dates occur within a period of no more than ninety (90) days from the first such issuance to the final such issuance, then, upon the final such issuance, the Conversion Price shall be readjusted to give effect to all such issuances as if they occurred on the date of the first such issuance (and without giving effect to any additional adjustments as a result of any such subsequent issuances within such period).

4.5 Adjustment for Stock Splits and Combinations. If the Corporation shall at any time or from time to time after the Series B Original Issue Date effect a subdivision of the outstanding Common Stock, the Conversion Price of a series of Preferred Stock in effect immediately before that subdivision shall be proportionately decreased so that the number of shares of Common Stock issuable on conversion of each share of such series shall be increased in proportion to such increase in the aggregate number of shares of Common Stock outstanding. If the Corporation shall at any time or from time to time after the Series B Original Issue Date combine the outstanding shares of Common Stock, the Conversion Price of a series of Preferred Stock in effect immediately before the combination shall be proportionately increased so that the number of shares of Common Stock issuable on conversion of each share of such series shall be decreased in proportion to such decrease in the aggregate number of shares of Common Stock outstanding. Any adjustment under this subsection shall become effective at the close of business on the date the subdivision or combination becomes effective.

4.6 Adjustment for Certain Dividends and Distributions. In the event the Corporation at any time or from time to time after the Series B Original Issue Date shall make or issue, or fix a record date for the determination of holders of Common Stock entitled to receive, a dividend or other distribution payable on the Common Stock in additional shares of Common Stock, then and in each such event the Conversion Price of a series of Preferred Stock in effect immediately before such event shall be decreased as of the time of such issuance or, in the event such a record date shall have been fixed, as of the close of business on such record date, by multiplying the Conversion Price of a series of Preferred Stock then in effect by a fraction:

(1) the numerator of which shall be the total number of shares of Common Stock issued and outstanding immediately prior to the time of such issuance or the close of business on such record date, and

(2) the denominator of which shall be the total number of shares of Common Stock issued and outstanding immediately prior to the time of such issuance or the close of business on such record date plus the number of shares of Common Stock issuable in payment of such dividend or distribution.

Notwithstanding the foregoing (a) if such record date shall have been fixed and such dividend is not fully paid or if such distribution is not fully made on the date fixed therefor, the Conversion Price shall be recomputed accordingly as of the close of business on such record date and thereafter the Conversion Price shall be adjusted pursuant to this subsection as of the time of actual payment of such dividends or distributions; and (b) that no such adjustment shall be made if the holders of Preferred Stock simultaneously receive a dividend or other distribution of shares of Common Stock in a number equal to the number of shares of Common Stock as they would have received if all outstanding shares of Preferred Stock had been converted into Common Stock on the date of such event.

4.7 Adjustments for Other Dividends and Distributions. In the event the Corporation at any time or from time to time after the Series B Original Issue Date shall make or issue, or fix a record date for the determination of holders of Common Stock entitled to receive, a dividend or other distribution payable in securities of the Corporation (other than a distribution of shares of Common Stock in respect of outstanding shares of Common Stock) or in other property and the provisions of Section 1 do not apply to such dividend or distribution, then and in each such event the holders of Preferred Stock shall receive, simultaneously with the distribution to the holders of Common Stock, a dividend or other distribution of such securities or other property in an amount equal to the amount of such securities or other property as they would have received if all outstanding shares of Preferred Stock had been converted into Common Stock on the date of such event.

4.8 Adjustment for Merger or Reorganization, etc. Subject to the provisions of Subsection 2.3, if there shall occur any reorganization, recapitalization, reclassification, consolidation or merger involving the Corporation in which the Common Stock (but not the Preferred Stock) is converted into or exchanged for securities, cash or other property (other than a transaction covered by Subsections 4.4, 4.6 or 4.7), then, following any such reorganization, recapitalization, reclassification, consolidation or merger, each share of Preferred Stock shall thereafter be convertible in lieu of the Common Stock into which it was convertible prior to such event into the kind and amount of securities, cash or other property which a holder of the number of shares of Common Stock of the Corporation issuable upon conversion of one share of Preferred Stock immediately prior to such reorganization, recapitalization, reclassification, consolidation or merger would have been entitled to receive pursuant to such transaction; and, in such case, appropriate adjustment (as determined in good faith by the Board of Directors) shall be made in the application of the provisions in this Section 4 with respect to the rights and interests thereafter of the holders of the Preferred Stock, to the end that the provisions set forth in this Section 4 (including provisions with respect to changes in and other adjustments of the Conversion Price) shall thereafter be applicable, as nearly as reasonably may be, in relation to any securities or other property thereafter deliverable upon the conversion of the Preferred Stock. For the avoidance of doubt, nothing in this Subsection 4.8 shall be construed as preventing the holders of Preferred Stock from seeking any appraisal rights to which they are otherwise entitled under the General Corporation Law in connection with a merger triggering an adjustment hereunder, nor shall this Subsection 4.8 be deemed conclusive evidence of the fair value of the shares of Preferred Stock in any such appraisal proceeding.

4.9 Certificate as to Adjustments. Upon the occurrence of each adjustment or readjustment of the Conversion Price of a series of Preferred Stock pursuant to this Section 4, the Corporation at its expense shall, as promptly as reasonably practicable but in any event not later than ten (10) days thereafter, compute such adjustment or readjustment in accordance with the terms hereof and furnish to each holder of Preferred Stock a certificate setting forth such adjustment or readjustment (including the kind and amount of securities, cash or other property into which the Preferred Stock is convertible) and showing in detail the facts upon which such adjustment or readjustment is based. The Corporation shall, as promptly as reasonably practicable after the written request at any time of any holder of Preferred Stock (but in any event not later than ten (10) days thereafter), furnish or cause to be furnished to such holder a certificate setting forth (i) the Conversion Price of each series of Preferred Stock then in effect, and (ii) the number of shares of Common Stock and the amount, if any, of other securities, cash or property which then would be received upon the conversion of Preferred Stock.

4.10 Notice of Record Date. In the event:

(a) the Corporation shall take a record of the holders of its Common Stock (or other capital stock or securities at the time issuable upon conversion of the Preferred Stock) for the purpose of entitling or enabling them to receive any dividend or other distribution, or to receive any right to subscribe for or purchase any shares of capital stock of any class or any other securities, or to receive any other security; or

(b) of any capital reorganization of the Corporation, any reclassification of the Common Stock of the Corporation, or any Deemed Liquidation Event; or

(c) of the voluntary or involuntary dissolution, liquidation or winding-up of the Corporation,

then, and in each such case, the Corporation will send or cause to be sent to the holders of the Preferred Stock a notice specifying, as the case may be, (i) the record date for such dividend, distribution or right, and the amount and character of such dividend, distribution or right, or (ii) the effective date on which such reorganization, reclassification, consolidation, merger, transfer, dissolution, liquidation or winding-up is proposed to take place, and the time, if any is to be fixed, as of which the holders of record of Common Stock (or such other capital stock or securities at the time issuable upon the conversion of the Preferred Stock) shall be entitled to exchange their shares of Common Stock (or such other capital stock or securities) for securities or other property deliverable upon such reorganization, reclassification, consolidation, merger, transfer, dissolution, liquidation or winding-up, and the amount per share and character of such exchange applicable to the Preferred Stock and the Common Stock. Such notice shall be sent at least ten (10) days prior to the record date or effective date for the event specified in such notice.

5. Mandatory Conversion.

5.1 Trigger Events.

5.1.1 Preferred Stock Mandatory Conversion Time. Upon either (a) the closing of the sale of shares of Common Stock to the public at a price of at least 1.5 times the Series B Original Issue Price per share (subject to appropriate adjustment in the event of any stock dividend, stock split, combination or other similar recapitalization with respect to the Common Stock) in a firm-commitment underwritten public offering pursuant to an effective registration statement under the Securities Act of 1933, as amended, resulting in at least $50 million of gross proceeds to the Corporation and following which shares of the Corporation's Common Stock are listed on the New York Stock Exchange or the Nasdaq Stock Market's National Market (a "**Qualified IPO**") or (b) the date and time, or the occurrence of an event, specified by vote or written consent of the Requisite Preferred Holders (the time of such closing or the date and time specified or the time of the event specified in such vote or written consent is referred to herein as the "**Mandatory Conversion Time**"), then (i) all outstanding shares of Preferred Stock shall automatically be converted into shares of Common Stock, at the then effective conversion rate as calculated pursuant to Subsection 4.1.1 and (ii) such shares may not be reissued by the Corporation. All declared but unpaid dividends, if any, shall be paid in cash upon automatic conversion in connection with a Qualified IPO or initial public offering.

5.2 Procedural Requirements. All holders of record of shares of Preferred Stock shall be sent written notice of the Mandatory Conversion Time and the place designated for mandatory conversion of all such shares of Preferred Stock pursuant to this Section 5. Such notice need not be sent in advance of the occurrence of the Mandatory Conversion Time. Upon receipt of such notice, each holder of shares of Preferred Stock in certificated form shall surrender his, her or its certificate or certificates for all such shares (or, if such holder alleges that such certificate has been lost, stolen or destroyed, a lost certificate affidavit and agreement reasonably acceptable to the Corporation to indemnify the Corporation against any claim that may be made against the Corporation on account of the alleged loss, theft or destruction of such certificate) to the Corporation at the place designated in such notice. If so required by the Corporation, any certificates surrendered for conversion shall be endorsed or accompanied by written instrument or instruments of transfer, in form satisfactory to the Corporation, duly executed by the registered holder or by his, her or its attorney duly authorized in writing. All rights with respect to the Preferred Stock converted pursuant to Subsection 5.1, including the rights, if any, to receive notices and vote (other than as a holder of Common Stock), will terminate at the Mandatory Conversion Time (notwithstanding the failure of the holder or holders thereof to surrender any certificates at or prior to such time), except only the rights of the holders thereof, upon surrender of any certificate or certificates of such holders (or lost certificate affidavit and agreement) therefor, to receive the items provided for in the next sentence of this Subsection 5.2. As soon as practicable after the Mandatory Conversion Time and, if applicable, the surrender of any certificate or certificates (or lost certificate affidavit and agreement) for Preferred Stock, the Corporation shall (a) issue and deliver to such holder, a certificate or certificates for the number of full shares of Common Stock issuable on such conversion in accordance with the provisions hereof and (b) pay cash as provided in Subsection 4.2 in lieu of any fraction of a share of Common Stock otherwise issuable upon such conversion and the payment of any declared but unpaid dividends on the shares of Preferred Stock converted. Such converted Preferred Stock shall be retired and cancelled and may not be reissued as shares of such series, and the Corporation may thereafter take such appropriate action (without the need for stockholder action) as may be necessary to reduce the authorized number of shares of Preferred Stock, Series B Preferred Stock, Series A Preferred Stock and Series Seed Preferred Stock accordingly.

6. Redemption.

6.1 General. Unless prohibited by Delaware law governing distributions to stockholders, shares of Preferred Stock shall be redeemed by the Corporation at (i) with respect to the Series B Preferred Stock, a price equal to the Series B Original Issue Price per share, plus all declared but unpaid dividends thereon, (ii) with respect to the Series A Preferred Stock, a price equal to the Series A Original Issue Price per share, plus all declared but unpaid dividends thereon and (iii) with respect to the Series Seed Preferred Stock, a price equal to the Series Seed Original Issue Price per share, plus all declared but unpaid dividends thereon (the "**Redemption Price**"), in three (3) annual installments commencing not more than sixty (60) days after receipt by the Corporation at any time on or after the fifth year anniversary of the Series B Original Issue Date, from the Requisite Preferred Holders, of written notice requesting redemption of all shares of Preferred Stock (the "**Redemption Request**"). Upon receipt of a Redemption Request, the Corporation shall apply all of its assets to any such redemption, and to no other corporate purpose, except to the extent prohibited by Delaware law governing distributions to stockholders. The date of each such installment shall be referred to as a "**Redemption Date.**" On each Redemption Date, the Corporation shall redeem, on a pro rata basis in accordance with the number of shares of Preferred Stock owned by each holder, that number of outstanding shares of Preferred Stock determined by dividing (i) the total number of shares of Preferred Stock outstanding immediately prior to such Redemption Date by (ii) the number of remaining Redemption Dates (including the Redemption Date to which such calculation applies). Notwithstanding the foregoing, if on any Redemption Date, Delaware law governing distributions to stockholders prevents the Corporation from redeeming all shares of Preferred Stock to be redeemed, the Corporation shall ratably redeem each holder's shares of Preferred Stock, in accordance with the priorities set forth in Sections 2.1 and 2.2, to the fullest extent permitted by such law, and shall redeem the remaining shares of Preferred Stock as soon as it may lawfully do so under Delaware law governing distributions to stockholders.

6.2 Redemption Notice. The Corporation shall send written notice of the mandatory redemption (the "**Redemption Notice**") to each holder of record of Preferred Stock not less than forty (40) days prior to each Redemption Date. Each Redemption Notice shall state:

(a) the number of shares of Preferred Stock held by the holder that the Corporation shall redeem on the Redemption Date specified in the Redemption Notice;

(b) the Redemption Date and the Redemption Price;

(c) the date upon which the holder's right to convert such shares terminates (as determined in accordance with Subsection 4.1); and

(d) for holders of shares in certificated form, that the holder is to surrender to the Corporation, in the manner and at the place designated, his, her or its certificate or certificates representing the shares of Preferred Stock to be redeemed.

6.3 Surrender of Certificates; Payment. On or before the applicable Redemption Date, each holder of shares of Preferred Stock to be redeemed on such Redemption Date, unless such holder has exercised his, her or its right to convert such shares as provided in Section 4, shall, if a holder of shares in certificated form, surrender the certificate or certificates representing such shares (or, if such registered holder alleges that such certificate has been lost, stolen or destroyed, a lost certificate affidavit and agreement reasonably acceptable to the Corporation to indemnify the Corporation against any claim that may be made against the Corporation on account of the alleged loss, theft or destruction of such certificate) to the Corporation, in the manner and at the place designated in the Redemption Notice, and thereupon the Redemption Price for such shares shall be payable to the order of the person whose name appears on such certificate or certificates as the owner thereof. In the event less than all of the shares of Preferred Stock represented by a certificate are redeemed, a new certificate, instrument, or book entry representing the unredeemed shares of Preferred Stock shall promptly be issued to such holder.

6.4 Rights Subsequent to Redemption. If the Redemption Notice shall have been duly given, and if on the applicable Redemption Date the Redemption Price payable upon redemption of the shares of Preferred Stock to be redeemed on such Redemption Date is paid or tendered for payment or deposited with an independent payment agent so as to be available therefor in a timely manner, then notwithstanding that any certificates evidencing any of the shares of Preferred Stock so called for redemption shall not have been surrendered, dividends with respect to such shares of Preferred Stock shall cease to accrue after such Redemption Date and all rights with respect to such shares shall forthwith after the Redemption Date terminate, except only the right of the holders to receive the Redemption Price without interest upon surrender of any such certificate or certificates therefor.

7. Redeemed or Otherwise Acquired Shares. Any shares of Preferred Stock that are redeemed or otherwise acquired by the Corporation or any of its subsidiaries shall be automatically and immediately cancelled and retired and shall not be reissued, sold or transferred. Neither the Corporation nor any of its subsidiaries may exercise any voting or other rights granted to the holders of Preferred Stock following redemption.

8. Waiver. Except as otherwise specifically set forth herein or as required under General Corporation Law, any of the rights, powers, preferences and other terms of the Preferred Stock set forth herein may be waived on behalf of all holders of Preferred Stock by the affirmative written consent or vote of the Requisite Preferred Holders. Any rights exercisable hereunder explicitly or required under General Corporation Law by (i) the holders of Series Seed Preferred Stock exclusively as separate class shall require the affirmative written consent or vote of the holders of a majority of the outstanding shares of Series Seed Preferred Stock, (ii) the holders of Series A Preferred Stock exclusively as separate class shall require the affirmative written consent or vote of the holders of a majority of the outstanding shares of Series A Preferred Stock and (iii) the holders of Series B Preferred Stock exclusively as separate class shall require the affirmative written consent or vote of the Requisite Series B Preferred.

9. Notices. Any notice required or permitted by the provisions of this Article Fourth to be given to a holder of shares of Preferred Stock shall be mailed, postage prepaid, to the post office address last shown on the records of the Corporation, or given by electronic communication in compliance with the provisions of the General Corporation Law, and shall be deemed sent upon such mailing or electronic transmission.

FIFTH: Subject to any additional vote required by the Certificate of Incorporation or Bylaws, in furtherance and not in limitation of the powers conferred by statute, the Board of Directors is expressly authorized to make, repeal, alter, amend and rescind any or all of the Bylaws of the Corporation.

SIXTH: Subject to any additional vote required by the Certificate of Incorporation, the number of directors of the Corporation shall be determined in the manner set forth in the Bylaws of the Corporation.

SEVENTH: Elections of directors need not be by written ballot unless the Bylaws of the Corporation shall so provide.

EIGHTH: Meetings of stockholders may be held within or without the State of Delaware, as the Bylaws of the Corporation may provide. The books of the Corporation may be kept outside the State of Delaware at such place or places as may be designated from time to time by the Board of Directors or in the Bylaws of the Corporation.

NINTH: To the fullest extent permitted by law, a director of the Corporation shall not be personally liable to the Corporation or its stockholders for monetary damages for breach of fiduciary duty as a director. If the General Corporation Law or any other law of the State of Delaware is amended after approval by the stockholders of this Article Ninth to authorize corporate action further eliminating or limiting the personal liability of directors, then the liability of a director of the Corporation shall be eliminated or limited to the fullest extent permitted by the General Corporation Law as so amended.

Any repeal or modification of the foregoing provisions of this Article Ninth by the stockholders of the Corporation shall not adversely affect any right or protection of a director of the Corporation existing at the time of, or increase the liability of any director of the Corporation with respect to any acts or omissions of such director occurring prior to, such repeal or modification.

TENTH: To the fullest extent permitted by applicable law, the Corporation is authorized to provide indemnification of (and advancement of expenses to) directors, officers and agents of the Corporation (and any other persons to which General Corporation Law permits the Corporation to provide indemnification) through Bylaw provisions, agreements with such agents or other persons, vote of stockholders or disinterested directors or otherwise, in excess of the indemnification and advancement otherwise permitted by Section 145 of the General Corporation Law.

Any amendment, repeal or modification of the foregoing provisions of this Article Tenth shall not adversely affect any right or protection of any director, officer or other agent of the Corporation existing at the time of such amendment, repeal or modification.

ELEVENTH: The Corporation renounces, to the fullest extent permitted by law, any interest or expectancy of the Corporation in, or in being offered an opportunity to participate in, any Excluded Opportunity. An "**Excluded Opportunity**" is any matter, transaction or interest that is presented to, or acquired, created or developed by, or which otherwise comes into the possession of (i) any director of the Corporation who is not an employee of the Corporation or any of its subsidiaries, or (ii) any holder of Preferred Stock or any partner, member, director,

stockholder, employee or agent of any such holder, other than someone who is an employee of the Corporation or any of its subsidiaries (collectively, "**Covered Persons**"), unless such matter, transaction or interest is presented to, or acquired, created or developed by, or otherwise comes into the possession of, a Covered Person expressly and solely in such Covered Person's capacity as a director of the Corporation.

TWELFTH: Unless the Corporation consents in writing to the selection of an alternative forum, the Court of Chancery in the State of Delaware shall be the sole and exclusive forum for any stockholder (including a beneficial owner) to bring (i) any derivative action or proceeding brought on behalf of the Corporation, (ii) any action asserting a claim of breach of fiduciary duty owed by any director, officer or other employee of the Corporation to the Corporation or the Corporation's stockholders, (iii) any action asserting a claim against the Corporation, its directors, officers or employees arising pursuant to any provision of the Delaware General Corporation Law or the Corporation's certificate of incorporation or bylaws or (iv) any action asserting a claim against the Corporation, its directors, officers or employees governed by the internal affairs doctrine, except for, as to each of (i) through (iv) above, any claim as to which the Court of Chancery determines that there is an indispensable party not subject to the jurisdiction of the Court of Chancery (and the indispensable party does not consent to the personal jurisdiction of the Court of Chancery within ten days following such determination), which is vested in the exclusive jurisdiction of a court or forum other than the Court of Chancery, or for which the Court of Chancery does not have subject matter jurisdiction. If any provision or provisions of this Article Twelfth shall be held to be invalid, illegal or unenforceable as applied to any person or entity or circumstance for any reason whatsoever, then, to the fullest extent permitted by law, the validity, legality and enforceability of such provisions in any other circumstance and of the remaining provisions of this Article Twelfth (including, without limitation, each portion of any sentence of this Article Twelfth containing any such provision held to be invalid, illegal or unenforceable that is not itself held to be invalid, illegal or unenforceable) and the application of such provision to other persons or entities and circumstances shall not in any way be affected or impaired thereby.

* * *

3. That the foregoing amendment and restatement was approved by the holders of the requisite number of shares of this corporation in accordance with Section 228 of the General Corporation Law.

4. That this Third Amended and Restated Certificate of Incorporation, which restates and integrates and further amends the provisions of this Corporation's Certificate of Incorporation, has been duly adopted in accordance with Sections 242 and 245 of the General Corporation Law.

IN WITNESS WHEREOF, this Third Amended and Restated Certificate of Incorporation has been executed by a duly authorized officer of this corporation on January 19, 2018.

By: /s/ Geoffrey MacKay
Geoffrey MacKay, President and Chief Executive Officer

SIGNATURE PAGE TO
THIRD AMENDED AND RESTATED CERTIFICATE OF INCORPORATION OF
AVROBIO, INC.

Exhibit 3.4

BY-LAWS

of

AVROBIO, INC.

(the "Corporation")

1. Stockholders

(a) Annual Meeting. The annual meeting of stockholders shall be held for the election of directors each year at such place, date and time as shall be designated by the board of directors of the Corporation (the "Board of Directors"). Any other proper business may be transacted at the annual meeting. If no date for the annual meeting is established or said meeting is not held on the date established as provided above, a special meeting in lieu thereof may be held or there may be action by written consent of the stockholders on matters to be voted on at the annual meeting, and such special meeting or written consent shall have for the purposes of these by-laws (the "By-laws") or otherwise all the force and effect of an annual meeting.

(b) Special Meetings. Special meetings of stockholders may be called by the Chief Executive Officer, if one is elected, or, if there is no Chief Executive Officer, a President, or by the Board of Directors, but such special meetings may not be called by any other person or persons. The call for the meeting shall state the place, date, hour and purposes of the meeting. Only the purposes specified in the notice of special meeting shall be considered or dealt with at such special meeting.

(c) Notice of Meetings. Whenever stockholders are required or permitted to take any action at a meeting, a notice stating the place, if any, date and hour of the meeting, the means of remote communications, if any, by which stockholders and proxyholders may be deemed to be present and vote at such meeting, and, in the case of a special meeting, the purpose or purposes of the meeting, shall be given by the Secretary (or other person authorized by these By-laws or by law) not less than ten (10) nor more than sixty (60) days before the meeting to each stockholder entitled to vote thereat and to each stockholder who, under the certificate of incorporation of the Corporation (the "Certificate of Incorporation") or under these By-laws is entitled to such notice. If mailed, notice is given when deposited in the mail, postage prepaid, directed to such stockholder at such stockholder's address as it appears in the records of the Corporation. Without limiting the manner by which notice otherwise may be effectively given to stockholders, any notice to stockholders may be given by electronic transmission in the manner provided in Section 232 of the Delaware General Corporation Law (the "DGCL").

If a meeting is adjourned to another time or place, notice need not be given of the adjourned meeting if the time and place, if any, and the means of remote communications, if any, by which stockholders and proxyholders may be deemed to be present in person and vote at such adjourned meeting are announced at the meeting at which the adjournment is taken, except that if the adjournment is for more than thirty (30) days, or if after the adjournment a new record date is fixed for the adjourned meeting, notice of the adjourned meeting shall be given to each stockholder of record entitled to vote at the meeting.

(d) Quorum. The holders of a majority in interest of all stock issued, outstanding and entitled to vote at a meeting, present in person or represented by proxy, shall constitute a quorum. Any meeting may be adjourned from time to time by a majority of the votes properly cast upon the question, whether or not a quorum is present. The stockholders present at a duly constituted meeting may continue to transact business until adjournment notwithstanding the withdrawal of enough stockholders to reduce the voting shares below a quorum.

(e) Voting and Proxies. Except as otherwise provided by the Certificate of Incorporation or by law, each stockholder entitled to vote at any meeting of stockholders shall be entitled to one vote for each share of stock held by such stockholder which has voting power upon the matter in question. Each stockholder entitled to vote at a meeting of stockholders or to express consent or dissent to corporate action in writing without a meeting may authorize another person or persons to act for such stockholder by either written proxy or by a transmission permitted by Section 212(c) of the DGCL, but no proxy shall be voted or acted upon after three years from its date, unless the proxy provides for a longer period or is irrevocable and coupled with an interest. Proxies shall be filed with the Secretary of the meeting, or of any adjournment thereof. Except as otherwise limited therein, proxies shall entitle the persons authorized thereby to vote at any adjournment of such meeting.

(f) Action at Meeting. When a quorum is present, any matter before the meeting shall be decided by vote of the holders of a majority of the shares of stock voting on such matter except where a larger vote is required by law, by the Certificate of Incorporation or by these By-laws. Any election of directors by stockholders shall be determined by a plurality of the votes cast, except where a larger vote is required by law, by the Certificate of Incorporation or by these By-laws. The Corporation shall not directly or indirectly vote any share of its own stock; provided, however, that the Corporation may vote shares which it holds in a fiduciary capacity to the extent permitted by law.

(g) Presiding Officer. Meetings of stockholders shall be presided over by the Chairman of the Board, if one is elected, or in his or her absence, the Vice Chairman of the Board, if one is elected, or if neither is elected or in their absence, a President. The Board of Directors shall have the authority to appoint a temporary presiding officer to serve at any meeting of the stockholders if the Chairman of the Board, the Vice Chairman of the Board or a President is unable to do so for any reason.

(h) Conduct of Meetings. The Board of Directors may adopt by resolution such rules and regulations for the conduct of the meeting of stockholders as it shall deem appropriate. Except to the extent inconsistent with such rules and regulations as adopted by the Board of Directors, the presiding officer of any meeting of stockholders shall have the right and authority to prescribe such rules, regulations and procedures and to do all such acts as, in the judgment of such chairman, are appropriate for the proper conduct of the meeting. Such rules, regulations or procedures, whether adopted by the Board of Directors or prescribed by the presiding officer of the meeting, may include, without limitation, the following: (i) the establishment of an agenda or order of business for the meeting; (ii) rules and procedures for

maintaining order at the meeting and the safety of those present; (iii) limitations on attendance at or participation in the meeting to stockholders of record of the Corporation, their duly authorized and constituted proxies or such other persons as the chairman of the meeting shall determine; (iv) restrictions on entry to the meeting after the time fixed for the commencement thereof; and (v) limitations on the time allotted to questions or comments by participants. Unless and to the extent determined by the Board of Directors or the presiding officer of the meeting, meetings of stockholders shall not be required to be held in accordance with the rules of parliamentary procedure.

(i) Action without a Meeting. Unless otherwise provided in the Certificate of Incorporation, any action required or permitted by law to be taken at any annual or special meeting of stockholders, may be taken without a meeting, without prior notice and without a vote, if a consent or consents in writing, setting forth the action so taken, shall be signed or be approved via electronic transmission by the holders of outstanding stock having not less than the minimum number of votes that would be necessary to authorize or take such action at a meeting at which all shares entitled to vote thereon were present and voted and shall be delivered to the Corporation by delivery to its registered office, by hand or by certified mail, return receipt requested, or to the Corporation's principal place of business or to the officer of the Corporation having custody of the minute book. Every written consent shall bear the date of signature and no written consent shall be effective unless, within sixty (60) days of the earliest dated consent delivered pursuant to these By-laws, written consents signed by a sufficient number of stockholders entitled to take action are delivered to the Corporation in the manner set forth in these By-laws. Prompt notice of the taking of the corporate action without a meeting by less than unanimous written consent shall be given to those stockholders who have not consented in writing.

(j) Stockholder Lists. The officer who has charge of the stock ledger of the Corporation shall prepare and make, at least ten (10) days before every meeting of stockholders, a complete list of the stockholders entitled to vote at the meeting, arranged in alphabetical order, and showing the address of each stockholder and the number of shares registered in the name of each stockholder. Nothing contained in this Section 1(j) shall require the Corporation to include electronic mail addresses or other electronic contact information on such list. Such list shall be open to the examination of any stockholder, for any purpose germane to the meeting, for a period of at least ten (10) days prior to the meeting in the manner provided by law. The list shall also be open to the examination of any stockholder during the whole time of the meeting as provided by law.

2. Directors

(a) Powers. The business of the Corporation shall be managed by or under the direction of a Board of Directors who may exercise all the powers of the Corporation except as otherwise provided by law, by the Certificate of Incorporation or by these By-laws. In the event of a vacancy in the Board of Directors, the remaining directors, except as otherwise provided by law, may exercise the powers of the full Board until the vacancy is filled.

(b) Number and Qualification. Unless otherwise provided in the Certificate of Incorporation or in these By-laws, the number of directors which shall constitute the whole board shall be determined from time to time by resolution of the Board of Directors. Directors need not be stockholders.

(c) Vacancies; Reduction of Board. A majority of the directors then in office, although less than a quorum, or a sole remaining Director, may fill vacancies in the Board of Directors occurring for any reason and newly created directorships resulting from any increase in the authorized number of directors. In lieu of filling any vacancy, the Board of Directors may reduce the number of directors.

(d) Tenure. Except as otherwise provided by law, by the Certificate of Incorporation or by these By-laws, directors shall hold office until their successors are elected and qualified or until their earlier resignation or removal. Any director may resign at any time upon notice given in writing or by electronic transmission to the Corporation. Such resignation shall be effective upon receipt unless it is specified to be effective at some other time or upon the happening of some other event.

(e) Removal. To the extent permitted by law, a director may be removed from office with or without cause by vote of the holders of a majority of the shares of stock entitled to vote in the election of directors.

(f) Meetings. Regular meetings of the Board of Directors may be held without notice at such time, date and place as the Board of Directors may from time to time determine. Special meetings of the Board of Directors may be called, orally or in writing, by the Chief Executive Officer, if one is elected, or, if there is no Chief Executive Officer, the President, or by two or more Directors, designating the time, date and place thereof. Directors may participate in meetings of the Board of Directors by means of conference telephone or other communications equipment by means of which all directors participating in the meeting can hear each other, and participation in a meeting in accordance herewith shall constitute presence in person at such meeting.

(g) Notice of Meetings. Notice of the time, date and place of all special meetings of the Board of Directors shall be given to each director by the Secretary, or Assistant Secretary, or in case of the death, absence, incapacity or refusal of such persons, by the officer or one of the directors calling the meeting. Notice shall be given to each director in person, by telephone, or by facsimile, electronic mail or other form of electronic communications, sent to such director's business or home address at least twenty-four (24) hours in advance of the meeting, or by written notice mailed to such director's business or home address at least forty-eight (48) hours in advance of the meeting.

(h) Quorum. At any meeting of the Board of Directors, a majority of the total number of directors shall constitute a quorum for the transaction of business. Less than a quorum may adjourn any meeting from time to time and the meeting may be held as adjourned without further notice.

(i) Action at Meeting. At any meeting of the Board of Directors at which a quorum is present, unless otherwise provided in the following sentence, a majority of the directors present may take any action on behalf of the Board of Directors, unless a larger number is required by law, by the Certificate of Incorporation or by these By-laws. So long as there are two (2) or fewer Directors, any action to be taken by the Board of Directors shall require the approval of all Directors.

(j) Action by Consent. Any action required or permitted to be taken at any meeting of the Board of Directors may be taken without a meeting if all members of the Board of Directors consent thereto in writing or by electronic transmission, and the writing or writings or electronic transmission or transmissions are filed with the records of the meetings of the Board of Directors. Such filing shall be in paper form if the minutes are maintained in paper form and shall be in electronic form if the minutes are maintained in electronic form.

(k) Committees. The Board of Directors may, by resolution passed by a majority of the whole Board of Directors, establish one or more committees, each committee to consist of one or more directors. The Board of Directors may designate one or more directors as alternate members of any committee, who may replace any absent or disqualified member at any meeting of the committee. In the absence or disqualification of a member of a committee, the member or members thereof present at any meeting and not disqualified from voting, whether or not such member or members constitute a quorum, may unanimously appoint another member of the Board of Directors to act at the meeting in the place of any such absent or disqualified member.

Any such committee, to the extent permitted by law and to the extent provided in the resolution of the Board of Directors, shall have and may exercise all the powers and authority of the Board of Directors in the management of the business and affairs of the Corporation, and may authorize the seal of the Corporation to be affixed to all papers which may require it; but no such committee shall have the power or authority in reference to the following: (i) approving or adopting, or recommending to the stockholders, any action or matter expressly required by the DGCL to be submitted to stockholders for approval or (ii) adopting, amending or repealing any provision of these By-laws.

Except as the Board of Directors may otherwise determine, any such committee may make rules for the conduct of its business, but in the absence of such rules its business shall be conducted so far as possible in the same manner as is provided in these By-laws for the Board of Directors. All members of such committees shall hold their committee offices at the pleasure of the Board of Directors, and the Board may abolish any committee at any time.

3. Officers

(a) Enumeration. The officers of the Corporation shall consist of one or more Presidents (who, if there is more than one, shall be referred to as Co-Presidents), a Treasurer, a Secretary, and such other officers, including, without limitation, a Chief Executive Officer and one or more Vice Presidents (including Executive Vice Presidents or Senior Vice Presidents), Assistant Vice Presidents, Assistant Treasurers and Assistant Secretaries, as the Board of Directors may determine. The Board of Directors may elect from among its members a Chairman of the Board and a Vice Chairman of the Board.

(b) Election. The Presidents, Treasurer and Secretary shall be elected annually by the Board of Directors at their first meeting following the annual meeting of stockholders. Other officers may be chosen by the Board of Directors at such meeting or at any other meeting.

(c) Qualification. No officer need be a stockholder or Director. Any two or more offices may be held by the same person. Any officer may be required by the Board of Directors to give bond for the faithful performance of such officer's duties in such amount and with such sureties as the Board of Directors may determine.

(d) Tenure. Except as otherwise provided by the Certificate of Incorporation or by these By-laws, each of the officers of the Corporation shall hold office until the first meeting of the Board of Directors following the next annual meeting of stockholders and until such officer's successor is elected and qualified or until such officer's earlier resignation or removal. Any officer may resign by delivering his or her written resignation to the Corporation, and such resignation shall be effective upon receipt unless it is specified to be effective at some other time or upon the happening of some other event.

(e) Removal. The Board of Directors may remove any officer with or without cause by a vote of a majority of the directors then in office.

(f) Vacancies. Any vacancy in any office may be filled for the unexpired portion of the term by the Board of Directors.

(g) Chairman of the Board and Vice Chairman. Unless otherwise provided by the Board of Directors, the Chairman of the Board of Directors, if one is elected, shall preside, when present, at all meetings of the stockholders and the Board of Directors. The Chairman of the Board shall have such other powers and shall perform such duties as the Board of Directors may from time to time designate.

Unless otherwise provided by the Board of Directors, in the absence of the Chairman of the Board, the Vice Chairman of the Board, if one is elected, shall preside, when present, at all meetings of the stockholders and the Board of Directors. The Vice Chairman of the Board shall have such other powers and shall perform such duties as the Board of Directors may from time to time designate.

(h) Chief Executive Officer. The Chief Executive Officer, if one is elected, shall have such powers and shall perform such duties as the Board of Directors may from time to time designate.

(i) Presidents. The Presidents shall, subject to the direction of the Board of Directors, each have general supervision and control of the Corporation's business and any action that would typically be taken by a President may be taken by any Co-President. If there is no Chairman of the Board or Vice Chairman of the Board, a President shall preside, when present, at all meetings of stockholders and the Board of Directors. The Presidents shall have such other powers and shall perform such duties as the Board of Directors may from time to time designate.

(j) Vice Presidents and Assistant Vice Presidents. Any Vice President (including any Executive Vice President or Senior Vice President) and any Assistant Vice President shall have such powers and shall perform such duties as the Board of Directors may from time to time designate.

(k) Treasurer and Assistant Treasurers. The Treasurer shall, subject to the direction of the Board of Directors, have general charge of the financial affairs of the Corporation and shall cause to be kept accurate books of account. The Treasurer shall have custody of all funds, securities, and valuable documents of the Corporation, except as the Board of Directors may otherwise provide. The Treasurer shall have such other powers and shall perform such duties as the Board of Directors may from time to time designate.

Any Assistant Treasurer shall have such powers and perform such duties as the Board of Directors may from time to time designate.

(l) Secretary and Assistant Secretaries. The Secretary shall record the proceedings of all meetings of the stockholders and the Board of Directors (including committees of the Board) in books kept for that purpose. In the absence of the Secretary from any such meeting an Assistant Secretary, or if such person is absent, a temporary secretary chosen at the meeting, shall record the proceedings thereof. The Secretary shall have charge of the stock ledger (which may, however, be kept by any transfer or other agent of the Corporation) and shall have such other duties and powers as may be designated from time to time by the Board of Directors.

Any Assistant Secretary shall have such powers and perform such duties as the Board of Directors may from time to time designate.

(m) Other Powers and Duties. Subject to these By-laws, each officer of the Corporation shall have in addition to the duties and powers specifically set forth in these By-laws, such duties and powers as are customarily incident to such officer’s office, and such duties and powers as may be designated from time to time by the Board of Directors.

4. Capital Stock

(a) Certificates of Stock. Each stockholder shall be entitled to a certificate of the capital stock of the Corporation in such form as may from time to time be prescribed by the Board of Directors. Such certificate shall be signed by a President or a Vice President, and by the Treasurer or an Assistant Treasurer, or the Secretary or an Assistant Secretary. Such signatures may be a facsimile. In case any officer, transfer agent or registrar who has signed or whose facsimile signature has been placed on such certificate shall have ceased to be such officer, transfer agent or registrar before such certificate is issued, it may be issued by the Corporation with the same effect as if such person were such officer, transfer agent or registrar at the time of its issue. Every certificate for shares of stock which are subject to any restriction on transfer and every certificate issued when the Corporation is authorized to issue more than one class or series of stock shall contain such legend with respect thereto as is required by law. The Corporation shall be permitted to issue fractional shares.

(b) Transfers. Subject to any restrictions on transfer, shares of stock may be transferred on the books of the Corporation by the surrender to the Corporation or its transfer agent of the certificate therefor properly endorsed or accompanied by a written assignment or power of attorney properly executed, with transfer stamps (if necessary) affixed, and with such proof of the authenticity of signature as the Corporation or its transfer agent may reasonably require.

(c) Record Holders. Except as may otherwise be required by law, by the Certificate of Incorporation or by these By-laws, the Corporation shall be entitled to treat the record holder of stock as shown on its books as the owner of such stock for all purposes, including the payment of dividends and the right to vote with respect thereto, regardless of any transfer, pledge or other disposition of such stock, until the shares have been transferred on the books of the Corporation in accordance with the requirements of these By-laws.

It shall be the duty of each stockholder to notify the Corporation of such stockholder's post office address.

(d) Record Date. In order that the Corporation may determine the stockholders entitled to notice of or to vote at any meeting of stockholders or any adjournment thereof, or to consent to corporate action in writing without a meeting, or entitled to receive payment of any dividend or other distribution or allotment of any rights, or entitled to exercise any rights in respect of any change, conversion or exchange of stock or for the purpose of any other lawful action, the Board of Directors may fix, in advance, a record date, which shall not precede the date on which it is established, and which shall not be more than sixty (60) nor less than ten (10) days before the date of such meeting, more than ten (10) days after the date on which the record date for stockholder consent without a meeting is established, nor more than sixty (60) days prior to any other action. In such case only stockholders of record on such record date shall be so entitled notwithstanding any transfer of stock on the books of the Corporation after the record date.

If no record date is fixed, (i) the record date for determining stockholders entitled to notice of or to vote at a meeting of stockholders shall be at the close of business on the day next preceding the day on which notice is given, or, if notice is waived, at the close of business on the day next preceding the day on which the meeting is held, (ii) the record date for determining stockholders entitled to consent to corporate action in writing without a meeting, when no prior action by the Board of Directors is necessary, shall be the first date on which a signed written consent setting forth the action taken or proposed to be taken is delivered to the Corporation by delivery to its registered office in this state, to its principal place of business, or to an officer or agent of the Corporation having custody of the book in which proceedings of meetings of stockholders are recorded, and (iii) the record date for determining stockholders for any other purpose shall be at the close of business on the day on which the Board of Directors adopts the resolution relating thereto.

(e) Lost Certificates. The Corporation may issue a new certificate of stock in the place of any certificate theretofore issued by it, alleged to have been lost, stolen or destroyed, and the Corporation may require the owner of the lost, stolen or destroyed certificate, or his legal representative, to give the Corporation a bond sufficient to indemnify it against any claim that may be made against it on account of the alleged loss, theft or destruction of any such certificate or the issuance of such new certificate.

5. Indemnification

(a) Definitions. For purposes of this Section 5:

(i) “Corporate Status” describes the status of a person who is serving or has served (A) as a Director of the Corporation, (B) as an Officer of the Corporation, (C) as a Non-Officer Employee of the Corporation, or (D) as a director, partner, trustee, officer, employee or agent of any other corporation, partnership, limited liability company, joint venture, trust, employee benefit plan, foundation, association, organization or other legal entity for which such person is or was serving at the request of the Corporation. For purposes of this Section 5(a)(i), a Director, Officer or Non-Officer Employee of the Corporation who is serving or has served as a director, partner, trustee, officer, employee or agent of a Subsidiary shall be deemed to be serving at the request of the Corporation. Notwithstanding the foregoing, “Corporate Status” shall not include the status of a person who is serving or has served as a director, officer, employee or agent of a constituent corporation absorbed in a merger or consolidation transaction with the Corporation with respect to such person’s activities prior to said transaction, unless specifically authorized by the Board of Directors or the stockholders of the Corporation;

(ii) “Director” means any person who serves or has served the Corporation as a director on the Board of Directors of the Corporation;

(iii) “Disinterested Director” means, with respect to each Proceeding in respect of which indemnification is sought hereunder, a Director of the Corporation who is not and was not a party to such Proceeding;

(iv) “Expenses” means all reasonable attorneys fees, retainers, court costs, transcript costs, fees of expert witnesses, private investigators and professional advisors (including, without limitation, accountants and investment bankers), travel expenses, duplicating costs, printing and binding costs, costs of preparation of demonstrative evidence and other courtroom presentation aids and devices, costs incurred in connection with document review, organization, imaging and computerization, telephone charges, postage, delivery service fees, and all other disbursements, costs or expenses of the type customarily incurred in connection with prosecuting, defending, preparing to prosecute or defend, investigating, being or preparing to be a witness in, settling or otherwise participating in, a Proceeding;

(v) “Liabilities” means judgments, damages, liabilities, losses, penalties, excise taxes, fines and amounts paid in settlement;

(vi) “Non-Officer Employee” means any person who serves or has served as an employee or agent of the Corporation, but who is not or was not a Director or Officer;

(vii) “Officer” means any person who serves or has served the Corporation as an officer of the Corporation appointed by the Board of Directors of the Corporation;

(viii) “Proceeding” means any threatened, pending or completed action, suit, arbitration, alternate dispute resolution mechanism, inquiry, investigation, administrative hearing or other proceeding, whether civil, criminal, administrative, arbitrative or investigative; and

(ix) “Subsidiary” shall mean any corporation, partnership, limited liability company, joint venture, trust or other entity of which the Corporation owns (either directly or through or together with another Subsidiary of the Corporation) either (i) a general partner, managing member or other similar interest or (ii) (A) 50% or more of the voting power of the voting capital equity interests of such corporation, partnership, limited liability company, joint venture or other entity, or (B) 50% or more of the outstanding voting capital stock or other voting equity interests of such corporation, partnership, limited liability company, joint venture or other entity.

(b) Indemnification of Directors and Officers. Subject to the operation of Section 5(d) of these By-laws, each Director and Officer shall be indemnified and held harmless by the Corporation to the fullest extent authorized by the DGCL, as the same exists or may hereafter be amended (but, in the case of any such amendment, only to the extent that such amendment permits the Corporation to provide broader indemnification rights than such law permitted the Corporation to provide prior to such amendment), and to the extent authorized in subsections (i) through (iv) of this Section 5(b).

(i) Actions, Suits and Proceedings Other than By or In the Right of the Corporation. Each Director and Officer shall be indemnified and held harmless by the Corporation against any and all Expenses and Liabilities that are incurred or paid by such Director or Officer or on such Director’s or Officer’s behalf in connection with any Proceeding or any claim, issue or matter therein (other than an action by or in the right of the Corporation), which such Director or Officer is, or is threatened to be made, a party to or participant in by reason of such Director’s or Officer’s Corporate Status, if such Director or Officer acted in good faith and in a manner such Director or Officer reasonably believed to be in or not opposed to the best interests of the Corporation and, with respect to any criminal proceeding, had no reasonable cause to believe his or her conduct was unlawful.

(ii) Actions, Suits and Proceedings By or In the Right of the Corporation. Each Director and Officer shall be indemnified and held harmless by the Corporation against any and all Expenses that are incurred by such Director or Officer or on such Director’s or Officer’s behalf in connection with any Proceeding or any claim, issue or matter therein by or in the right of the Corporation, which such Director or Officer is, or is threatened to be made, a party to or participant in by reason of such Director’s or Officer’s Corporate Status, if such Director or Officer acted in good faith and in a manner such Director or Officer reasonably believed to be in or not opposed to the best interests of the Corporation; provided, however, that no indemnification shall be

made under this Section 5(b)(ii) in respect of any claim, issue or matter as to which such Director or Officer shall have been finally adjudged by a court of competent jurisdiction to be liable to the Corporation, unless, and only to the extent that, the Court of Chancery or another court in which such Proceeding was brought shall determine upon application that, despite adjudication of liability, but in view of all the circumstances of the case, such Director or Officer is fairly and reasonably entitled to indemnification for such Expenses that such court deems proper.

(iii) Survival of Rights. The rights of indemnification provided by this Section 5(b) shall continue as to a Director or Officer after he or she has ceased to be a Director or Officer and shall inure to the benefit of his or her heirs, executors, administrators and personal representatives.

(iv) Actions by Directors or Officers. Notwithstanding the foregoing, the Corporation shall indemnify any Director or Officer seeking indemnification in connection with a Proceeding initiated by such Director or Officer only if such Proceeding (including any parts of such Proceeding not initiated by such Director or Officer) was authorized in advance by the Board of Directors of the Corporation, unless such Proceeding was brought to enforce such Officer's or Director's rights to indemnification or, in the case of Directors, advancement of Expenses under these By-laws in accordance with the provisions set forth herein.

(c) Indemnification of Non-Officer Employees. Subject to the operation of Section 5(d) of these By-laws, each Non-Officer Employee may, in the discretion of the Board of Directors of the Corporation, be indemnified by the Corporation to the fullest extent authorized by the DGCL, as the same exists or may hereafter be amended, against any or all Expenses and Liabilities that are incurred by such Non-Officer Employee or on such Non-Officer Employee's behalf in connection with any threatened, pending or completed Proceeding, or any claim, issue or matter therein, which such Non-Officer Employee is, or is threatened to be made, a party to or participant in by reason of such Non-Officer Employee's Corporate Status, if such Non-Officer Employee acted in good faith and in a manner such Non-Officer Employee reasonably believed to be in or not opposed to the best interests of the Corporation and, with respect to any criminal proceeding, had no reasonable cause to believe his or her conduct was unlawful. The rights of indemnification provided by this Section 5(c) shall exist as to a Non-Officer Employee after he or she has ceased to be a Non-Officer Employee and shall inure to the benefit of his or her heirs, personal representatives, executors and administrators. Notwithstanding the foregoing, the Corporation may indemnify any Non-Officer Employee seeking indemnification in connection with a Proceeding initiated by such Non-Officer Employee only if such Proceeding was authorized in advance by the Board of Directors of the Corporation.

(d) Determination. Unless ordered by a court, no indemnification shall be provided pursuant to this Section 5 to a Director, to an Officer or to a Non-Officer Employee unless a determination shall have been made that such person acted in good faith and in a manner such person reasonably believed to be in or not opposed to the best interests of the Corporation and, with respect to any criminal Proceeding, such person had no reasonable cause to believe his or her conduct was unlawful. Such determination shall be made by (i) a majority vote of the Disinterested Directors, even though less than a quorum of the Board of Directors, (ii) a

committee comprised of Disinterested Directors, such committee having been designated by a majority vote of the Disinterested Directors (even though less than a quorum), (iii) if there are no such Disinterested Directors, or if a majority of Disinterested Directors so directs, by independent legal counsel in a written opinion, or (iv) by the stockholders of the Corporation.

(e) Advancement of Expenses to Directors Prior to Final Disposition.

(i) The Corporation shall advance all Expenses incurred by or on behalf of any Director in connection with any Proceeding in which such Director is involved by reason of such Director's Corporate Status within thirty (30) days after the receipt by the Corporation of a written statement from such Director requesting such advance or advances from time to time, whether prior to or after final disposition of such Proceeding. Such statement or statements shall reasonably evidence the Expenses incurred by such Director and shall be preceded or accompanied by an undertaking by or on behalf of such Director to repay any Expenses so advanced if it shall ultimately be determined that such Director is not entitled to be indemnified against such Expenses. Notwithstanding the foregoing, the Corporation shall advance all Expenses incurred by or on behalf of any Director seeking advancement of expenses hereunder in connection with a Proceeding initiated by such Director only if such Proceeding (including any parts of such Proceeding not initiated by such Director) was (A) authorized by the Board of Directors of the Corporation, or (B) brought to enforce such Director's rights to indemnification or advancement of Expenses under these By-laws.

(ii) If a claim for advancement of Expenses hereunder by a Director is not paid in full by the Corporation within thirty (30) days after receipt by the Corporation of documentation of Expenses and the required undertaking, such Director may at any time thereafter bring suit against the Corporation to recover the unpaid amount of the claim and if successful in whole or in part, such Director shall also be entitled to be paid the expenses of prosecuting such claim. The failure of the Corporation (including its Board of Directors or any committee thereof, independent legal counsel, or stockholders) to make a determination concerning the permissibility of such advancement of Expenses under this Section 5 shall not be a defense to an action brought by a Director for recovery of the unpaid amount of an advancement claim and shall not create a presumption that such advancement is not permissible. The burden of proving that a Director is not entitled to an advancement of expenses shall be on the Corporation.

(iii) In any suit brought by the Corporation to recover an advancement of expenses pursuant to the terms of an undertaking, the Corporation shall be entitled to recover such expenses upon a final adjudication that the Director has not met any applicable standard for indemnification set forth in the DGCL.

(f) Advancement of Expenses to Officers and Non-Officer Employees Prior to Final Disposition.

(i) The Corporation may, at the discretion of the Board of Directors of the Corporation, advance any or all Expenses incurred by or on behalf of any Officer or any Non-Officer Employee in connection with any Proceeding in which such person is involved by reason of his or her Corporate Status as an Officer or Non-Officer Employee upon the receipt by the Corporation of a statement or statements from such Officer or Non-Officer Employee requesting such advance or advances from time to time, whether prior to or after final disposition of such Proceeding. Such statement or statements shall reasonably evidence the Expenses incurred by such Officer or Non-Officer Employee and shall be preceded or accompanied by an undertaking by or on behalf of such person to repay any Expenses so advanced if it shall ultimately be determined that such Officer or Non-Officer Employee is not entitled to be indemnified against such Expenses.

(ii) In any suit brought by the Corporation to recover an advancement of expenses pursuant to the terms of an undertaking, the Corporation shall be entitled to recover such expenses upon a final adjudication that the Officer or Non-Officer Employee has not met any applicable standard for indemnification set forth in the DGCL.

(g) Contractual Nature of Rights.

(i) The provisions of this Section 5 shall be deemed to be a contract between the Corporation and each Director and Officer entitled to the benefits hereof at any time while this Section 5 is in effect, in consideration of such person's past or current and any future performance of services for the Corporation. Neither amendment, repeal or modification of any provision of this Section 5 nor the adoption of any provision of the Certificate of Incorporation inconsistent with this Section 5 shall eliminate or reduce any right conferred by this Section 5 in respect of any act or omission occurring, or any cause of action or claim that accrues or arises or any state of facts existing, at the time of or before such amendment, repeal, modification or adoption of an inconsistent provision (even in the case of a proceeding based on such a state of facts that is commenced after such time), and all rights to indemnification and advancement of Expenses granted herein or arising out of any act or omission shall vest at the time of the act or omission in question, regardless of when or if any proceeding with respect to such act or omission is commenced. The rights to indemnification and to advancement of expenses provided by, or granted pursuant to, this Section 5 shall continue notwithstanding that the person has ceased to be a director or officer of the Corporation and shall inure to the benefit of the estate, heirs, executors, administrators, legatees and distributees of such person.

(ii) If a claim for indemnification hereunder by a Director or Officer is not paid in full by the Corporation within sixty (60) days after receipt by the Corporation of a written claim for indemnification, such Director or Officer may at any time thereafter bring suit against the Corporation to recover the unpaid amount of the claim, and if successful in whole or in part, such Director or Officer shall also be entitled to be paid the expenses of prosecuting such claim. The failure of the Corporation (including its Board of Directors or any committee thereof, independent legal counsel, or stockholders) to make a determination concerning the permissibility of such indemnification under this Section 5 shall not be a defense to an action brought by a Director or Officer for recovery of the unpaid amount of an indemnification claim and shall not create a presumption that such indemnification is not permissible. The burden of proving that a Director or Officer is not entitled to indemnification shall be on the Corporation.

(iii) In any suit brought by a Director or Officer to enforce a right to indemnification hereunder, it shall be a defense that such Director or Officer has not met any applicable standard for indemnification set forth in the DGCL.

(h) Non-Exclusivity of Rights. The rights to indemnification and advancement of Expenses set forth in this Section 5 shall not be exclusive of any other right which any Director, Officer, or Non-Officer Employee may have or hereafter acquire under any statute, provision of the Certificate or these By-laws, agreement, vote of stockholders or Disinterested Directors or otherwise.

(i) Insurance. The Corporation may maintain insurance, at its expense, to protect itself and any Director, Officer or Non-Officer Employee against any liability of any character asserted against or incurred by the Corporation or any such Director, Officer or Non-Officer Employee, or arising out of any such person's Corporate Status, whether or not the Corporation would have the power to indemnify such person against such liability under the DGCL or the provisions of this Section 5.

(j) Other Indemnification. The Corporation's obligation, if any, to indemnify or provide advancement of Expenses to any person under this Section 5 as a result of such person serving, at the request of the Corporation, as a director, partner, trustee, officer, employee or agent of another corporation, partnership, joint venture, trust, employee benefit plan or other enterprise shall be reduced by any amount such person may collect as indemnification or advancement of Expenses from such other corporation, partnership, joint venture, trust, employee benefit plan or enterprise (the "Primary Indemnitor"). Any indemnification or advancement of Expenses under this Section 5 owed by the Corporation as a result of a person serving, at the request of the Corporation, as a director, partner, trustee, officer, employee or agent of another corporation, partnership, joint venture, trust, employee benefit plan or other enterprise shall only be in excess of, and shall be secondary to, the indemnification or advancement of Expenses available from the applicable Primary Indemnitor(s) and any applicable insurance policies.

6. Miscellaneous Provisions

(a) Fiscal Year. Except as otherwise determined by the Board of Directors, the fiscal year of the Corporation shall end on December 31 of each year.

(b) Seal. The Board of Directors shall have power to adopt and alter the seal of the Corporation.

(c) Execution of Instruments. Subject to any limitations which may be set forth in a resolution of the Board of Directors, all deeds, leases, transfers, contracts, bonds, notes and other obligations to be entered into by the Corporation in the ordinary course of its business without director action may be executed on behalf of the Corporation by, a President, or by any other officer, employee or agent of the Corporation as the Board of Directors may authorize.

(d) Voting of Securities. Unless the Board of Directors otherwise provides, a President, any Vice President or the Treasurer may waive notice of and act on behalf of this Corporation, or appoint another person or persons to act as proxy or attorney in fact for this Corporation with or without discretionary power and/or power of substitution, at any meeting of stockholders or shareholders of any other corporation or organization, any of whose securities are held by this Corporation.

(e) Resident Agent. The Board of Directors may appoint a resident agent upon whom legal process may be served in any action or proceeding against the Corporation.

(f) Corporate Records. The original or attested copies of the Certificate of Incorporation, By-laws and records of all meetings of the incorporators, stockholders and the Board of Directors and the stock and transfer records, which shall contain the names of all stockholders, their record addresses and the amount of stock held by each, shall be kept at the principal office of the Corporation, at the office of its counsel, or at an office of its transfer agent.

(g) Certificate of Incorporation. All references in these By-laws to the Certificate of Incorporation shall be deemed to refer to the Certificate of Incorporation of the Corporation, as amended and in effect from time to time.

(h) Amendments. These By-laws may be altered, amended or repealed, and new By-laws may be adopted, by the stockholders or by the Board of Directors; provided, that (a) the Board of Directors may not alter, amend or repeal any provision of these By-laws which by law, by the Certificate of Incorporation or by these By-laws requires action by the stockholders and (b) any alteration, amendment or repeal of these By-laws by the Board of Directors and any new By-law adopted by the Board of Directors may be altered, amended or repealed by the stockholders.

(i) Waiver of Notice. Whenever notice is required to be given under any provision of these By-laws, a written waiver, signed by the person entitled to notice, or a waiver by electronic transmission by the person entitled to notice, whether before or after the time of the event for which notice is to be given, shall be deemed equivalent to notice. Attendance of a person at a meeting shall constitute a waiver of notice of such meeting, except when the person attends a meeting for the express purpose of objecting at the beginning of the meeting to the transaction of any business because the meeting is not lawfully called or convened. Neither the business to be transacted at, nor the purpose of, any meeting needs to be specified in any written waiver or any waiver by electronic transmission.

Adopted November 17, 2015

Exhibit 4.2

SECOND AMENDED AND RESTATED

INVESTORS' RIGHTS AGREEMENT

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SECOND AMENDED AND RESTATED
INVESTORS' RIGHTS AGREEMENT

THIS SECOND AMENDED AND RESTATED INVESTORS' RIGHTS AGREEMENT (this "**Agreement**"), is made as of the 19th day of January, 2018, by and among AVROBIO, Inc., a Delaware corporation (the "**Company**"), and each of the investors listed on Schedule A hereto (together with any subsequent investors, or transferees, who become parties hereto as "Investors" in accordance with Subsection 6.1 or Subsection 6.9 below, the "**Investors**").

RECITALS

WHEREAS, the Company and certain of the Investors (the "**Prior Investors**") have previously entered into that certain Amended and Restated Investors' Rights Agreement dated as of July 21, 2016 (the "**Prior Agreement**");

WHEREAS, the Company and the Investors are parties to the Series B Preferred Stock Purchase Agreement of even date herewith (the "**Purchase Agreement**");

WHEREAS, the parties to the Prior Agreement desire to amend and restate the Prior Agreement and to accept the rights and covenants hereof in lieu of their rights and covenants under the Prior Agreement;

WHEREAS, the Company and the Prior Investors who have signed this Agreement constitute the requisite parties to amend and restate the Prior Agreement; and

WHEREAS, in order to induce the Company to enter into the Purchase Agreement and to induce the Investors to invest funds in the Company pursuant to the Purchase Agreement, the Investors and the Company hereby agree that this Agreement shall amend and restate the Prior Agreement and govern the rights of the Investors to cause the Company to register shares of Common Stock issuable to the Investors, to receive certain information from the Company, and to participate in future equity offerings by the Company, and shall govern certain other matters as set forth in this Agreement;

NOW, THEREFORE, the parties hereby agree as follows:

1. Definitions. For purposes of this Agreement:

1.1 "**Affiliate**" means, with respect to any specified Person, any other Person who, directly or indirectly, controls, is controlled by, or is under common control with such Person, including without limitation any general partner, managing member, limited partner, member, employee, officer or director of such Person or any venture capital fund now or hereafter existing that is controlled by one or more general partners or managing members of, or shares the same management company with, such Person. For purposes of this definition, the term "control" when used with respect to any Person means the power to direct the management or policies of such Person, directly or indirectly, whether through ownership of voting securities, by contract or otherwise, and the terms "controlling" and "controlled" shall have meanings correlative to the foregoing.

1.2 “**Aisling**” means Aisling Capital IV, L.P.

1.3 “**Atlas**” means Atlas Venture Fund X, L.P.

1.4 “**Brace**” means Brace Pharmaceuticals LLC.

1.5 “**Clarus**” means Clarus Lifesciences III, LLP.

1.6 “**Common Stock**” means shares of the Company’s common stock, par value $0.0001 per share.

1.7 “**Competitor**” means a Person engaged, directly or indirectly (including through any partnership, limited liability company, corporation, joint venture or similar arrangement (whether now existing or formed hereafter)), in the research, development or commercialization of human biopharmaceutical products involving lentiviral-based gene therapy for rare disease or neoplastic cells transduced to express molecules to treat cancer, but shall not include any financial investment firm or collective investment vehicle that, together with its Affiliates, holds less than twenty percent (20)% of the outstanding equity of any Competitor and does not, nor do any of its Affiliates, have a right to designate any members of the Board of Directors of any Competitor. Notwithstanding anything herein, the Company acknowledges that none of Surveyor, Atlas, SV or Clarus shall be deemed to be a Competitor solely by virtue of its (or any of its Affiliates’) status as a venture capital investor or equity holdings in a Competitor.

1.8 “**Cormorant**” means, collectively, Cormorant Private Healthcare Fund I, LP, Cormorant Global Healthcare Master Fund, LP, and CRMA SPV, L.P.

1.9 “**Damages**” means any loss, damage, claim or liability (joint or several) to which a party hereto may become subject under the Securities Act, the Exchange Act, or other federal or state law, insofar as such loss, damage, claim or liability (or any action in respect thereof) arises out of or is based upon: (i) any untrue statement or alleged untrue statement of a material fact contained in any registration statement of the Company, including any preliminary prospectus or final prospectus contained therein or any amendments or supplements thereto; (ii) an omission or alleged omission to state therein a material fact required to be stated therein, or necessary to make the statements therein not misleading; or (iii) any violation or alleged violation by the indemnifying party (or any of its agents or Affiliates) of the Securities Act, the Exchange Act, any state securities law, or any rule or regulation promulgated under the Securities Act, the Exchange Act, or any state securities law.

1.10 “**Derivative Securities**” means any securities or rights convertible into, or exercisable or exchangeable for (in each case, directly or indirectly)**,** Common Stock, including options and warrants.

1.11 “**Exchange Act**” means the Securities Exchange Act of 1934, as amended, and the rules and regulations promulgated thereunder.

1.12 "**Excluded Registration**" means (i) a registration relating to the sale of securities to employees of the Company or a subsidiary pursuant to a stock option, stock purchase, or similar plan; (ii) a registration relating to an SEC Rule 145 transaction; (iii) a registration on any form that does not include substantially the same information as would be required to be included in a registration statement covering the sale of the Registrable Securities; or (iv) a registration in which the only Common Stock being registered is Common Stock issuable upon conversion of debt securities that are also being registered.

1.13 "**Eventide**" means Eventide Healthcare & Life Sciences Fund.

1.14 "**FOIA Party**" means a Person that, in the reasonable determination of the Board of Directors, may be subject to, and thereby required to disclose non-public information furnished by or relating to the Company under, the Freedom of Information Act, 5 U.S.C. 552 ("**FOIA**"), any state public records access law, any state or other jurisdiction's laws similar in intent or effect to FOIA, or any other similar statutory or regulatory requirement.

1.15 "**Form S-1**" means such form under the Securities Act as in effect on the date hereof or any successor registration form under the Securities Act subsequently adopted by the SEC.

1.16 "**Form S-3**" means such form under the Securities Act as in effect on the date hereof or any registration form under the Securities Act subsequently adopted by the SEC that permits incorporation of substantial information by reference to other documents filed by the Company with the SEC.

1.17 "**GAAP**" means generally accepted accounting principles in the United States.

1.18 "**Holder**" means any holder of Registrable Securities who is a party to this Agreement.

1.19 "**Immediate Family Member**" means a child, stepchild, grandchild, parent, stepparent, grandparent, spouse, sibling, mother-in-law, father-in-law, son-in-law, daughter-in-law, brother-in-law, or sister-in-law, including, adoptive relationships, of a natural person referred to herein.

1.20 "**Initiating Holders**" means, collectively, Holders who properly initiate a registration request under this Agreement.

1.21 "**IPO**" means the Company's first underwritten public offering of its Common Stock under the Securities Act.

1.22 "**Key Employee**" means any executive-level employee (including, division director and vice president-level positions) as well as any employee who, either alone or in concert with others, develops, invents, programs, or designs any Company Intellectual Property (as defined in the Purchase Agreement).

1.23 "**Leerink**" means, collectively, Leerink Holdings LLC, and Leerink Swann Co-Investment Fund, LLC.

1.24 "**Major Investor**" means any Investor that, individually or together with such Investor's Affiliates, holds at least 750,000 shares of Registrable Securities (as adjusted for any stock split, stock dividend, combination, or other recapitalization or reclassification effected after the date hereof).

1.25 "**Morningside**" means Morningside Venture Investments Limited.

1.26 "**New Securities**" means, collectively, equity securities of the Company, whether or not currently authorized, as well as rights, options, or warrants to purchase such equity securities, or securities of any type whatsoever that are, or may become, convertible or exchangeable into or exercisable for such equity securities.

1.27 "**Person**" means any individual, corporation, partnership, trust, limited liability company, association or other entity.

1.28 "**Preferred Directors**" means directors of the Company that the holders of record of the Preferred Stock are entitled to elect pursuant to the Company's Certificate of Incorporation.

1.29 "**Preferred Majority**" shall mean the Requisite Preferred Holders (as defined in the Company's Certificate of Incorporation); provided, however that subsequent to the consummation of the IPO, Preferred Majority shall mean the holders of a majority of the shares of Registrable Shares issued upon conversion of the Series Seed Preferred Stock, Series A Preferred Stock and the Series B Preferred Stock.

1.30 "**Preferred Stock**" means, collectively, the Series B Preferred Stock, Series A Preferred Stock and the Series Seed Preferred Stock.

1.31 "**Registrable Securities**" means (i) the Common Stock issuable or issued upon conversion of the Preferred Stock; (ii) any Common Stock, or any Common Stock issued or issuable (directly or indirectly) upon conversion and/or exercise of any other securities of the Company**,** acquired by the Investors after the date hereof; and (iii) any Common Stock issued as (or issuable upon the conversion or exercise of any warrant, right, or other security that is issued as) a dividend or other distribution with respect to, or in exchange for or in replacement of, the shares referenced in clauses (i) and (ii) above; excluding in all cases, however, any Registrable Securities sold by a Person in a transaction in which the applicable rights under this Agreement are not assigned pursuant to Subsection 6.1, and excluding for purposes of Section 2 any shares for which registration rights have terminated pursuant to Subsection 2.13 of this Agreement.

1.32 "**Registrable Securities then outstanding**" means the number of shares determined by adding the number of shares of outstanding Common Stock that are Registrable Securities and the number of shares of Common Stock issuable (directly or indirectly) pursuant to then exercisable and/or convertible securities that are Registrable Securities.

1.33 "**Restricted Securities**" means the securities of the Company required to be notated with the legend set forth in Subsection 2.12(b) hereof.

1.34 "**SEC**" means the Securities and Exchange Commission.

1.35 "**SEC Rule 144**" means Rule 144 promulgated by the SEC under the Securities Act.

1.36 "**SEC Rule 145**" means Rule 145 promulgated by the SEC under the Securities Act.

1.37 "**Securities Act**" means the Securities Act of 1933, as amended, and the rules and regulations promulgated thereunder.

1.38 "**Selling Expenses**" means all underwriting discounts, selling commissions, and stock transfer taxes applicable to the sale of Registrable Securities, and fees and disbursements of counsel for any Holder, except for the fees and disbursements of the Selling Holder Counsel borne and paid by the Company as provided in Subsection 2.6.

1.39 "**Series A Preferred Stock**" means shares of the Company's Series A Preferred Stock, par value $0.0001 per share.

1.40 "**Series B Preferred Stock**" means shares of the Company's Series B Preferred Stock, par value $0.0001 per share.

1.41 **"Series Seed Preferred Stock**" means shares of the Company's Series Seed Preferred Stock, par value $0.0001 per share.

1.42 "**Surveyor**" means Citadel Multi-Strategy Equities Master Fund Ltd.

1.43 "**SV**" means SV Life Sciences Fund VI, L.P and SV Life Sciences Fund VI Strategic Partners, L.P.

2. Registration Rights. The Company covenants and agrees as follows:

2.1 Demand Registration.

(a) Form S-1 Demand. If at any time after the earlier of (i) five (5) years after the date of this Agreement or (ii) one hundred eighty (180) days after the effective date of the registration statement for the IPO, the Company receives a request from the Preferred Majority that the Company file a Form S-1 registration statement with respect to at least fifty percent (50%) of the Registrable Securities then outstanding having an anticipated aggregate offering price, net of Selling Expenses, of not less than $10 million, then the Company shall (x) within ten (10) days after the date such request is given, give notice thereof (the "**Demand Notice**") to all Holders other than the Initiating Holders; and (y) as soon as practicable, and in any event within sixty (60) days after the date such request is given by the Initiating Holders, file a Form S-1 registration statement under the Securities Act covering all Registrable Securities

that the Initiating Holders requested to be registered and any additional Registrable Securities requested to be included in such registration by any other Holders, as specified by notice given by each such Holder to the Company within twenty (20) days of the date the Demand Notice is given, and in each case, subject to the limitations of Subsections 2.1(c) and 2.3.

(b) Form S-3 Demand. If at any time when it is eligible to use a Form S-3 registration statement, the Company receives a request from Holders of at least twenty-five percent (25%) of the Registrable Securities then outstanding that the Company file a Form S-3 registration statement with respect to outstanding Registrable Securities of such Holders having an anticipated aggregate offering price, net of Selling Expenses, of at least $3 million, then the Company shall (i) within ten (10) days after the date such request is given, give a Demand Notice to all Holders other than the Initiating Holders; and (ii) as soon as practicable, and in any event within forty-five (45) days after the date such request is given by the Initiating Holders, file a Form S-3 registration statement under the Securities Act covering all Registrable Securities requested to be included in such registration by any other Holders, as specified by notice given by each such Holder to the Company within twenty (20) days of the date the Demand Notice is given, and in each case, subject to the limitations of Subsections 2.1(c) and 2.3.

(c) Notwithstanding the foregoing obligations, if the Company furnishes to Holders requesting a registration pursuant to this Subsection 2.1 a certificate signed by the Company's chief executive officer stating that in the good faith judgment of the Company's Board of Directors it would be materially detrimental to the Company and its stockholders for such registration statement to either become effective or remain effective for as long as such registration statement otherwise would be required to remain effective, because such action would (i) materially interfere with a significant acquisition, corporate reorganization, or other similar transaction involving the Company; (ii) require premature disclosure of material information that the Company has a bona fide business purpose for preserving as confidential; or (iii) render the Company unable to comply with requirements under the Securities Act or Exchange Act, then the Company shall have the right to defer taking action with respect to such filing, and any time periods with respect to filing or effectiveness thereof shall be tolled correspondingly, for a period of not more than ninety (90) days after the request of the Initiating Holders is given; provided, however, that the Company may not invoke this right more than once in any twelve (12) month period; and provided further that the Company shall not register any securities for its own account or that of any other stockholder during such ninety (90) day period other than an Excluded Registration.

(d) The Company shall not be obligated to effect, or to take any action to effect, any registration pursuant to Subsection 2.1(a)(i) during the period that is sixty (60) days before the Company's good faith estimate of the date of filing of, and ending on a date that is one hundred eighty (180) days after the effective date of, a Company-initiated registration, provided that the Company is actively employing in good faith commercially reasonable efforts to cause such registration statement to become effective; (ii) after the Company has effected two registrations pursuant to Subsection 2.1(a); or (iii) if the Initiating Holders propose to dispose of shares of Registrable Securities that may be immediately registered on Form S-3 pursuant to a request made pursuant to Subsection 2.1(b). The Company shall not be obligated to effect, or to take any action to effect, any registration pursuant to Subsection 2.1(b)(i) during the period

that is thirty (30) days before the Company's good faith estimate of the date of filing of, and ending on a date that is ninety (90) days after the effective date of, a Company-initiated registration, provided that the Company is actively employing in good faith commercially reasonable efforts to cause such registration statement to become effective; or (ii) if the Company has effected two registrations pursuant to Subsection 2.1(b) within the twelve (12) month period immediately preceding the date of such request. A registration shall not be counted as "effected" for purposes of this Subsection 2.1(d) until such time as the applicable registration statement has been declared effective by the SEC, unless the Initiating Holders withdraw their request for such registration, elect not to pay the registration expenses therefor, and forfeit their right to one demand registration statement pursuant to Subsection 2.6, in which case such withdrawn registration statement shall be counted as "effected" for purposes of this Subsection 2.1(d).

2.2 Company Registration. If the Company proposes to register (including, for this purpose, a registration effected by the Company for stockholders other than the Holders) any of its securities under the Securities Act in connection with the public offering of such securities solely for cash (other than in an Excluded Registration), the Company shall, at such time, promptly give each Holder notice of such registration. Upon the request of each Holder given within twenty (20) days after such notice is given by the Company, the Company shall, subject to the provisions of Subsection 2.3, cause to be registered all of the Registrable Securities that each such Holder has requested to be included in such registration. The Company shall have the right to terminate or withdraw any registration initiated by it under this Subsection 2.2 before the effective date of such registration, whether or not any Holder has elected to include Registrable Securities in such registration. The expenses (other than Selling Expenses) of such withdrawn registration shall be borne by the Company in accordance with Subsection 2.6.

2.3 Underwriting Requirements.

(a) If, pursuant to Subsection 2.1, the Initiating Holders intend to distribute the Registrable Securities covered by their request by means of an underwriting, they shall so advise the Company as a part of their request made pursuant to Subsection 2.1, and the Company shall include such information in the Demand Notice. The underwriter(s) will be selected by the Company and shall be reasonably acceptable to a majority in interest of the Initiating Holders. In such event, the right of any Holder to include such Holder's Registrable Securities in such registration shall be conditioned upon such Holder's participation in such underwriting and the inclusion of such Holder's Registrable Securities in the underwriting to the extent provided herein. All Holders proposing to distribute their securities through such underwriting shall (together with the Company as provided in Subsection 2.4(e)) enter into an underwriting agreement in customary form with the underwriter(s) selected for such underwriting. Notwithstanding any other provision of this Subsection 2.3, if the managing underwriter(s) advise(s) the Initiating Holders in writing that marketing factors require a limitation on the number of shares to be underwritten, then the Initiating Holders shall so advise all Holders of Registrable Securities that otherwise would be underwritten pursuant hereto, and the number of Registrable Securities that may be included in the underwriting shall be allocated among such Holders of Registrable Securities, including the Initiating Holders, in proportion (as nearly as practicable) to the number of Registrable Securities owned by each Holder or in such

other proportion as shall mutually be agreed to by all such selling Holders; provided, however, that the number of Registrable Securities held by the Holders to be included in such underwriting shall not be reduced unless all other securities are first entirely excluded from the underwriting. To facilitate the allocation of shares in accordance with the above provisions, the Company or the underwriters may round the number of shares allocated to any Holder to the nearest one hundred (100) shares.

(b) In connection with any offering involving an underwriting of shares of the Company's capital stock pursuant to Subsection 2.2, the Company shall not be required to include any of the Holders' Registrable Securities in such underwriting unless the Holders accept the terms of the underwriting as agreed upon between the Company and its underwriters, and then only in such quantity as the underwriters in their sole discretion determine will not jeopardize the success of the offering by the Company. If the total number of securities, including Registrable Securities, requested by stockholders to be included in such offering exceeds the number of securities to be sold (other than by the Company) that the underwriters in their reasonable discretion determine is compatible with the success of the offering, then the Company shall be required to include in the offering only that number of such securities, including Registrable Securities, which the underwriters and the Company in their sole discretion determine will not jeopardize the success of the offering. If the underwriters determine that less than all of the Registrable Securities requested to be registered can be included in such offering, then the Registrable Securities that are included in such offering shall be allocated among the selling Holders in proportion (as nearly as practicable to) the number of Registrable Securities owned by each selling Holder or in such other proportions as shall mutually be agreed to by all such selling Holders. To facilitate the allocation of shares in accordance with the above provisions, the Company or the underwriters may round the number of shares allocated to any Holder to the nearest one hundred (100) shares. Notwithstanding the foregoing, in no event shall (i) the number of Registrable Securities included in the offering be reduced unless all other securities (other than securities to be sold by the Company) are first entirely excluded from the offering, or (ii) the number of Registrable Securities included in the offering be reduced below thirty percent (30%) of the total number of securities included in such offering, unless such offering is the IPO, in which case the selling Holders may be excluded further if the underwriters make the determination described above and no other stockholder's securities are included in such offering. For purposes of the provision in this Subsection 2.3(b) concerning apportionment, for any selling Holder that is a partnership, limited liability company, or corporation, the partners, members, retired partners, retired members, stockholders, and Affiliates of such Holder, or the estates and Immediate Family Members of any such partners, retired partners, members, and retired members and any trusts for the benefit of any of the foregoing Persons, shall be deemed to be a single "selling Holder," and any pro rata reduction with respect to such "selling Holder" shall be based upon the aggregate number of Registrable Securities owned by all Persons included in such "selling Holder," as defined in this sentence.

(c) For purposes of Subsection 2.1, a registration shall not be counted as "effected" if, as a result of an exercise of the underwriter's cutback provisions in Subsection 2.3(a), fewer than fifty percent (50%) of the total number of Registrable Securities that Holders have requested to be included in such registration statement are actually included.

2.4 Obligations of the Company. Whenever required under this Section 2 to effect the registration of any Registrable Securities, the Company shall, as expeditiously as reasonably possible:

(a) prepare and file with the SEC a registration statement with respect to such Registrable Securities and use its commercially reasonable efforts to cause such registration statement to become effective and, upon the request of the Holders of a majority of the Registrable Securities registered thereunder, keep such registration statement effective for a period of up to one hundred twenty (120) days or, if earlier, until the distribution contemplated in the registration statement has been completed; provided, however, that (i) such one hundred twenty (120) day period shall be extended for a period of time equal to the period the Holder refrains, at the request of an underwriter of Common Stock (or other securities) of the Company, from selling any securities included in such registration, and (ii) in the case of any registration of Registrable Securities on Form S-3 that are intended to be offered on a continuous or delayed basis, subject to compliance with applicable SEC rules, such one hundred twenty (120) day period shall be extended for up to sixty (60) days, if necessary, to keep the registration statement effective until all such Registrable Securities are sold;

(b) prepare and file with the SEC such amendments and supplements to such registration statement, and the prospectus used in connection with such registration statement, as may be necessary to comply with the Securities Act in order to enable the disposition of all securities covered by such registration statement;

(c) furnish to the selling Holders such numbers of copies of a prospectus, including a preliminary prospectus, as required by the Securities Act, and such other documents as the Holders may reasonably request in order to facilitate their disposition of their Registrable Securities;

(d) use its commercially reasonable efforts to register and qualify the securities covered by such registration statement under such other securities or blue-sky laws of such jurisdictions as shall be reasonably requested by the selling Holders; provided that the Company shall not be required to qualify to do business or to file a general consent to service of process in any such states or jurisdictions, unless the Company is already subject to service in such jurisdiction and except as may be required by the Securities Act;

(e) in the event of any underwritten public offering, enter into and perform its obligations under an underwriting agreement, in usual and customary form, with the underwriter(s) of such offering;

(f) use its commercially reasonable efforts to cause all such Registrable Securities covered by such registration statement to be listed on a national securities exchange or trading system and each securities exchange and trading system (if any) on which similar securities issued by the Company are then listed;

(g) provide a transfer agent and registrar for all Registrable Securities registered pursuant to this Agreement and provide a CUSIP number for all such Registrable Securities, in each case not later than the effective date of such registration;

(h) promptly make available for inspection by the selling Holders, any managing underwriter(s) participating in any disposition pursuant to such registration statement, and any attorney or accountant or other agent retained by any such underwriter or selected by the selling Holders, all financial and other records, pertinent corporate documents, and properties of the Company, and cause the Company's officers, directors, employees, and independent accountants to supply all information reasonably requested by any such seller, underwriter, attorney, accountant, or agent, in each case, as necessary or advisable to verify the accuracy of the information in such registration statement and to conduct appropriate due diligence in connection therewith;

(i) notify each selling Holder, promptly after the Company receives notice thereof, of the time when such registration statement has been declared effective or a supplement to any prospectus forming a part of such registration statement has been filed; and

(j) after such registration statement becomes effective, notify each selling Holder of any request by the SEC that the Company amend or supplement such registration statement or prospectus.

In addition, the Company shall ensure that, at all times after any registration statement covering a public offering of securities of the Company under the Securities Act shall have become effective, its insider trading policy shall provide that the Company's directors may implement a trading program under Rule 10b5-1 of the Exchange Act.

2.5 Furnish Information. It shall be a condition precedent to the obligations of the Company to take any action pursuant to this Section 2 with respect to the Registrable Securities of any selling Holder that such Holder shall furnish to the Company such information regarding itself, the Registrable Securities held by it, and the intended method of disposition of such securities as is reasonably required to effect the registration of such Holder's Registrable Securities.

2.6 Expenses of Registration. All expenses (other than Selling Expenses) incurred in connection with registrations, filings, or qualifications pursuant to Section 2, including all registration, filing, and qualification fees; printers' and accounting fees; fees and disbursements of counsel for the Company; and the reasonable fees and disbursements, not to exceed $40,000, of one counsel for the selling Holders ("**Selling Holder Counsel**"), shall be borne and paid by the Company; provided, however, that the Company shall not be required to pay for any expenses of any registration proceeding begun pursuant to Subsection 2.1 if the registration request is subsequently withdrawn at the request of the Holders of a majority of the Registrable Securities to be registered (in which case all selling Holders shall bear such expenses pro rata based upon the number of Registrable Securities that were to be included in the withdrawn registration), unless the Holders of a majority of the Registrable Securities agree to forfeit their right to one registration pursuant to Subsections 2.1(a) or 2.1(b), as the case may be; provided further that if, at the time of such withdrawal, the Holders shall have learned of a material adverse change in the condition, business, or prospects of the Company from that known to the Holders at the time of their request and have withdrawn the request with reasonable promptness after learning of such information then the Holders shall not be required to pay any of such expenses and shall not forfeit their right to one registration pursuant to Subsections 2.1(a) or 2.1(b). All Selling Expenses relating to Registrable Securities registered pursuant to this Section 2 shall be borne and paid by the Holders pro rata on the basis of the number of Registrable Securities registered on their behalf.

2.7 Delay of Registration. No Holder shall have any right to obtain or seek an injunction restraining or otherwise delaying any registration pursuant to this Agreement as the result of any controversy that might arise with respect to the interpretation or implementation of this Section 2.

2.8 Indemnification. If any Registrable Securities are included in a registration statement under this Section 2:

(a) To the extent permitted by law, the Company will indemnify and hold harmless each selling Holder, and the partners, members, officers, directors, and stockholders of each such Holder; legal counsel and accountants for each such Holder; any underwriter (as defined in the Securities Act) for each such Holder; and each Person, if any, who controls such Holder or underwriter within the meaning of the Securities Act or the Exchange Act, against any Damages, and the Company will pay to each such Holder, underwriter, controlling Person, or other aforementioned Person any legal or other expenses reasonably incurred thereby in connection with investigating or defending any claim or proceeding from which Damages may result, as such expenses are incurred; provided, however, that the indemnity agreement contained in this Subsection 2.8(a) shall not apply to amounts paid in settlement of any such claim or proceeding if such settlement is effected without the consent of the Company, which consent shall not be unreasonably withheld, nor shall the Company be liable for any Damages to the extent that they arise out of or are based upon actions or omissions made in reliance upon and in conformity with written information furnished by or on behalf of any such Holder, underwriter, controlling Person, or other aforementioned Person expressly for use in connection with such registration.

(b) To the extent permitted by law, each selling Holder, severally and not jointly, will indemnify and hold harmless the Company, and each of its directors, each of its officers who has signed the registration statement, each Person (if any), who controls the Company within the meaning of the Securities Act, legal counsel and accountants for the Company, any underwriter (as defined in the Securities Act), any other Holder selling securities in such registration statement, and any controlling Person of any such underwriter or other Holder, against any Damages, in each case only to the extent that such Damages arise out of or are based upon actions or omissions made in reliance upon and in conformity with written information furnished by or on behalf of such selling Holder expressly for use in connection with such registration; and each such selling Holder will pay to the Company and each other aforementioned Person any legal or other expenses reasonably incurred thereby in connection with investigating or defending any claim or proceeding from which Damages may result, as such expenses are incurred; provided, however, that the indemnity agreement contained in this Subsection 2.8(b) shall not apply to amounts paid in settlement of any such claim or proceeding if such settlement is effected without the consent of the Holder, which consent shall not be unreasonably withheld; and provided further that in no event shall the aggregate amounts payable by any Holder by way of indemnity or contribution under Subsections 2.8(b) and 2.8(d) exceed the proceeds from the offering received by such Holder (net of any Selling Expenses paid by such Holder), except in the case of fraud or willful misconduct by such Holder.

(c) Promptly after receipt by an indemnified party under this Subsection 2.8 of notice of the commencement of any action (including any governmental action) for which a party may be entitled to indemnification hereunder, such indemnified party will, if a claim in respect thereof is to be made against any indemnifying party under this Subsection 2.8, give the indemnifying party notice of the commencement thereof. The indemnifying party shall have the right to participate in such action and, to the extent the indemnifying party so desires, participate jointly with any other indemnifying party to which notice has been given, and to assume the defense thereof with counsel mutually satisfactory to the parties; provided, however, that an indemnified party (together with all other indemnified parties that may be represented without conflict by one counsel) shall have the right to retain one separate counsel, with the fees and expenses to be paid by the indemnifying party, if representation of such indemnified party by the counsel retained by the indemnifying party would be inappropriate due to actual or potential differing interests between such indemnified party and any other party represented by such counsel in such action. The failure to give notice to the indemnifying party within a reasonable time of the commencement of any such action shall relieve such indemnifying party of any liability to the indemnified party under this Subsection 2.8, to the extent that such failure materially prejudices the indemnifying party's ability to defend such action. The failure to give notice to the indemnifying party will not relieve it of any liability that it may have to any indemnified party otherwise than under this Subsection 2.8.

(d) To provide for just and equitable contribution to joint liability under the Securities Act in any case in which either: (i) any party otherwise entitled to indemnification hereunder makes a claim for indemnification pursuant to this Subsection 2.8 but it is judicially determined (by the entry of a final judgment or decree by a court of competent jurisdiction and the expiration of time to appeal or the denial of the last right of appeal) that such indemnification may not be enforced in such case, notwithstanding the fact that this Subsection 2.8 provides for indemnification in such case, or (ii) contribution under the Securities Act may be required on the part of any party hereto for which indemnification is provided under this Subsection 2.8, then, and in each such case, such parties will contribute to the aggregate losses, claims, damages, liabilities, or expenses to which they may be subject (after contribution from others) in such proportion as is appropriate to reflect the relative fault of each of the indemnifying party and the indemnified party in connection with the statements, omissions, or other actions that resulted in such loss, claim, damage, liability, or expense, as well as to reflect any other relevant equitable considerations. The relative fault of the indemnifying party and of the indemnified party shall be determined by reference to, among other things, whether the untrue or allegedly untrue statement of a material fact, or the omission or alleged omission of a material fact, relates to information supplied by the indemnifying party or by the indemnified party and the parties' relative intent, knowledge, access to information, and opportunity to correct or prevent such statement or omission; provided, however, that, in any such case (x) no Holder will be required to contribute any amount in excess of the public offering price of all such Registrable Securities offered and sold by such Holder pursuant to such registration statement, and (y) no Person guilty of fraudulent misrepresentation (within the meaning of Section 11(f) of the Securities Act) will be entitled to contribution from any Person who was not guilty of such

fraudulent misrepresentation; and provided further that in no event shall a Holder's liability pursuant to this Subsection 2.8(d), when combined with the amounts paid or payable by such Holder pursuant to Subsection 2.8(b), exceed the proceeds from the offering received by such Holder (net of any Selling Expenses paid by such Holder), except in the case of willful misconduct or fraud by such Holder.

(e) Notwithstanding the foregoing, to the extent that the provisions on indemnification and contribution in the underwriting agreement approved by the Preferred Majority entered into in connection with the underwritten public offering are in conflict with the foregoing provisions, the provisions in the underwriting agreement shall control.

(f) Unless otherwise superseded by an underwriting agreement entered into in connection with the underwritten public offering, the obligations of the Company and Holders under this Subsection 2.8 shall survive the completion of any offering of Registrable Securities in a registration under this Section 2, and otherwise shall survive the termination of this Agreement.

2.9 Reports Under Exchange Act. With a view to making available to the Holders the benefits of SEC Rule 144 and any other rule or regulation of the SEC that may at any time permit a Holder to sell securities of the Company to the public without registration or pursuant to a registration on Form S-3, the Company shall:

(a) make and keep available adequate current public information, as those terms are understood and defined in SEC Rule 144, at all times after the effective date of the registration statement filed by the Company for the IPO;

(b) use commercially reasonable efforts to file with the SEC in a timely manner all reports and other documents required of the Company under the Securities Act and the Exchange Act (at any time after the Company has become subject to such reporting requirements); and

(c) furnish to any Holder, so long as the Holder owns any Registrable Securities, forthwith upon request (i) to the extent accurate, a written statement by the Company that it has complied with the reporting requirements of SEC Rule 144 (at any time after ninety (90) days after the effective date of the registration statement filed by the Company for the IPO), the Securities Act, and the Exchange Act (at any time after the Company has become subject to such reporting requirements), or that it qualifies as a registrant whose securities may be resold pursuant to Form S-3 (at any time after the Company so qualifies); (ii) a copy of the most recent annual or quarterly report of the Company and such other reports and documents so filed by the Company; and (iii) such other information as may be reasonably requested in availing any Holder of any rule or regulation of the SEC that permits the selling of any such securities without registration (at any time after the Company has become subject to the reporting requirements under the Exchange Act) or pursuant to Form S-3 (at any time after the Company so qualifies to use such form).

2.10 Limitations on Subsequent Registration Rights. From and after the date of this Agreement, the Company shall not, without the prior written consent of the Preferred Majority, enter into any agreement with any holder or prospective holder of any securities of the Company that (i) would provide to such holder the right to include securities in any registration on other than on a subordinate basis after all Holders have had the opportunity to include in the registration and offering all shares of Registrable Securities that they wish to so include; or (ii) allow such holder or prospective holder to initiate a demand for registration of any securities held by such holder or prospective holder; provided that this limitation shall not apply to any additional Investor who becomes a party to this Agreement in accordance with Subsection 6.9.

2.11 "Market Stand-off" Agreement. Each Holder hereby agrees that it will not, without the prior written consent of the managing underwriter, during the period commencing on the effective date of the registration statement relating to the IPO and ending on the date specified by the managing underwriter (such period not to exceed one hundred eighty (180) days, or such other period as may be requested by the Company or an underwriter to accommodate regulatory restrictions on (1) the publication or other distribution of research reports, and (2) analyst recommendations and opinions, including, but not limited to, the restrictions contained in FINRA Rule 2711(f)(4) or NYSE Rule 472(f)(4), or any successor provisions or amendments thereto; provided, however, that in no event will the restricted period extend beyond two hundred sixteen (216) days after the effective date of such registration statement) or such longer period approved by the Preferred Majority; (i) lend; offer; pledge; sell; contract to sell; sell any option or contract to purchase; purchase any option or contract to sell; grant any option, right, or warrant to purchase; or otherwise transfer or dispose of, directly or indirectly, any shares of Common Stock or any securities convertible into or exercisable or exchangeable (directly or indirectly) for Common Stock held immediately before the effective date of the registration statement for such offering or (ii) enter into any swap or other arrangement that transfers to another, in whole or in part, any of the economic consequences of ownership of such securities, whether any such transaction described in clause (i) or (ii) above is to be settled by delivery of Common Stock or other securities, in cash, or otherwise. The foregoing provisions of this Subsection 2.11 shall not apply to the sale of any shares to an underwriter pursuant to an underwriting agreement, or the transfer of any shares to any trust for the direct or indirect benefit of the Holder or the immediate family of the Holder, provided that the trustee of the trust agrees to be bound in writing by the restrictions set forth herein, and provided further that any such transfer shall not involve a disposition for value, and shall be applicable to the Holders only if all officers, directors and stockholders individually (and with their Affiliates) owning more than one percent (1%) of the Company's outstanding Common Stock (after giving effect to conversion into Common Stock of all outstanding Preferred Stock) are subject to the same or substantially similar restrictions. The underwriters in connection with such registration are intended third-party beneficiaries of this Subsection 2.11 and shall have the right, power and authority to enforce the provisions hereof as though they were a party hereto. Each Holder further agrees to execute such agreements as may be reasonably requested by the underwriters in connection with such registration that are consistent with this Subsection 2.11 or that are necessary to give further effect thereto. Any discretionary waiver or termination of the restrictions of any or all of such agreements by the Company or the underwriters shall apply pro rata to all Holders subject to such agreements, based on the number of shares subject to such agreements.

2.12 Restrictions on Transfer.

(a) The Preferred Stock and the Registrable Securities shall not be sold, pledged, or otherwise transferred, and the Company shall not recognize and shall issue stop-transfer instructions to its transfer agent with respect to any such sale, pledge, or transfer, except upon the conditions specified in this Agreement, which conditions are intended to ensure compliance with the provisions of the Securities Act. A transferring Holder will cause any proposed purchaser, pledgee, or transferee of the Preferred Stock and the Registrable Securities held by such Holder to agree to take and hold such securities subject to the provisions and upon the conditions specified in this Agreement.

(b) Each certificate, instrument, or book entry representing (i) the Preferred Stock, (ii) the Registrable Securities, and (iii) any other securities issued in respect of the securities referenced in clauses (i) and (ii), upon any stock split, stock dividend, recapitalization, merger, consolidation, or similar event, shall (unless otherwise permitted by the provisions of Subsection 2.12) be notated with a legend substantially in the following form:

THE SECURITIES REPRESENTED HEREBY HAVE BEEN ACQUIRED FOR INVESTMENT AND HAVE NOT BEEN REGISTERED UNDER THE SECURITIES ACT OF 1933. SUCH SHARES MAY NOT BE SOLD, PLEDGED, OR TRANSFERRED IN THE ABSENCE OF SUCH REGISTRATION OR A VALID EXEMPTION FROM THE REGISTRATION AND PROSPECTUS DELIVERY REQUIREMENTS OF SAID ACT.

THE SECURITIES REPRESENTED HEREBY MAY BE TRANSFERRED ONLY IN ACCORDANCE WITH THE TERMS OF AN AGREEMENT BETWEEN THE COMPANY AND THE STOCKHOLDER, A COPY OF WHICH IS ON FILE WITH THE SECRETARY OF THE COMPANY.

The Holders consent to the Company making a notation in its records and giving instructions to any transfer agent of the Restricted Securities in order to implement the restrictions on transfer set forth in this Subsection 2.12.

(c) The holder of such Restricted Securities, by acceptance of ownership thereof, agrees to comply in all respects with the provisions of this Section 2. Before any proposed sale, pledge, or transfer of any Restricted Securities, unless there is in effect a registration statement under the Securities Act covering the proposed transaction, the Holder thereof shall give notice to the Company of such Holder's intention to effect such sale, pledge, or transfer. Each such notice shall describe the manner and circumstances of the proposed sale, pledge, or transfer in sufficient detail and, if reasonably requested by the Company, shall be accompanied at such Holder's expense by either (i) a written opinion of legal counsel who shall, and whose legal opinion shall, be reasonably satisfactory to the Company, addressed to the Company, to the effect that the proposed transaction may be effected without registration under the Securities Act; (ii) a "no action" letter from the SEC to the effect that the proposed sale, pledge, or transfer of such Restricted Securities without registration will not result in a recommendation by the staff of the SEC that action be taken with respect thereto; or (iii) any other evidence reasonably satisfactory to counsel to the Company to the effect that the proposed

sale, pledge, or transfer of the Restricted Securities may be effected without registration under the Securities Act, whereupon the Holder of such Restricted Securities shall be entitled to sell, pledge, or transfer such Restricted Securities in accordance with the terms of the notice given by the Holder to the Company. The Company will not require such a legal opinion or "no action" letter (x) in any transaction in compliance with SEC Rule 144; or (y) in any transaction in which such Holder distributes Restricted Securities to an Affiliate of such Holder for no consideration; provided that each transferee agrees in writing to be subject to the terms of this Subsection 2.12. Each certificate, instrument, or book entry representing the Restricted Securities transferred as above provided shall be notated with, except if such transfer is made pursuant to SEC Rule 144, the appropriate restrictive legend set forth in Subsection 2.12(b), except that such certificate instrument, or book entry shall not be notated with such restrictive legend if, in the opinion of counsel for such Holder and the Company, such legend is not required in order to establish compliance with any provisions of the Securities Act.

2.13 Termination of Registration Rights. The right of any Holder to request registration or inclusion of Registrable Securities in any registration pursuant to Subsections 2.1 or 2.2 shall terminate upon the earliest to occur of:

(a) the closing of a Deemed Liquidation Event, as such term is defined in the Company's Certificate of Incorporation;

(b) such time as Rule 144 or another similar exemption under the Securities Act is available for the sale of all of such Holder's shares without limitation during a three-month period without registration; and

(c) the fifth anniversary of the IPO.

3. Information and Inspection Rights.

3.1 Delivery of Financial Statements. The Company shall deliver to each Major Investor, provided that the Board of Directors (including a majority of the Preferred Directors) has not reasonably determined that such Major Investor is a Competitor:

(a) as soon as practicable, but in any event within one hundred twenty (120) days after the end of each fiscal year of the Company (i) a balance sheet as of the end of such year, (ii) statements of income and of cash flows for such year, and (iii) a statement of stockholders' equity as of the end of such year, with each being prepared in accordance with GAAP, audited and certified by independent public accountants selected by the Board of Directors (including a majority of the Preferred Directors);

(b) as soon as practicable, but in any event within thirty (30) days after the end of each of the first three (3) quarters of each fiscal year of the Company, unaudited statements of income and cash flows for such fiscal quarter, and an unaudited balance sheet as of the end of such fiscal quarter, all prepared in accordance with GAAP (except that such financial statements may (i) be subject to normal year-end audit adjustments; and (ii) not contain all notes thereto that may be required in accordance with GAAP);

(c) as soon as practicable, but in any event within thirty (30) days after the end of each of the first three (3) quarters of each fiscal year of the Company, a statement showing the number of shares of each class and series of capital stock and securities convertible into or exercisable for shares of capital stock outstanding at the end of the period, the Common Stock issuable upon conversion or exercise of any outstanding securities convertible or exercisable for Common Stock and the exchange ratio or exercise price applicable thereto, and the number of shares of issued stock options and stock options not yet issued but reserved for issuance, if any, all in sufficient detail as to permit the Major Investors to calculate their respective percentage equity ownership in the Company, and certified by the chief financial officer or chief executive officer of the Company as being true, complete, and correct;

(d) as soon as practicable, but in any event thirty (30) days before the end of each fiscal year, a budget and business plan for the next fiscal year (collectively, the "**Budget**"), approved by the Board of Directors and prepared on a monthly basis, including balance sheets, income statements, and statements of cash flow for such months and, promptly after prepared, any other budgets or revised budgets prepared by the Company; and

(e) such other information relating to the financial condition, business, prospects, or corporate affairs of the Company as any Major Investor may from time to time reasonably request; provided, however, that the Company shall not be obligated under this Subsection 3.1 to provide information (i) that the Company reasonably determines in good faith to be a trade secret or confidential information (unless covered by an enforceable confidentiality agreement, in a form reasonably acceptable to the Company, it being agreed that the confidentiality provisions of Section 3.4 hereof shall constitute such an enforceable confidentiality agreement with respect to any Major Investor party to this Agreement); or (ii) the disclosure of which would adversely affect the attorney-client privilege between the Company and its counsel.

If, for any period, the Company has any subsidiary whose accounts are consolidated with those of the Company, then in respect of such period the financial statements delivered pursuant to the foregoing sections shall be the consolidated and consolidating financial statements of the Company and all such consolidated subsidiaries.

Notwithstanding anything else in this Subsection 3.1 to the contrary, the Company may cease providing the information set forth in this Subsection 3.1 during the period starting with the date sixty (60) days before the Company's good-faith estimate of the date of submission or filing of a registration statement if it reasonably concludes it must do so to comply with the SEC rules applicable to such registration statement and related offering; provided that the Company's covenants under this Subsection 3.1 shall be reinstated at such time as the Company is no longer actively employing its commercially reasonable efforts to cause such registration statement to become effective.

3.2 Inspection. The Company shall permit each Major Investor (provided that the Board of Directors (including a majority of the Preferred Directors) has not reasonably determined that such Major Investor is a competitor of the Company), at such Major Investor's expense, to visit and inspect the Company's properties; examine its books of account and records; and discuss the Company's affairs, finances, and accounts with its officers, during

normal business hours of the Company as may be reasonably requested by the Major Investor; provided, however, that the Company shall not be obligated pursuant to this Subsection 3.2 to provide access to any information that it reasonably and in good faith considers to be a trade secret or confidential information (unless covered by an enforceable confidentiality agreement, in a form reasonably acceptable to the Company, it being agreed that the confidentiality provisions of Section 3.5 hereof shall constitute such an enforceable confidentiality agreement with respect to any Major Investor party to this Agreement) or the disclosure of which would adversely affect the attorney-client privilege between the Company and its counsel.

3.3 Termination of Information. The covenants set forth in Subsection 3.1 and Subsection 3.2 shall terminate and be of no further force or effect (i) immediately before the consummation of the IPO, or (ii) when the Company first becomes subject to the periodic reporting requirements of Section 12(g) or 15(d) of the Exchange Act, or (iii) upon a Deemed Liquidation Event, as such term is defined in the Company's Certificate of Incorporation.

3.4 Confidentiality. Each Investor agrees that such Investor will keep confidential and will not disclose, divulge, or use for any purpose (other than to monitor its investment in the Company) any confidential information obtained from the Company pursuant to the terms of this Agreement (including notice of the Company's intention to file a registration statement), unless such confidential information (a) is known or becomes known to the public in general (other than as a result of a breach of this Subsection 3.4 by such Investor), (b) is or has been independently developed or conceived by the Investor without use of the Company's confidential information, or (c) is or has been made known or disclosed to the Investor by a third party without a breach of any obligation of confidentiality such third party may have to the Company; provided, however, that an Investor may disclose confidential information (i) to its attorneys, accountants, consultants, and other professionals to the extent necessary or reasonably appropriate to obtain their services in connection with monitoring its investment in the Company or interpreting, enforcing, or defending a claim under an agreement to which such Investor and the Company are both party; (ii) to any prospective purchaser of any Registrable Securities from such Investor, if such prospective purchaser agrees to be bound by the provisions of this Subsection 3.4; (iii) to any existing or prospective Affiliate, limited partner, partner, member, stockholder, or wholly owned subsidiary of such Investor in the ordinary course of business, provided that such Investor informs such Person that such information is confidential and directs such Person to maintain the confidentiality of such information and such Person is bound by confidentiality obligations with respect to any confidential information of the Company to the same degree as such Investor hereunder; or (iv) as may otherwise be required by law, provided that the Investor promptly notifies the Company of such disclosure and takes reasonable steps to minimize the extent of any such required disclosure. This Subsection 3.4 shall supersede any confidentiality agreement executed by Aisling, Atlas, Brace, Clarus, Cormorant, Eventide, Leerink, Morningside, Surveyor or SV or any of their respective Affiliates and the Company. The Company acknowledges that each of Aisling, Atlas, Brace, Clarus, Cormorant, Eventide, Leerink, Morningside, Surveyor and SV and their respective representatives and Affiliates (the "Investor Parties") are or may be in the business of venture capital investing and, therefore, review business plans and other materials containing proprietary information of many enterprises, including enterprises which may have products or services which compete directly or indirectly with those of the Company and that have and may provide to the Investor Parties,

ideas, plans or other information which is similar to that embodied in the confidential information of the Company and nothing in this Agreement shall preclude or in any way restrict the Investor Parties from investing in any particular enterprise (including but not limited to participating fully as a member of the board of directors in such enterprise) whether or not such enterprise has products or services which compete with those of the Company. The Company acknowledges that some knowledge may be gained by the Investor Parties from reviewing the confidential information of the Company that cannot be separated from any of the Investors Parties' overall knowledge and, provided that the Investor Parties do not disclose any confidential information of the Company to a third party in violation of this Agreement, including any companies in which any of the Investor Parties invests, such general industry knowledge shall be permitted to be used in the ordinary course of business of each of the Investor Parties.

4. Rights to Future Stock Issuances.

4.1 Right of First Offer. Subject to the terms and conditions of this Subsection 4.1 and applicable securities laws, if the Company proposes to offer or sell any New Securities, the Company shall first offer such New Securities to each Major Investor. A Major Investor shall be entitled to apportion the right of first offer hereby granted to it in such proportions as it deems appropriate, among (i) itself (ii) its Affiliates and (iii) its beneficial interest holders, such as limited partners, members or any other Person having "beneficial ownership," as such term is defined in Rule 13d-3 promulgated under the Exchange Act, of such Investor ("**Investor Beneficial Owners**"); provided that each such Affiliate or Investor Beneficial Owner (x) is not a Competitor or FOIA Party, unless such party's purchase of New Securities is otherwise consented to by the Board of Directors, and (y) agrees to enter into this Agreement and each of the Voting Agreement and Right of First Refusal and Co-Sale Agreement of even date herewith among the Company, the Investors and the other parties named therein, as an "**Investor**" under each such agreement (provided that any Competitor or FOIA Party to whom the foregoing right of first offer is apportioned shall not be entitled to any rights as a Major Investor or Investor, as applicable, under Subsections 3.1, 3.2 and 4.1 hereof but the Investor that so apportioned the right of first offer shall retain all rights hereunder to which it would otherwise be entitled in accordance with the terms hereof).

(a) The Company shall give notice (the "**Offer Notice**") to each Major Investor, stating (i) its bona fide intention to offer such New Securities, (ii) the number of such New Securities to be offered, and (iii) the price and terms, if any, upon which it proposes to offer such New Securities.

(b) By notification to the Company within twenty (20) days after the Offer Notice is given, each Major Investor may elect to purchase or otherwise acquire, at the price and on the terms specified in the Offer Notice, up to that portion of such New Securities which equals the proportion that the Preferred Stock on an as converted to Common Stock basis then held by such Major Investor bears to the total Preferred Stock on an as converted to Common Stock basis held by all Major Investors. At the expiration of such twenty (20) day period, the Company shall promptly notify each Major Investor that elects to purchase or acquire all the shares available to it (each, a "**Fully Exercising Investor**") of any other Major Investor's failure to do likewise. During the ten (10) day period commencing after the Company has

given such notice, each Fully Exercising Investor may, by giving notice to the Company, elect to purchase or acquire, in addition to the number of shares specified above, up to that portion of the New Securities for which Major Investors were entitled to subscribe but that were not subscribed for by the Major Investors which is equal to the proportion that the Preferred Stock on an as-converted to Common Stock basis issued and held, then held, by such Fully Exercising Investor bears to the Preferred Stock on an as-converted to Common Stock basis issued and held, by all Fully Exercising Investors who wish to purchase such unsubscribed shares. The closing of any sale pursuant to this Subsection 4.1(b) shall occur within the later of ninety (90) days of the date that the Offer Notice is given and the date of initial sale of New Securities pursuant to Subsection 4.1(c).

(c) If all New Securities referred to in the Offer Notice are not elected to be purchased or acquired as provided in Subsection 4.1(b), the Company may, during the ninety (90) day period following the expiration of the periods provided in Subsection 4.1(b), offer and sell the remaining unsubscribed portion of such New Securities to any Person or Persons at a price not less than, and upon terms no more favorable to the offeree than, those specified in the Offer Notice. If the Company does not enter into an agreement for the sale of the New Securities within such period, or if such agreement is not consummated within thirty (30) days of the execution thereof, the right provided hereunder shall be deemed to be revived and such New Securities shall not be offered unless first reoffered to the Major Investors in accordance with this Subsection 4.1.

(d) The right of first offer in this Subsection 4.1 shall not be applicable to (i) Exempted Securities (as defined in the Company's Certificate of Incorporation); (ii) shares of Common Stock issued in the IPO; and (iii) the issuance of shares of Series B Preferred Stock pursuant to the Purchase Agreement.

(e) Notwithstanding any provision hereof to the contrary, in lieu of complying with the provisions of this Subsection 4.1, the Company may elect to give notice to the Major Investors within thirty (30) days after the issuance of New Securities. Such notice shall describe the type, price, and terms of the New Securities. Each Major Investor shall have twenty (20) days from the date notice is given to elect to purchase up to the number of New Securities that would, if purchased by such Major Investor, maintain such Major Investor's percentage-ownership position, calculated as set forth in Subsection 4.1(b) before giving effect to the issuance of such New Securities. The closing of such sale shall occur within sixty (60) days of the date notice is given to the Major Investors.

4.2 Termination. The covenants set forth in Subsection 4.1 shall terminate and be of no further force or effect (i) immediately before the consummation of a Qualified IPO, as such term is defined in the Company's Certificate of Incorporation, or (ii) upon a Deemed Liquidation Event, as such term is defined in the Company's Certificate of Incorporation, whichever event occurs first.

5. Additional Covenants.

5.1 Insurance. The Company shall use its commercially reasonable efforts to maintain Directors and Officers liability insurance from financially sound and reputable insurers in an amount and on terms and conditions satisfactory to the Board of Directors, including a majority of the Preferred Directors, and will use commercially reasonable efforts to cause such insurance policies to be maintained until such time as the Board of Directors, including a majority of the Preferred Directors, determines that such insurance should be discontinued. The policy shall not be cancelable by the Company without prior approval by the Board of Directors including a majority of the Preferred Directors. Notwithstanding any other provision of this Section 5.1 to the contrary, for so long as any Preferred Director is serving on the Board of Directors, the Company shall not cease to maintain a Directors and Officers liability insurance policy in an amount of at least two million dollars ($2.0 million) unless approved by such Preferred Director, and the Company shall annually, within one hundred twenty (120) days after the end of each fiscal year of the Company, deliver to each Preferred Director a certification that such a Directors and Officers liability insurance policy remains in effect.

5.2 Employee Agreements. The Company will cause (i) each person now or hereafter employed by it or by any subsidiary (or engaged by the Company or any subsidiary as a consultant/independent contractor) with access to confidential information and/or trade secrets to enter into a nondisclosure and proprietary rights assignment agreement; and (ii) each Key Employee to enter into a one (1) year noncompetition and nonsolicitation agreement, substantially in the form approved by the Board of Directors (including a majority of the Preferred Directors), after the date hereof, or, otherwise, substantially in the form provided to counsel for the Investors before the date hereof as the Company's standard form agreement. In addition, the Company shall not amend, modify, terminate, waive, or otherwise alter, in whole or in part, any of the above-referenced agreements or any restricted stock agreement between the Company and any employee, without the consent of a majority of the Preferred Directors.

5.3 Employee Stock. Unless otherwise approved by the Board of Directors, including a majority of the Preferred Directors, any employees or consultants of the Company who purchases, receives options to purchase, or receives awards of shares of the Company's capital stock after the date hereof shall be required to execute restricted stock or option agreements, as applicable, providing for (i) vesting of shares over a four (4) year period, with the first twenty-five percent (25%) of such shares vesting following twelve (12) months of continued employment or service, and the remaining shares vesting in equal monthly installments over the following thirty-six (36) months or in equal quarterly installments over the following twelve (12) quarters, (ii) a market stand-off provision substantially similar to that in Subsection 2.11 and (iii) provisions requiring such employee or consultant to enter into each of the Voting Agreement pursuant to Section 7.1(b) thereof and Right of First Refusal and Co-Sale Agreement pursuant to Section 6.17 thereof, in each case as applicable to such employee or consultant. In addition, unless otherwise approved by the Board of Directors, including a majority of the Preferred Directors, the Company shall retain a "right of first refusal" on employee transfers until the Company's IPO and shall have the right to repurchase unvested shares at cost upon termination of employment of a holder of restricted stock.

5.4 Board Matters. Unless otherwise determined the Board of Directors, including a majority of the Preferred Directors, the Board of Directors shall meet at least quarterly in accordance with an agreed-upon schedule. The Company shall reimburse the nonemployee directors for all reasonable out-of-pocket travel (consistent with the Company's

travel policy) and other expenses incurred in connection with the performance of their duties as directors and attending meetings of the Board of Directors and committees thereof and attending events on behalf of the Company. Each of the Preferred Directors shall have the right to sit on any audit committee or compensation committee of the Board of Directors or any other committee with authority to act on behalf of the Company without specific approval from the Board of Directors. As of the date hereof, Bruce Booth shall be the Chairman of the Board of Directors.

5.5 Successor Indemnification. If the Company or any of its successors or assignees consolidates with or merges into any other Person and is not the continuing or surviving corporation or entity of such consolidation or merger, then to the extent necessary, proper provision shall be made so that the successors and assignees of the Company assume the obligations of the Company with respect to indemnification of members of the Board of Directors as in effect immediately before such transaction, whether such obligations are contained in the Company's Bylaws, its Certificate of Incorporation, or elsewhere, as the case may be.

5.6 Expenses of Counsel. In the event of a transaction which is a Sale of the Company (as defined in the Voting Agreement), the reasonable fees and disbursements, not to exceed $25,000, of one counsel for the Investors ("**Investor Counsel**"), in their capacities as stockholders, shall be borne and paid by the Company. At the outset of considering a transaction which, if consummated would constitute a Sale of the Company, the Company shall obtain the ability to share with the Investor Counsel (and such counsel's clients) and shall share the confidential information (including, without limitation, the initial and all subsequent drafts of memoranda of understanding, letters of intent and other transaction documents and related noncompete, employment, consulting and other compensation agreements and plans) pertaining to and memorializing any of the transactions which, individually or when aggregated with others would constitute the Sale of the Company. The Company shall be obligated to share (and cause the Company's counsel and investment bankers to share) such materials when distributed to the Company's executives and/or any one or more of the other parties to such transaction(s). In the event that Investor Counsel deems it appropriate, in its reasonable discretion, to enter into a joint defense agreement or other arrangement to enhance the ability of the parties to protect their communications and other reviewed materials under the attorney client privilege, the Company shall, and shall direct its counsel to, execute and deliver to Investor Counsel and its clients such an agreement in form and substance reasonably acceptable to Investor Counsel. In the event that one or more of the other party or parties to such transactions require the clients of Investor Counsel to enter into a confidentiality agreement and/or joint defense agreement in order to receive such information, then the Company shall share whatever information can be shared without entry into such agreement and shall, at the same time, in good faith work expeditiously to enable Investor Counsel and its clients to negotiate and enter into the appropriate agreement(s) without undue burden to the clients of Investor Counsel.

5.7 Indemnification Matters. The Company hereby acknowledges that one (1) or more of the Preferred Directors (each a "**Fund Director**") may have certain rights to indemnification, advancement of expenses and/or insurance provided by one or more of the Investors and certain of their affiliates (collectively, the "**Fund Indemnitors**"). The Company

hereby agrees (a) that it is the indemnitor of first resort (*i.e.*, its obligations to any such Fund Director are primary and any obligation of the Fund Indemnitors to advance expenses or to provide indemnification for the same expenses or liabilities incurred by such Fund Director are secondary), (b) that it shall be required to advance the full amount of expenses incurred by such Fund Director and shall be liable for the full amount of all expenses, judgments, penalties, fines and amounts paid in settlement by or on behalf of any such Fund Director to the extent legally permitted and as required by the Company's Certificate of Incorporation or Bylaws of the Company (or any agreement between the Company and such Fund Director), without regard to any rights such Fund Director may have against the Fund Indemnitors, and, (c) that it irrevocably waives, relinquishes and releases the Fund Indemnitors from any and all claims against the Fund Indemnitors for contribution, subrogation or any other recovery of any kind in respect thereof. The Company further agrees that no advancement or payment by the Fund Indemnitors on behalf of any such Fund Director with respect to any claim for which such Fund Director has sought indemnification from the Company shall affect the foregoing and the Fund Indemnitors shall have a right of contribution and/or be subrogated to the extent of such advancement or payment to all of the rights of recovery of such Fund Director against the Company.

5.8 Termination of Covenants. The covenants set forth in this Section 5, except for Subsections 5.5, 5.6, 5.7, 5.8 and 5.9, shall terminate and be of no further force or effect (i) immediately before the consummation of the IPO, (ii) when the Company first becomes subject to the periodic reporting requirements of Section 12(g) or 15(d) of the Exchange Act, or (iii) upon a Deemed Liquidation Event, as such term is defined in the Company's Certificate of Incorporation, whichever event occurs first.

5.9 Right to Conduct Activities. The Company hereby agrees and acknowledges that each of Aisling, Atlas, Brace, Clarus, Cormorant, Eventide, Leerink, Morningside, Surveyor and SV (each a "**Fund**") is a professional investment fund, and as such invests in numerous portfolio companies, some of which may be deemed competitive with the Company's business (as currently conducted or as currently proposed to be conducted). The Company hereby agrees that, to the extent permitted under applicable law, no Fund shall be liable to the Company for any claim arising out of, or based upon, (i) the investment by such Fund or its Affiliates in any entity competitive with the Company, or (ii) actions taken by any Affiliate, partner, officer or other representative of such Fund to assist any such competitive company, whether or not such action was taken as a member of the board of directors of such competitive company or otherwise, and whether or not such action has a detrimental effect on the Company; provided, however, that the foregoing shall not relieve (x) any of the Funds from liability associated with the unauthorized disclosure of the Company's confidential information obtained pursuant to this Agreement, or (y) any director or officer of the Company from any liability associated with his or her fiduciary duties to the Company.

5.10 Matters Requiring Preferred Director Approval. So long as there are any Preferred Directors, the Company hereby covenants and agrees with each of the Investors that it shall not, without approval of the Board of Directors, which approval must include the affirmative vote a majority of the Preferred Directors:

(a) make any loan or advance to, or own any stock or other securities of, any subsidiary or other corporation, partnership, unless it is wholly owned by the Company;

(b) make any loan or advance to any person, including, any employee or director, except advances and similar expenditures in the ordinary course of business or under the terms of an employee stock or option plan approved by the Board of Directors;

(c) guarantee any indebtedness except for trade accounts of the Company or any subsidiary arising in the ordinary course of business;

(d) make any investment inconsistent with any investment policy approved by the Board of Directors;

(e) incur any aggregate indebtedness in excess of $100,000 that is not already included in a Board-approved budget, other than trade credit incurred in the ordinary course of business;

(f) enter into or be a party to any transaction with any director, officer or employee of the Company or any "associate" (as defined in Rule 12b-2 promulgated under the Exchange Act) of any such person, including without limitation any "management bonus" or similar plan providing payments to employees in connection with a Deemed Liquidation Event, as such term is defined in the Restated Charter, except for transactions contemplated by this Agreement and the Purchase Agreement;

(g) hire, terminate, or change the compensation of the executive officers, including approving any option grants or stock awards;

(h) change the principal business of the Company, enter new lines of business, or exit the current line of business;

(i) sell, assign, license, pledge or encumber material technology or intellectual property, other than licenses granted in the ordinary course of business;

(j) enter into any corporate strategic relationship involving the payment contribution or assignment by the Company or to the Company of assets greater than $100,000; or

(k) permit AvroBio, Inc. (a corporation formed under the laws of Ontario and a wholly-owned subsidiary of the Company, or the "Canadian Subsidiary") to have any assets, liabilities or operations, unless, at such time and continuing for so long as the Canadian Subsidiary has any assets, liabilities or operations, the board of directors or other governing body of the Canadian Subsidiary shall be composed of the same members as the Board of Directors of the Company at such time (subject to applicable law), and the other covenants set forth in this Section 5.10 shall be applicable to the Canadian Subsidiary to the same extent as they are to the Company.

6. Miscellaneous.

6.1 Successors and Assigns. The rights under this Agreement may be assigned (but only with all related obligations) by a Holder to a transferee of Registrable Securities that (i) is an Affiliate of a Holder; (ii) is a Holder's Immediate Family Member or trust

for the benefit of an individual Holder or one or more of such Holder's Immediate Family Members; or (iii) after such transfer, holds at least 1,500,000 shares of Registrable Securities (subject to appropriate adjustment for stock splits, stock dividends, combinations, and other recapitalizations); provided, however, that (x) the Company is, within a reasonable time after such transfer, furnished with written notice of the name and address of such transferee and the Registrable Securities with respect to which such rights are being transferred; and (y) such transferee agrees in a written instrument delivered to the Company to be bound by and subject to the terms and conditions of this Agreement, including the provisions of Subsection 2.11. For the purposes of determining the number of shares of Registrable Securities held by a transferee, the holdings of a transferee (1) that is an Affiliate or stockholder of a Holder; (2) who is a Holder's Immediate Family Member; or (3) that is a trust for the benefit of an individual Holder or such Holder's Immediate Family Member shall be aggregated together and with those of the transferring Holder; provided further that all transferees who would not qualify individually for assignment of rights shall have a single attorney-in-fact for the purpose of exercising any rights, receiving notices, or taking any action under this Agreement. The terms and conditions of this Agreement inure to the benefit of and are binding upon the respective successors and permitted assignees of the parties. Nothing in this Agreement, express or implied, is intended to confer upon any party other than the parties hereto or their respective successors and permitted assignees any rights, remedies, obligations or liabilities under or by reason of this Agreement, except as expressly provided herein.

6.2 Governing Law. This Agreement shall be governed by and construed in accordance with the General Corporation Law of the State of Delaware as to matters within the scope thereof, and as to all other matters shall be governed by and construed in accordance with the internal laws of the Commonwealth of Massachusetts, without regard to its principles of conflicts of laws.

6.3 Counterparts. This Agreement may be executed in two (2) or more counterparts, each of which shall be deemed an original, but all of which together shall constitute one and the same instrument. Counterparts may be delivered via facsimile, electronic mail (including pdf or any electronic signature complying with the U.S. federal ESIGN Act of 2000, *e.g.*, www.docusign.com) or other transmission method and any counterpart so delivered shall be deemed to have been duly and validly delivered and be valid and effective for all purposes**.**

6.4 Titles and Subtitles. The titles and subtitles used in this Agreement are for convenience only and are not to be considered in construing or interpreting this Agreement.

6.5 Notices. All notices and other communications given or made pursuant to this Agreement shall be in writing and shall be deemed effectively given upon the earlier of actual receipt or (i) personal delivery to the party to be notified; (ii) when sent, if sent by electronic mail or facsimile during the recipient's normal business hours, and if not sent during normal business hours, then on the recipient's next business day; (iii) five (5) days after having been sent by registered or certified mail, return receipt requested, postage prepaid; or (iv) one (1) business day after the business day of deposit with a nationally recognized overnight courier, freight prepaid, specifying next-day delivery, with written verification of receipt. All

communications shall be sent to the respective parties at their addresses as set forth on Schedule A or to the principal office of the Company and to the attention of the Chief Executive Officer, in the case of the Company, or to such email address, facsimile number, or address as subsequently modified by written notice given in accordance with this Subsection 6.5. If notice is given to the Company, a copy (which shall not constitute notice) shall also be sent to Arthur R. McGivern, Esq., Goodwin Procter LLP, to the following address: 100 Northern Avenue, Boston, MA 02210 and if notice is given to Investors, a copy shall also be given to Brian Lenihan, Choate, Hall & Stewart LLP, Two International Place, Boston, MA 02110 (which shall not constitute notice)and Suzanne P. Hamel and Thomas B. Rosedale, BRL Law Group LLC, 425 Boylston Street, Third Floor, Boston, MA 02116 (which shall not constitute notice).

6.6 Amendments and Waivers. Any term of this Agreement may be amended and the observance of any term of this Agreement may be waived (either generally or in a particular instance, and either retroactively or prospectively) only with the written consent of the Company and the Preferred Majority; provided, that, that the Company may in its sole discretion waive compliance with Subsection 6.1 (and the Company's failure to object promptly in writing after notification of a proposed assignment allegedly in violation of Subsection 6.1 shall be deemed to be a waiver); and provided further that any provision hereof may be waived by any waiving party on such party's own behalf, without the consent of any other party; and provided further that the terms of Section 1.20, the first paragraph of this Section 6.6 and the first sentence of the second paragraph of this Section 6.6 may be amended, modified or terminated and the observance of any term of such sections may be waived only with the written consent of the Company and the holders of at least a majority of outstanding Series B Preferred Stock party to this Agreement.

Notwithstanding the foregoing, this Agreement may not be amended or terminated and the observance of any term hereof may not be waived with respect to any Investor without (i) the written consent of such Investor, unless such amendment, termination, or waiver applies to all Investors in the same fashion (it being agreed that a waiver of the provisions of Section 4 with respect to a particular transaction shall be deemed to apply to all Investors in the same fashion if such waiver does so by its terms, notwithstanding the fact that certain Investors may nonetheless, by agreement with the Company, purchase securities in such transaction); provided, however, that if, after giving effect to such waiver of Section 4 with respect to a particular transaction, an Investor purchases securities in such transaction or issuance (such Investor, a "**Participating Investor**"), such waiver of the provisions of Section 4 shall be deemed to apply to each Major Investor only if the Major Investors have been provided the opportunity to purchase a proportional number of the securities in such transaction based on the pro rata purchase right of each Major Investor set forth in Section 4, assuming a transaction size determined based upon the amount purchased by the Participating Investor that invested the largest percentage in such transaction, or (ii) the written consent of holders of at least a majority of the outstanding Series B Preferred Stock, if such amendment, termination or waiver adversely affects the rights of holders of the Series B Preferred Stock in a different and disproportionate manner than the holders of the Series A Preferred Stock or the Series Seed Preferred Stock. The Company shall give prompt notice of any amendment or termination hereof or waiver hereunder to any party hereto that did not consent in writing to such amendment, termination, or waiver. Any amendment, termination, or waiver effected in accordance with this Subsection 6.6 shall be binding on all parties hereto, regardless of whether any such party has consented thereto. No waivers of or exceptions to any term, condition, or provision of this Agreement, in any one or more instances, shall be deemed to be or construed as a further or continuing waiver of any such term, condition, or provision.

6.7 Severability. In case any one or more of the provisions contained in this Agreement is for any reason held to be invalid, illegal or unenforceable in any respect, such invalidity, illegality, or unenforceability shall not affect any other provision of this Agreement, and such invalid, illegal, or unenforceable provision shall be reformed and construed so that it will be valid, legal, and enforceable to the maximum extent permitted by law.

6.8 Aggregation of Stock. All shares of Registrable Securities held or acquired by Affiliates shall be aggregated together for the purpose of determining the availability of any rights under this Agreement and such Affiliated persons may apportion such rights as among themselves in any manner they deem appropriate.

6.9 Additional Investors. Notwithstanding anything to the contrary contained herein, if the Company issues additional shares of the Company's Preferred Stock after the date hereof, whether pursuant to the Purchase Agreement or otherwise, any purchaser of such shares of Preferred Stock may become a party to this Agreement by executing and delivering an additional counterpart signature page to this Agreement, and thereafter shall be deemed an "Investor" for all purposes hereunder. No action or consent by the Investors shall be required for such joinder to this Agreement by such additional Investor, so long as such additional Investor has agreed in writing to be bound by all of the obligations as an "Investor" hereunder.

6.10 Entire Agreement. This Agreement (including any Schedules and Exhibits hereto) constitutes the full and entire understanding and agreement among the parties with respect to the subject matter hereof, and any other written or oral agreement relating to the subject matter hereof existing between the parties is expressly canceled, including without limitation, the Prior Agreement.

6.11 Dispute Resolution. The parties (a) hereby irrevocably and unconditionally submit to the jurisdiction of the state courts of the Commonwealth of Massachusetts and to the jurisdiction of the United States District Court for the District of Massachusetts for the purpose of any suit, action or other proceeding arising out of or based upon this Agreement, (b) agree not to commence any suit, action or other proceeding arising out of or based upon this Agreement except in the state courts of the Commonwealth of Massachusetts or the United States District Court for the District of Massachusetts, and (c) hereby waive, and agree not to assert, by way of motion, as a defense, or otherwise, in any such suit, action or proceeding, any claim that it is not subject personally to the jurisdiction of the above-named courts, that its property is exempt or immune from attachment or execution, that the suit, action or proceeding is brought in an inconvenient forum, that the venue of the suit, action or proceeding is improper or that this Agreement or the subject matter hereof may not be enforced in or by such court.

WAIVER OF JURY TRIAL: EACH PARTY HEREBY WAIVES ITS RIGHTS TO A JURY TRIAL OF ANY CLAIM OR CAUSE OF ACTION BASED UPON OR ARISING OUT OF THIS AGREEMENT, THE OTHER TRANSACTION DOCUMENTS, THE SECURITIES OR THE SUBJECT MATTER HEREOF OR THEREOF. THE SCOPE OF THIS WAIVER IS INTENDED TO BE ALL-ENCOMPASSING OF ANY AND ALL DISPUTES THAT MAY BE FILED IN ANY COURT AND THAT RELATE TO THE SUBJECT MATTER OF THIS TRANSACTION, INCLUDING, WITHOUT LIMITATION, CONTRACT CLAIMS, TORT CLAIMS (INCLUDING NEGLIGENCE), BREACH OF DUTY CLAIMS, AND ALL OTHER COMMON LAW AND STATUTORY CLAIMS. THIS SECTION HAS BEEN FULLY DISCUSSED BY EACH OF THE PARTIES HERETO AND THESE PROVISIONS WILL NOT BE SUBJECT TO ANY EXCEPTIONS. EACH PARTY HERETO HEREBY FURTHER WARRANTS AND REPRESENTS THAT SUCH PARTY HAS REVIEWED THIS WAIVER WITH ITS LEGAL COUNSEL, AND THAT SUCH PARTY KNOWINGLY AND VOLUNTARILY WAIVES ITS JURY TRIAL RIGHTS FOLLOWING CONSULTATION WITH LEGAL COUNSEL.

6.12 Delays or Omissions. No delay or omission to exercise any right, power, or remedy accruing to any party under this Agreement, upon any breach or default of any other party under this Agreement, shall impair any such right, power, or remedy of such nonbreaching or nondefaulting party, nor shall it be construed to be a waiver of or acquiescence to any such breach or default, or to any similar breach or default thereafter occurring, nor shall any waiver of any single breach or default be deemed a waiver of any other breach or default theretofore or thereafter occurring. All remedies, whether under this Agreement or by law or otherwise afforded to any party, shall be cumulative and not alternative.

[*Remainder of Page Intentionally Left Blank*]

IN WITNESS WHEREOF, the parties have executed this Second Amended and Restated Investors' Rights Agreement as of the date first written above.

COMPANY:

AVROBIO, INC.

By: /s/ Geoffrey MacKay
Name: Geoffrey MacKay
Title: President and Chief Executive Officer

IN WITNESS WHEREOF, the parties have executed this Second Amended and Restated Investors' Rights Agreement as of the date first written above.

INVESTOR:

CITADEL MULTI-STRATEGY EQUITIES MASTER FUND LTD.

By: Citadel Advisors LLC, its portfolio manager

/s/ Noah Goldberg

Name: Noah Goldberg
Title: Authorized Signatory

IN WITNESS WHEREOF, the parties have executed this Second Amended and Restated Investors' Rights Agreement as of the date first written above.

INVESTOR:

Cormorant Private Healthcare Fund I, LP

By: Cormorant Private Healthcare GP, LLC
By: Bihua Chen, Managing Member of the GP

By: /s/ Bihua Chen
Name: Bihua Chen
Title:

Cormorant Global Healthcare Master Fund, LP

By: Cormorant Private Healthcare GP, LLC
By: Bihua Chen, Managing Member of the GP

By: /s/ Bihua Chen
Name: Bihua Chen
Title:

CRMA SPV, L.P.

By: Cormorant Asset Management, LLC
By: Bihua Chen, CEO/CIO

By: /s/ Bihua Chen
Name: Bihua Chen
Title:

IN WITNESS WHEREOF, the parties have executed this Second Amended and Restated Investors' Rights Agreement as of the date first written above.

INVESTOR:

AISLING CAPITAL IV, L.P.

By: /s/ Robert Wenzel
Name: Robert Wenzel
Title: Chief Financial Officer

IN WITNESS WHEREOF, the parties have executed this Second Amended and Restated Investors' Rights Agreement as of the date first written above.

INVESTOR:

LEERINK HOLDINGS LLC

By: /s/ Jim Boylan
Name: Jim Boylan
Title: President

LEERINK SWANN CO-INVESTMENT FUND, LLC

By: /s/ Jim Boylan
Name: Jim Boylan
Title: Manager

IN WITNESS WHEREOF, the parties have executed this Second Amended and Restated Investors' Rights Agreement as of the date first written above.

INVESTOR:

BRACE PHARMACEUTICALS LLC

By: /s/ Vinzenz Ploerer
Name: Vinzenz Ploerer
Title: President & Chief Executive Officer

IN WITNESS WHEREOF, the parties have executed this Second Amended and Restated Investors' Rights Agreement as of the date first written above.

INVESTOR:

MUTUAL FUND SERIES TRUST, ON BEHALF OF EVENTIDE HEALTHCARE & LIFE SCIENCES FUND

By: /s/ Erik Naviloff
Name: Erik Naviloff
Title: Treasurer

IN WITNESS WHEREOF, the parties have executed this Second Amended and Restated Investors' Rights Agreement as of the date first written above.

INVESTOR:

BIOMARIN PHARMACEUTICAL INC.

By: /s/ Brinda Balakrishnan
Name: Brinda Balakrishnan
Title: Group Vice President

IN WITNESS WHEREOF, the parties have executed this Second Amended and Restated Investors' Rights Agreement as of the date first written above.

INVESTOR:

ALEXANDRIA VENTURE INVESTMENTS, LLC,
a Delaware limited liability company

By: Alexandria Real Estate Equities, Inc., a Maryland corporation, its managing member

By: /s/ Aaron Jacobson
Name: Aaron Jacobson
Title: VP - Corporate Counsel

IN WITNESS WHEREOF, the parties have executed this Second Amended and Restated Investors' Rights Agreement as of the date first written above.

INVESTOR:

For and on behalf of
Morningside Venture Investments Limited

By: /s/ Hon Kit Bing /s/ Jill Marie Franklin
Name: Hon Kit Bing/Jill Marie Franklin
Title: Authorized Signatories

IN WITNESS WHEREOF, the parties have executed this Second Amended and Restated Investors' Rights Agreement as of the date first written above.

INVESTOR:

ATLAS VENTURE FUND X, L.P.

By: Atlas Venture Associates X, L.P. Its General Partner

By: Atlas Venture Associates X, LLC Its General Partner

By: /s/ Ommer Chohan
Name: Ommer Chohan
Title: Chief Financial Officer

IN WITNESS WHEREOF, the parties have executed this Second Amended and Restated Investors' Rights Agreement as of the date first written above.

INVESTOR:

SV Life Sciences Fund VI, L.P.

By: SV Life Sciences Fund VI (GP), L.P., its sole General Partner

By: SVLSF VI, LLC, its sole general partner

By: /s/ Denise W. Marks
Name: Denise W. Marks
Title: SVLSF VI, LLC, Member

SV Life Sciences Fund VI Strategic Partners, L.P.

By: SV Life Sciences Fund VI (GP), L.P., its sole General Partner

By: SVLSF VI, LLC, its sole general partner

By: /s/ Denise W. Marks
Name: Denise W. Marks
Title: SVLSF VI, LLC, Member

IN WITNESS WHEREOF, the parties have executed this Second Amended and Restated Investors' Rights Agreement as of the date first written above.

INVESTOR:

CLARUS LIFESCIENCES III, L.P.

BY ITS GENERAL PARTNER, CLARUS VENTURES III GP, LP
BY ITS GENERAL PARTNER, CLARUS VENTURES III, LLC

BY: /s/ Scott Requadt
SCOTT REQUADT
MANAGING DIRECTOR

SCHEDULE A
Investors

Name and Address	Number of Shares Held
Citadel Multi-Strategy Equities Master Fund Ltd. c/o Citadel Advisors LLC 601 Lexington Avenue, New York, New York Attention: Noah Goldberg, Senior Deputy General Counsel CitadelAgreementNotice@citadel.com	**5,610,360**
Cormorant Private Healthcare Fund I, LP 200 Clarendon Street, 52nd Floor Boston, MA 02116 Attention: Jake Abdolmohammadi	**4,366,543**
Cormorant Global Healthcare Master Fund, LP 200 Clarendon Street, 52nd Floor Boston, MA 02116 Attention: Jake Abdolmohammadi	**1,005,938**
CRMA SPV, L.P. PO Box 309 Ugland House Grand Cayman KY1-1104 Cayman Islands Copy to: 200 Clarendon Street, 52nd Floor Boston, MA 02116 Attention: Jake Abdolmohammadi	**237,879**
Aisling Capital IV, L.P. 888 Seventh Avenue, 12th Floor New York, NY 10106 Attn: Drew Schiff and Attn: Chief Financial Officer Fax: 212 651 6379, with copy to: McDermott Will & Emery LLP 340 Madison Avenue New York, NY 10173-1922 Attn: Todd Finger Fax: 212 547 5444	**2,805,179**
Mutual Fund Series Trust, on behalf of Eventide Healthcare & Life Sciences Fund c/o Finny Kuruvilla, One International Place, Suite 3510, Boston, MA 02110	**2,805,179**
Brace Pharmaceuticals LLC 155 Gibbs Street, Suite 406, Rockville, MD, 20850	**1,402,589**
Morningside Venture Investments Limited Attn: Louise Garbarino 2nd Floor, Le Prince de Galles 3-5 Avenue des Citronniers MC 98000, Monaco T: 011-377-97-97-47-37 F: 011-377-97-97-47-30 lgarbarino@thc-mgt.mc with copies to: 1)McCarthy Legal Services Attn: Stephanie O'Brien, Esq. 1188 Centre Street	**935,059**

Newton Centre, MA 02459 T: (617) 244-2800 F: (617) 244-2889 obrien@morningsidenewton.com, and	
2) Springfield Financial Advisory Limited Attn: Alice Li/Makim Ma 22nd Floor Hang Lung Centre 2-20 Paterson Street Causeway Bay, Hong Kong T: 011-852-2576-6800 F: 011-852-2881-5741 alice.li@springfld.com MakimMa@springfld.com	
Leerink Holdings LLC c/o Leerink Partners LLC One Federal Street, 37th Floor Boston, MA 02110 Attention: General Counsel	**233,764**
Leerink Swann Co-Investment Fund, LLC c/o Leerink Partners LLC One Federal Street, 37th Floor Boston, MA 02110 Attention: General Counsel	**233,765**
Atlas Venture Fund X, L.P. 400 Technology Square, 10th Floor Cambridge, MA 02139 Attention: General Counsel, E-mail: bruce@atlasventure.com, with a copy to ommer@atlasventure.com	**3,740,239**
SV Life Sciences Fund VI, L.P. One Boston Place 201 Washington Street, Suite 3900 Boston, Massachusetts 02108 Attention: Josh Resnick and Denise Marks E-mail: jresnick@svhealthinvestors.com dmarks@svhealthinvestors.com	**1,808,211**
SV Life Sciences Fund VI Strategic Partners, L.P. One Boston Place 201 Washington Street, Suite 3900 Boston, Massachusetts 02108 Attention: Josh Resnick and Denise Marks E-mail: jresnick@svhealthinvestors.com dmarks@svhealthinvestors.com	**61,908**
Clarus Lifesciences III, LLP 101 Main Street, Suite 1210 Cambridge MA 02142 Attention: Scott Requadt and Rob Liptak E-mail: srequadt@clarusfunds.com rliptak@clarusfunds.com	**2,805,179**

Alexandria Venture Investments, LLC 385 E. Colorado Blvd., Suite 299, Pasadena, CA 91101 Attention: Aaron Jacobson	**233,765**
BioMarin Pharmaceutical Inc. 105 Digital Drive, Novato, CA 94949 Attention: General Counsel	233,765
TOTAL:	28,519,322

THIS WARRANT AND THE SHARES ISSUABLE HEREUNDER HAVE NOT BEEN REGISTERED UNDER THE SECURITIES ACT OF 1933, AS AMENDED (THE "**ACT**"), OR THE SECURITIES LAWS OF ANY STATE AND, EXCEPT AS SET FORTH IN SECTIONS 5.3 AND 5.4 BELOW, MAY NOT BE OFFERED, SOLD, PLEDGED OR OTHERWISE TRANSFERRED UNLESS AND UNTIL REGISTERED UNDER SAID ACT AND LAWS OR, IN THE OPINION OF LEGAL COUNSEL IN FORM AND SUBSTANCE SATISFACTORY TO THE COMPANY, SUCH OFFER, SALE, PLEDGE OR OTHER TRANSFER IS EXEMPT FROM SUCH REGISTRATION.

WARRANT TO PURCHASE STOCK

Company: AVROBIO, Inc., a Delaware corporation
Number of Shares: As set forth in Paragraph A below
Type/Series of Stock: Series A Preferred Stock, $0.0001 par value per share
Warrant Price: $0.7949 per Share, subject to adjustment as provided herein
Issue Date: June 23, 2017
Expiration Date: June 22, 2027 **See also Section 5.1(b).**
Credit Facility: This Warrant to Purchase Stock ("**Warrant**") is issued in connection with that certain Loan and Security Agreement of even date herewith between Silicon Valley Bank and the Company (as amended and/or modified and in effect from time to time, the "**Loan Agreement**").

THIS WARRANT CERTIFIES THAT, for good and valuable consideration, SILICON VALLEY BANK (together with any successor or permitted assignee or transferee of this Warrant or of any shares issued upon exercise hereof, "**Holder**") is entitled to purchase up to such number of fully paid and non-assessable shares of the above-stated Type/Series of Stock (the "**Class**") of the above-named company (the "**Company**") as determined pursuant to Paragraph A below, at the above-stated Warrant Price, all as set forth above and as adjusted pursuant to Section 2 of this Warrant, subject to the provisions and upon the terms and conditions set forth in this Warrant. Reference is made to Section 5.4 of this Warrant whereby Silicon Valley Bank shall transfer this Warrant to its parent company, SVB Financial Group.

A. Number of Shares. This Warrant shall be exercisable for the Initial Shares, plus the Additional Shares, if any (collectively, and as may be adjusted from time to time in accordance with the provisions of this Warrant, the "**Shares**").

(1) Initial Shares. As used herein, "**Initial Shares**" means 28,305 shares of the Class, subject to adjustment from time to time in accordance with the provisions of this Warrant.

(2) Additional Shares. Upon the making of each Term Loan Advance (as defined in the Loan Agreement) to the Company, this Warrant automatically shall become exercisable for such number of additional shares of the Class as shall equal (a) the Additional Shares Pool, multiplied by (b) a fraction, the numerator of which shall equal the amount of such Term Loan Advance and the denominator of which shall equal $10,000,000, subject to adjustment thereafter from time to time in accordance with the provisions of this Warrant. All shares, if any, for which this Warrant becomes exercisable pursuant to this Paragraph A(2) are referred to herein cumulatively as the "**Additional Shares**.

(3) Additional Shares Pool. As used herein, "**Additional Shares Pool**" means 160,397 shares of the Class, as such number may be adjusted from time to time in accordance with the provisions of this Warrant (as if the Additional Shares Pool constituted "Shares" hereunder at all times from and after the Issue Date for such purpose).

SECTION 1. EXERCISE.

1.1 Method of Exercise. Holder may, at any time and from time to time through 5:00 PM, Eastern time, on the Expiration Date, exercise this Warrant, in whole or in part, by delivering to the Company the original of this Warrant together with a duly executed Notice of Exercise in substantially the form attached hereto as Appendix 1 and, unless Holder is exercising this Warrant pursuant to a cashless exercise set forth in Section 1.2, a check, wire transfer of same-day funds (to an account designated by the Company), or other form of payment acceptable to the Company for the aggregate Warrant Price for the Shares being purchased.

1.2 Cashless Exercise. On any exercise of this Warrant, in lieu of payment of the aggregate Warrant Price in the manner as specified in Section 1.1 above, but otherwise in accordance with the requirements of Section 1.1, Holder may elect to receive Shares equal to the value of this Warrant, or portion hereof as to which this Warrant is being exercised. Thereupon, the Company shall issue to the Holder such number of fully paid and non-assessable Shares as are computed using the following formula:

$$X = Y(A-B)/A$$

where:

X = the number of Shares to be issued to the Holder;

Y = the number of Shares with respect to which this Warrant is being exercised (inclusive of the Shares surrendered to the Company in payment of the aggregate Warrant Price);

A = the Fair Market Value (as determined pursuant to Section 1.3 below) of one Share; and

B = the Warrant Price.

1.3 Fair Market Value. If the Company's common stock is then traded or quoted on a nationally recognized securities exchange, inter-dealer quotation system or over-the-counter market (a "**Trading Market**") and the Class is common stock, the fair market value of a Share shall be the closing price or last sale price of a share of common stock reported for the Business Day immediately before the date on which Holder delivers this Warrant together with its Notice of Exercise to the Company. If the Company's common stock is then traded in a Trading Market and the Class is a series of the Company's convertible preferred stock, the fair market value of a Share shall be the closing price or last sale price of a share of the Company's common stock reported for the Business Day immediately before the date on which Holder delivers this Warrant together with its Notice of Exercise to the Company multiplied by the number of shares of the Company's common stock into which a Share is then convertible. If the Company's common stock is not traded in a Trading Market, the Board of Directors of the Company shall determine the fair market value of a Share in its reasonable good faith judgment.

1.4 Delivery of Certificate and New Warrant. Within a reasonable time after Holder exercises this Warrant in the manner set forth in Section 1.1 or 1.2 above, the Company shall deliver to Holder a certificate representing the Shares issued to Holder upon such exercise and, if this Warrant has not been fully exercised and has not expired, a new warrant of like tenor representing the Shares not so acquired.

1.5 Replacement of Warrant. On receipt of evidence reasonably satisfactory to the Company of the loss, theft, destruction or mutilation of this Warrant and, in the case of loss, theft or destruction, on delivery of an indemnity agreement reasonably satisfactory in form, substance and amount to the Company or, in the case of mutilation, on surrender of this Warrant to the Company for cancellation, the Company shall, within a reasonable time, execute and deliver to Holder, in lieu of this Warrant, a new warrant of like tenor and amount.

1.6 Treatment of Warrant Upon Acquisition of Company.

(a) Acquisition. For the purpose of this Warrant, "**Acquisition**" means any transaction or series of related transactions involving: (i) the sale, lease, exclusive license, or other disposition of all or substantially all of the assets of the Company; (ii) any merger or consolidation of the Company into or with another person or entity (other than a merger or consolidation effected exclusively to change the Company's domicile), or any other corporate reorganization, in which the stockholders of the Company in their capacity as such immediately prior to such merger, consolidation or reorganization, own less than a majority of the Company's (or the surviving or successor entity's) outstanding voting power immediately after such merger, consolidation or reorganization (or, if such Company stockholders beneficially own a majority of the outstanding voting power of the surviving or successor entity as of immediately after such merger, consolidation or reorganization, such surviving or successor entity is not the Company); or (iii) any sale or other transfer by the stockholders of the Company of shares representing at least a majority of the Company's then-total outstanding combined voting power.

(b) Treatment of Warrant at Acquisition. In the event of an Acquisition in which the consideration to be received by the Company's stockholders consists solely of cash, solely of Marketable Securities or a combination of cash and Marketable Securities (a "**Cash/Public Acquisition**"), and the fair market value of one Share as determined in accordance with Section 1.3 above would be greater than the Warrant Price in effect on such date immediately prior to such Cash/Public Acquisition, and Holder has not exercised this Warrant pursuant to Section 1.1 above as to all Shares, then this Warrant shall automatically be deemed to be Cashless Exercised pursuant to Section 1.2 above as to all Shares effective immediately prior to and contingent upon the consummation of a Cash/Public Acquisition. In connection with such Cashless Exercise, Holder shall be deemed to have restated each of the representations and warranties in Section 4 of the Warrant as of the date thereof and the Company shall promptly notify the Holder of the number of Shares (or such other securities) issued upon exercise. In the event of a Cash/Public Acquisition where the fair market value of one Share as determined in accordance with Section 1.3 above would be less than the Warrant Price in effect immediately prior to such Cash/Public Acquisition, then this Warrant will expire immediately prior to the consummation of such Cash/Public Acquisition.

(c) Upon the closing of any Acquisition other than a Cash/Public Acquisition, the acquiring, surviving or successor entity shall assume the obligations of this Warrant, and this Warrant shall thereafter be exercisable for the same securities and/or other property as would have been paid for the Shares issuable upon exercise of the unexercised portion of this Warrant as if such Shares were outstanding on and as of the closing of such Acquisition, subject to further adjustment from time to time in accordance with the provisions of this Warrant.

(d) As used in this Warrant, "**Marketable Securities**" means securities meeting all of the following requirements: (i) the issuer thereof is then subject to the reporting requirements of Section 13 or Section 15(d) of the Securities Exchange Act of 1934, as amended (the "**Exchange Act**"), and is then current in its filing of all required reports and other information under the Act and the Exchange Act; (ii) the class and series of shares or other security of the issuer that would be received by Holder in connection with the Acquisition were Holder to exercise this Warrant on or prior to the closing thereof is then traded in a Trading Market, and (iii) following the closing of such Acquisition, Holder would not be restricted from publicly re-selling all of the issuer's shares and/or other securities that would be received by Holder in such Acquisition were Holder to exercise this Warrant in full on or prior to the closing of such Acquisition, except to the extent that any such restriction (x) arises solely under federal or state securities laws, rules or regulations, and (y) does not extend beyond six (6) months from the closing of such Acquisition.

1.7 Certain Agreements. Following any exercise of this Warrant and solely with respect to the Shares issued thereupon (and the shares of Common Stock, if any, issued upon conversion of such Shares), Holder shall, if the Company so requests in writing, become a party to, by execution and delivery to the Company of a counterpart signature page, joinder agreement, instrument of accession or similar instrument, the Company's then-effective investor rights agreement, stockholders agreement and/or each other agreement entered into among the Company and the holders of the outstanding shares of the Class, in each case only if (i) all holders of outstanding shares of the Class are then parties thereto, and (ii) such agreement is then by its terms in force and effect. Provided that the conditions described in the foregoing clauses (i) and (ii) are met as to any such agreement at the time of any exercise of this Warrant, Holder shall, effective upon such exercise, automatically become bound by, and the Shares issued upon such exercise (and the shares of Common Stock, if any, issuable upon conversion of such Shares), automatically become subject to, such agreement.

SECTION 2. ADJUSTMENTS TO THE SHARES AND WARRANT PRICE.

2.1 Stock Dividends, Splits, Etc. If the Company declares or pays a dividend or distribution on the outstanding shares of the Class payable in common stock or other securities or property (other than cash), then upon exercise of this Warrant, for each Share acquired, Holder shall receive, without additional cost to Holder, the total number and kind of securities and property which Holder would have received had Holder owned the Shares of record as of the date the dividend or distribution occurred. If the Company subdivides the outstanding shares of the Class by reclassification or otherwise into a greater number of shares, the number of Shares purchasable hereunder shall be proportionately increased and the Warrant Price shall be proportionately decreased. If the outstanding shares of the Class are combined or consolidated, by reclassification or otherwise, into a lesser number of shares, the Warrant Price shall be proportionately increased and the number of Shares shall be proportionately decreased.

2.2 Reclassification, Exchange, Combinations or Substitution. Upon any event whereby all of the outstanding shares of the Class are reclassified, exchanged, combined, substituted, or replaced for, into, with or by Company securities of a different class and/or series, then from and after the consummation of such event, this Warrant will be exercisable for the number, class and series of Company securities that Holder would have received had the Shares been outstanding on and as of the

consummation of such event, and subject to further adjustment thereafter from time to time in accordance with the provisions of this Warrant. The provisions of this Section 2.2 shall similarly apply to successive reclassifications, exchanges, combinations, substitutions, replacements or other similar events.

2.3 Conversion of Preferred Stock. If the Class is a class and series of the Company's convertible preferred stock, in the event that all outstanding shares of the Class are converted, automatically or by action of the holders thereof, into common stock pursuant to the provisions of the Company's Certificate of Incorporation, including, without limitation, in connection with the Company's initial, underwritten public offering and sale of its common stock pursuant to an effective registration statement under the Act (the "**IPO**"), then from and after the date on which all outstanding shares of the Class have been so converted, this Warrant shall be exercisable for such number of shares of common stock into which the Shares would have been converted had the Shares been outstanding on the date of such conversion, and the Warrant Price shall equal the Warrant Price in effect as of immediately prior to such conversion divided by the number of shares of common stock into which one Share would have been converted, all subject to further adjustment thereafter from time to time in accordance with the provisions of this Warrant.

2.4 Adjustments for Diluting Issuances. Without duplication of any adjustment otherwise provided for in this Section 2, the number of shares of common stock issuable upon conversion of the Shares shall be subject to the same anti-dilution adjustments, if any, made to the outstanding shares of the Class from time to time in the manner set forth in the Company's Certificate of Incorporation as if the Shares were issued and outstanding on and as of the date of any such required adjustment.

2.5 No Fractional Share. No fractional Share shall be issuable upon exercise of this Warrant and the number of Shares to be issued shall be rounded down to the nearest whole Share. If a fractional Share interest arises upon any exercise of the Warrant, the Company shall eliminate such fractional Share interest by paying Holder in cash the amount computed by multiplying the fractional interest by (i) the fair market value (as determined in accordance with Section 1.3 above) of a full Share, less (ii) the then-effective Warrant Price.

2.6 Notice/Certificate as to Adjustments. Upon each adjustment of the Warrant Price, Class and/or number of Shares, the Company, at the Company's expense, shall notify Holder in writing within a reasonable time setting forth the adjustments to the Warrant Price, Class and/or number of Shares and facts upon which such adjustment is based. The Company shall, upon written request from Holder, furnish Holder with a certificate of its Chief Financial Officer, including computations of such adjustment and the Warrant Price, Class and number of Shares in effect upon the date of such adjustment.

SECTION 3. REPRESENTATIONS AND COVENANTS OF THE COMPANY.

3.1 Representations and Warranties. The Company represents and warrants to, and agrees with, the Holder as follows:

(a) The initial Warrant Price referenced on the first page of this Warrant is not greater than the price per share at which shares of the Class were last sold and issued prior to the Issue Date hereof in an arms-length transaction in which at least $500,000 of such shares were sold.

(b) All Shares which may be issued upon the exercise of this Warrant, and all securities, if any, issuable upon conversion of the Shares, shall, upon issuance, be duly authorized, validly issued, fully paid and non-assessable, and free of any liens and encumbrances except for restrictions on transfer provided for herein or under applicable federal and state securities laws. The Company covenants that it shall at all times cause to be reserved and kept available out of its authorized and unissued capital stock such number of shares of the Class, common stock and other securities as will be sufficient to permit the exercise in full of this Warrant and the conversion of the Shares into common stock or such other securities.

(c)The Company's capitalization table attached hereto as Schedule 1 is true and complete, in all material respects, as of the Issue Date.

3.2 Notice of Certain Events. If the Company proposes at any time to:

(a) declare any dividend or distribution upon the outstanding shares of the Class or common stock, whether in cash, property, stock, or other securities and whether or not a regular cash dividend;

(b) offer for subscription or sale pro rata to the holders of the outstanding shares of the Class any additional shares of any class or series of the Company's stock (other than pursuant to contractual pre-emptive rights);

(c) effect any reclassification, exchange, combination, substitution, reorganization or recapitalization of the outstanding shares of the Class;

(d) effect an Acquisition or to liquidate, dissolve or wind up; or

(e) effect an IPO;

then, in connection with each such event, the Company shall give Holder:

(1) in the case of the matters referred to in (a) and (b) above, at least seven (7) Business Days prior written notice of the earlier to occur of the effective date thereof or the date on which a record will be taken for such dividend, distribution, or subscription rights (and specifying the date on which the holders of outstanding shares of the Class will be entitled thereto) or for determining rights to vote, if any;

(2) in the case of the matters referred to in (c) and (d) above at least seven (7) Business Days prior written notice of the date when the same will take place (and specifying the date on which the holders of outstanding shares of the Class will be entitled to exchange their shares for the securities or other property deliverable upon the occurrence of such event and such reasonable information as Holder may reasonably require regarding the treatment of this Warrant in connection with such event giving rise to the notice); and

(3) with respect to the IPO, at least seven (7) Business Days prior written notice of the date on which the Company proposes to file its registration statement in connection therewith.

The Company will also provide information requested by Holder that is reasonably necessary to enable Holder to comply with Holder's accounting or reporting requirements.

SECTION 4. REPRESENTATIONS, WARRANTIES OF THE HOLDER.

The Holder represents and warrants to the Company as follows:

4.1 Purchase for Own Account. This Warrant and the securities to be acquired upon exercise of this Warrant by Holder are being acquired for investment for Holder's account, not as a nominee or agent, and not with a view to the public resale or distribution within the meaning of the Act. Holder also represents that it has not been formed for the specific purpose of acquiring this Warrant or the Shares.

4.2 Disclosure of Information. Holder is aware of the Company's business affairs and financial condition and has received or has had full access to all the information it considers necessary or appropriate to make an informed investment decision with respect to the acquisition of this Warrant and its underlying securities. Holder further has had an opportunity to ask questions and receive answers from the Company regarding the terms and conditions of the offering of this Warrant and its underlying securities and to obtain additional information (to the extent the Company possessed such information or could acquire it without unreasonable effort or expense) necessary to verify any information furnished to Holder or to which Holder has access.

4.3 Investment Experience. Holder understands that the purchase of this Warrant and its underlying securities involves substantial risk. Holder has experience as an investor in securities of companies in the development stage and acknowledges that Holder can bear the economic risk of such Holder's investment in this Warrant and its underlying securities and has such knowledge and experience in financial or business matters that Holder is capable of evaluating the merits and risks of its investment in this Warrant and its underlying securities and/or has a preexisting personal or business relationship with the Company and certain of its officers, directors or controlling persons of a nature and duration that enables Holder to be aware of the character, business acumen and financial circumstances of such persons.

4.4 Accredited Investor Status. Holder is an "accredited investor" within the meaning of Regulation D promulgated under the Act.

4.5 The Act. Holder understands that this Warrant and the Shares issuable upon exercise hereof have not been registered under the Act in reliance upon a specific exemption therefrom, which exemption depends upon, among other things, the bona fide nature of the Holder's investment intent as expressed herein. Holder understands that this Warrant and the Shares issued upon any exercise hereof must be held indefinitely unless subsequently registered under the Act and qualified under applicable state securities laws, or unless exemption from such registration and qualification are otherwise available. Holder is aware of the provisions of Rule 144 promulgated under the Act.

4.6 Market Stand-off Agreement. The Holder agrees that the Shares and the securities issuable, directly or indirectly, upon conversion of the Shares, if any, shall be subject to the Market Standoff provisions in Section 2.11 of the Company's Amended and Restated Investor Rights Agreement, dated as of July 21, 2016, as amended and/or restated and in effect from time to time.

4.7 No Shareholder Rights. Without limiting any provision of this Warrant, Holder agrees that as a Holder of this Warrant it will not have any rights (including, but not limited to, voting rights) as a shareholder of the Company with respect to the Shares issuable hereunder unless and until the exercise of this Warrant and then only with respect to the Shares issued on such exercise.

SECTION 5. MISCELLANEOUS.

5.1 Term; Automatic Cashless Exercise Upon Expiration.

(a) Term. Subject to the provisions of Section 1.6 above, this Warrant is exercisable in whole or in part at any time and from time to time on or before 6:00 PM, Pacific time, on the Expiration Date and shall be void thereafter.

(b) Automatic Cashless Exercise upon Expiration. In the event that, upon the Expiration Date, the fair market value of one Share (or other security issuable upon the exercise hereof) as determined in accordance with Section 1.3 above is greater than the Warrant Price in effect on such date, then this Warrant shall automatically be deemed on and as of such date to be exercised pursuant to Section 1.2 above as to all Shares (or such other securities) for which it shall not previously have been exercised, and the Company shall, within a reasonable time, deliver a certificate representing the Shares (or such other securities) issued upon such exercise to Holder.

5.2 Legends. Each certificate evidencing Shares (and each certificate evidencing securities issued upon conversion of any Shares, if any) shall be imprinted with a legend in substantially the following form:

> THE SHARES EVIDENCED BY THIS CERTIFICATE HAVE NOT BEEN REGISTERED UNDER THE SECURITIES ACT OF 1933, AS AMENDED (THE "**ACT**"), OR THE SECURITIES LAWS OF ANY STATE AND, EXCEPT AS SET FORTH IN THAT CERTAIN WARRANT TO PURCHASE STOCK ISSUED BY THE ISSUER TO SILICON VALLEY BANK DATED JUNE __, 2017, MAY NOT BE OFFERED, SOLD, PLEDGED OR OTHERWISE TRANSFERRED UNLESS AND UNTIL REGISTERED UNDER SAID ACT AND LAWS OR, IN THE OPINION OF LEGAL COUNSEL IN FORM AND SUBSTANCE SATISFACTORY TO THE COMPANY, SUCH OFFER, SALE, PLEDGE OR OTHER TRANSFER IS EXEMPT FROM SUCH REGISTRATION.

5.3 Compliance with Securities Laws on Transfer. This Warrant and the Shares issued upon exercise of this Warrant (and the securities issuable, directly or indirectly, upon conversion of the Shares, if any) may not be transferred or assigned in whole or in part except in compliance with applicable federal and state securities laws by the transferor and the transferee (including, without limitation, the delivery of investment representation letters and legal opinions reasonably satisfactory to the Company, as reasonably requested by the Company). The Company shall not require Holder to provide an opinion of counsel if the transfer is to SVB Financial Group (Silicon Valley Bank's parent company) or any other affiliate of Holder, provided that any such transferee is an "accredited investor" as defined in Regulation D promulgated under the Act. Additionally, the Company shall also not require an opinion of counsel if there is no material question as to the availability of Rule 144 promulgated under the Act.

5.4 Transfer Procedure. After receipt by Silicon Valley Bank of the executed Warrant, Silicon Valley Bank will transfer all of this Warrant to its parent company, SVB Financial Group. By its acceptance of this Warrant, SVB Financial Group hereby makes to the Company each of the representations and warranties set forth in Section 4 hereof and agrees to be bound by all of the terms and conditions of this Warrant as if the original Holder hereof. Subject to the provisions of Section 5.3 and upon providing the Company with written notice, SVB Financial Group and any subsequent Holder may transfer all or part of this Warrant or the Shares issued upon exercise of this Warrant (or the securities issued upon conversion of the Shares, if any) to any transferee, provided, however, in connection with any such transfer, SVB Financial Group or any subsequent Holder will give the Company notice of the portion of the Warrant and/or Shares (and/or securities issued upon conversion of the Shares, if any) being transferred with the name, address and taxpayer identification number of the transferee and Holder will surrender this Warrant to the Company for reissuance to the transferee(s) (and Holder if applicable); and provided further, that any subsequent transferee other than SVB Financial Group shall agree in writing with the Company to be bound by all of the terms and conditions of this Warrant. Notwithstanding any contrary provision herein, at all times prior to the IPO, Holder may not, without the Company's prior written consent, transfer this Warrant or any portion hereof, or any Shares issued upon any exercise hereof, or any shares or other securities issued upon any conversion of any Shares issued upon any exercise hereof, to any person or entity who directly competes with the Company, except in connection with an Acquisition of the Company by such a direct competitor.

5.5 Notices. All notices and other communications hereunder from the Company to the Holder, or vice versa, shall be deemed delivered and effective (i) when given personally, (ii) on the third (3rd) Business Day after being mailed by first-class registered or certified mail, postage prepaid, (iii) upon actual receipt if given by facsimile or electronic mail and such receipt is confirmed in writing by the recipient, or (iv) on the first Business Day following delivery to a reliable overnight courier service, courier fee prepaid, in any case at such address as may have been furnished to the Company or Holder, as the case may be, in writing by the Company or such Holder from time to time in accordance with the provisions of this Section 5.5. All notices to Holder shall be addressed as follows until the Company receives notice of a change of address in connection with a transfer or otherwise:

SVB Financial Group
Attn: Treasury Department
3003 Tasman Drive, HC 215
Santa Clara, CA 95054
Telephone: (408) 654-7400
Facsimile: (408) 988-8317
Email address: derivatives@svb.com

Notice to the Company shall be addressed as follows until Holder receives notice of a change in address:

AVROBIO, Inc.
Attn: Chief Executive Officer
400 Technology Square, Suite 101
Cambridge, MA 02139
Telephone: (617) 914-8403
Email: geoff.mackay@avrobio.com

With a copy (which shall not constitute notice) to:

Goodwin Procter LLP
Attn: Arthur McGivern
100 Northern Avenue
Boston, MA 02210
Telephone: (617) 570-1971
Facsimile: (617) 523-1231
Email: AMcGivern@goodwinlaw.com

5.6 Waiver. This Warrant and any term hereof may be changed, waived, discharged or terminated (either generally or in a particular instance and either retroactively or prospectively) only by an instrument in writing signed by the party against which enforcement of such change, waiver, discharge or termination is sought.

5.7 Attorneys' Fees. In the event of any dispute between the parties concerning the terms and provisions of this Warrant, the party prevailing in such dispute shall be entitled to collect from the other party all costs incurred in such dispute, including reasonable attorneys' fees.

5.8 Counterparts; Facsimile/Electronic Signatures. This Warrant may be executed in counterparts, all of which together shall constitute one and the same agreement. Any signature page delivered electronically or by facsimile shall be binding to the same extent as an original signature page with regards to any agreement subject to the terms hereof or any amendment thereto.

5.9 Governing Law. This Warrant shall be governed by and construed in accordance with the laws of the Commonwealth of Massachusetts, without giving effect to its principles regarding conflicts of law.

5.10 Headings. The headings in this Warrant are for purposes of reference only and shall not limit or otherwise affect the meaning of any provision of this Warrant.

5.11 Business Days. "**Business Day**" is any day that is not a Saturday, Sunday or a day on which Silicon Valley Bank is closed.

[Remainder of page left blank intentionally]
[Signature page follows]

IN WITNESS WHEREOF, the parties have caused this Warrant to Purchase Stock to be executed by their duly authorized representatives effective as of the Issue Date written above.

"COMPANY"

AVROBIO, INC.

By: /s/ Geoffrey MacKay
Name: Geoffrey MacKay
(Print)
Title: President and CEO, Treasurer and Secretary

"HOLDER"

SILICON VALLEY BANK

By: /s/ Thomas C. Kelly
Name: Thomas C. Kelly
(Print)
Title: Managing Director

APPENDIX 1

NOTICE OF EXERCISE

1. The undersigned Holder hereby exercises its right to purchase shares of the Common/Series Preferred [circle one] Stock of (the "**Company**") in accordance with the attached Warrant To Purchase Stock, and tenders payment of the aggregate Warrant Price for such shares as follows:

☐ check in the amount of $ payable to order of the Company enclosed herewith

☐ Wire transfer of immediately available funds to the Company's account

☐ Cashless Exercise pursuant to Section 1.2 of the Warrant

☐ Other [Describe] _____

2. Please issue a certificate or certificates representing the Shares in the name specified below:

_____

Holder's Name

_____

_____

(Address)

3. By its execution below and for the benefit of the Company, Holder hereby restates each of the representations and warranties in Section 4 of the Warrant to Purchase Stock as of the date hereof.

HOLDER:

_____

By: _____

Name: _____

Title: _____

(Date): _____

SCHEDULE 1

Company Capitalization Table

See attached

Schedule 1

Exhibit 10.1

AVROBIO, INC.

AMENDED AND RESTATED 2015 STOCK OPTION AND GRANT PLAN

SECTION 1. GENERAL PURPOSE OF THE PLAN; DEFINITIONS

The name of the plan is the AvroBio, Inc. Amended and Restated 2015 Stock Option and Grant Plan (the "Plan"). The purpose of the Plan is to encourage and enable the officers, employees, directors, Consultants and other key persons of AvroBio, Inc., a Delaware corporation (including any successor entity, the "Company") and its Subsidiaries, upon whose judgment, initiative and efforts the Company largely depends for the successful conduct of its business, to acquire a proprietary interest in the Company.

The following terms shall be defined as set forth below:

"*Affiliate*" of any Person means a Person that directly or indirectly, through one or more intermediaries, controls, is controlled by or is under common control with the first mentioned Person. A Person shall be deemed to control another Person if such first Person possesses directly or indirectly the power to direct, or cause the direction of, the management and policies of the second Person, whether through the ownership of voting securities, by contract or otherwise.

"*Award*" or "*Awards*," except where referring to a particular category of grant under the Plan, shall include Incentive Stock Options, Non-Qualified Stock Options, Restricted Stock Awards, Unrestricted Stock Awards, Restricted Stock Units or any combination of the foregoing.

"Award Agreement" means a written or electronic agreement setting forth the terms and provisions applicable to an Award granted under the Plan. Each Award Agreement may contain terms and conditions in addition to those set forth in the Plan; *provided*, *however*, in the event of any conflict in the terms of the Plan and the Award Agreement, the terms of the Plan shall govern**.**

"*Board*" means the Board of Directors of the Company.

"*Cause*" shall have the meaning as set forth in the Award Agreement(s). In the case that any Award Agreement does not contain a definition of "Cause," it shall mean (i) the grantee's dishonest statements or acts with respect to the Company or any Affiliate of the Company, or any current or prospective customers, suppliers vendors or other third parties with which such entity does business; (ii) the grantee's commission of (A) a felony or (B) any misdemeanor involving moral turpitude, deceit, dishonesty or fraud; (iii) the grantee's failure to perform his assigned duties and responsibilities to the reasonable satisfaction of the Company which failure continues, in the reasonable judgment of the Company, after written notice given to the grantee by the Company; (iv) the grantee's gross negligence, willful misconduct or insubordination with respect to the Company or any Affiliate of the Company; or (v) the grantee's material violation of any provision of any agreement(s) between the grantee and the Company relating to noncompetition, nonsolicitation, nondisclosure and/or assignment of inventions.

"Chief Executive Officer" means the Chief Executive Officer of the Company or, if there is no Chief Executive Officer, then the President of the Company.

"*Code*" means the Internal Revenue Code of 1986, as amended, and any successor Code, and related rules, regulations and interpretations.

"*Committee*" means the Committee of the Board referred to in Section 2.

"Consultant" means any natural person that provides bona fide services to the Company (including a Subsidiary), and such services are not in connection with the offer or sale of securities in a capital-raising transaction and do not directly or indirectly promote or maintain a market for the Company's securities.

"*Disability*" means "disability" as defined in Section 422(c) of the Code.

"*Effective Date*" means the date on which the Plan is adopted as set forth on the final page of the Plan.

"*Exchange Act*" means the Securities Exchange Act of 1934, as amended, and the rules and regulations thereunder.

"*Fair Market Value*" of the Stock on any given date means the fair market value of the Stock determined in good faith by the Committee based on the reasonable application of a reasonable valuation method not inconsistent with Section 409A of the Code. If the Stock is admitted to trade on a national securities exchange, the determination shall be made by reference to the closing price reported on such exchange. If there is no closing price for such date, the determination shall be made by reference to the last date preceding such date for which there is a closing price. If the date for which Fair Market Value is determined is the first day when trading prices for the Stock are reported on a national securities exchange, the Fair Market Value shall be the "Price to the Public" (or equivalent) set forth on the cover page for the final prospectus relating to the Company's Initial Public Offering.

"Good Reason" shall have the meaning as set forth in the Award Agreement(s). In the case that any Award Agreement does not contain a definition of "Good Reason," it shall mean (i) a material diminution in the grantee's base salary except for across-the-board salary reductions similarly affecting all or substantially all similarly situated employees of the Company or (ii) a change of more than 50 miles in the geographic location at which the grantee provides services to the Company, so long as the grantee provides at least 90 days notice to the Company following the initial occurrence of any such event and the Company fails to cure such event within 30 days thereafter.

"*Grant Date*" means the date that the Committee designates in its approval of an Award in accordance with applicable law as the date on which the Award is granted, which date may not precede the date of such Committee approval.

"Holder" means, with respect to an Award or any Shares, the Person holding such Award or Shares, including the initial recipient of the Award or any Permitted Transferee.

"*Incentive Stock Option*" means any Stock Option designated and qualified as an "incentive stock option" as defined in Section 422 of the Code.

"*Initial Public Offering*" means the consummation of the first firm commitment underwritten public offering pursuant to an effective registration statement under the Securities Act covering the offer and sale by the Company of its equity securities, as a result of or following which the Stock shall be publicly held.

"*Non-Qualified Stock Option*" means any Stock Option that is not an Incentive Stock Option.

"*Option*" or "*Stock Option*" means any option to purchase shares of Stock granted pursuant to Section 5.

"*Permitted Transferees*" shall mean any of the following to whom a Holder may transfer Shares hereunder (as set forth in Section 9(a)(ii)(A)): the Holder's child, stepchild, grandchild, parent, stepparent, grandparent, spouse, former spouse, sibling, niece, nephew, mother-in-law, father-in-law, son-in-law, daughter-in-law, brother-in-law, or sister-in-law, including adoptive relationships, any person sharing the Holder's household (other than a tenant or employee), a trust in which these persons have more than fifty percent of the beneficial interest, a foundation in which these persons control the management of assets, and any other entity in which these persons own more than fifty percent of the voting interests*; provided, however,* that any such trust does not require or permit distribution of any Shares during the term of the Award Agreement unless subject to its terms. Upon the death of the Holder, the term Permitted Transferees shall also include such deceased Holder's estate, executors, administrators, personal representatives, heirs, legatees and distributees, as the case may be.

"*Person*" shall mean any individual, corporation, partnership (limited or general), limited liability company, limited liability partnership, association, trust, joint venture, unincorporated organization or any similar entity.

"Restricted Stock Award" means Awards granted pursuant to Section 6 and *"Restricted Stock"* means Shares issued pursuant to such Awards.

"Restricted Stock Unit" means an Award of phantom stock units to a grantee, which may be settled in cash or Shares as determined by the Committee, pursuant to Section 8.

"*Sale Event"* means the consummation of (i) the dissolution or liquidation of the Company, (ii) the sale of all or substantially all of the assets of the Company on a consolidated basis to an unrelated person or entity, (iii) a merger, reorganization or consolidation pursuant to which the holders of the Company's outstanding voting power immediately prior to such transaction do not own a majority of the outstanding voting power of the surviving or resulting entity (or its ultimate parent, if applicable), (iv) the acquisition of all or a majority of the outstanding voting stock of the Company in a single transaction or a series of related transactions by a Person or group of Persons, or (v) any other acquisition of the business of the Company, as determined by the Board; *provided, however,* that the Company's Initial Public Offering, any subsequent public offering or another capital raising event, or a merger effected solely to change the Company's domicile shall not constitute a "Sale Event."

"Section 409A" means Section 409A of the Code and the regulations and other guidance promulgated thereunder.

"*Securities Act*" means the Securities Act of 1933, as amended, and the rules and regulations thereunder.

"Service Relationship" means any relationship as a full-time employee, part-time employee, director or other key person (including Consultants) of the Company or any Subsidiary or any successor entity (e.g., a Service Relationship shall be deemed to continue without interruption in the event an individual's status changes from full-time employee to part-time employee or Consultant).

"*Shares*" means shares of Stock.

"*Stock*" means the Common Stock, par value $0.0001 per share, of the Company.

"*Subsidiary*" means any corporation or other entity (other than the Company) in which the Company has more than a 50 percent interest, either directly or indirectly.

"Ten Percent Owner" means an employee who owns or is deemed to own (by reason of the attribution rules of Section 424(d) of the Code) more than 10 percent of the combined voting power of all classes of stock of the Company or any parent of the Company or any Subsidiary.

"Termination Event" means the termination of the Award recipient's Service Relationship with the Company and its Subsidiaries for any reason whatsoever, regardless of the circumstances thereof, and including, without limitation, upon death, disability, retirement, discharge or resignation for any reason, whether voluntarily or involuntarily. The following shall not constitute a Termination Event: (i) a transfer to the service of the Company from a Subsidiary or from the Company to a Subsidiary, or from one Subsidiary to another Subsidiary or (ii) an approved leave of absence for military service or sickness, or for any other purpose approved by the Committee, if the individual's right to re-employment is guaranteed either by a statute or by contract or under the policy pursuant to which the leave of absence was granted or if the Committee otherwise so provides in writing.

"*Unrestricted Stock Award"* means any Award granted pursuant to Section 7 and *"Unrestricted Stock"* means Shares issued pursuant to such Awards.

SECTION 2. ADMINISTRATION OF PLAN; COMMITTEE AUTHORITY TO SELECT GRANTEES AND DETERMINE AWARDS

(a) Administration of Plan. The Plan shall be administered by the Board, or at the discretion of the Board, by a committee of the Board, comprised of not less than two directors. All references herein to the "Committee" shall be deemed to refer to the group then responsible for administration of the Plan at the relevant time (i.e., either the Board of Directors or a committee or committees of the Board, as applicable).

(b) Powers of Committee. The Committee shall have the power and authority to grant Awards consistent with the terms of the Plan, including the power and authority:

(i) to select the individuals to whom Awards may from time to time be granted;

(ii) to determine the time or times of grant, and the amount, if any, of Incentive Stock Options, Non-Qualified Stock Options, Restricted Stock Awards, Unrestricted Stock Awards, Restricted Stock Units, or any combination of the foregoing, granted to any one or more grantees;

(iii) to determine the number of Shares to be covered by any Award and, subject to the provisions of the Plan, the price, exercise price, conversion ratio or other price relating thereto;

(iv) to determine and, subject to Section 12, to modify from time to time the terms and conditions, including restrictions, not inconsistent with the terms of the Plan, of any Award, which terms and conditions may differ among individual Awards and grantees, and to approve the form of Award Agreements;

(v) to accelerate at any time the exercisability or vesting of all or any portion of any Award;

(vi) to impose any limitations on Awards, including limitations on transfers, repurchase provisions and the like, and to exercise repurchase rights or obligations;

(vii) subject to Section 5(a)(ii) and any restrictions imposed by Section 409A, to extend at any time the period in which Stock Options may be exercised; and

(viii) at any time to adopt, alter and repeal such rules, guidelines and practices for administration of the Plan and for its own acts and proceedings as it shall deem advisable; to interpret the terms and provisions of the Plan and any Award (including Award Agreements); to make all determinations it deems advisable for the administration of the Plan; to decide all disputes arising in connection with the Plan; and to otherwise supervise the administration of the Plan.

All decisions and interpretations of the Committee shall be binding on all persons, including the Company and all Holders.

(c) Award Agreement. Awards under the Plan shall be evidenced by Award Agreements that set forth the terms, conditions and limitations for each Award.

(d) Indemnification. Neither the Board nor the Committee, nor any member of either or any delegate thereof, shall be liable for any act, omission, interpretation, construction or determination made in good faith in connection with the Plan, and the members of the Board and the Committee (and any delegate thereof) shall be entitled in all cases to indemnification and reimbursement by the Company in respect of any claim, loss, damage or expense (including, without limitation, reasonable attorneys' fees) arising or resulting therefrom to the fullest extent permitted by law and/or under the Company's governing documents, including its certificate of incorporation or bylaws, or any directors' and officers' liability insurance coverage which may be in effect from time to time and/or any indemnification agreement between such individual and the Company.

(e) Foreign Award Recipients. Notwithstanding any provision of the Plan to the contrary, in order to comply with the laws in other countries in which the Company and any Subsidiary operate or have employees or other individuals eligible for Awards, the Committee, in its sole discretion, shall have the power and authority to: (i) determine which Subsidiaries, if any, shall be covered by the Plan; (ii) determine which individuals, if any, outside the United States are eligible to participate in the Plan; (iii) modify the terms and conditions of any Award granted to individuals outside the United States to comply with applicable foreign laws; (iv) establish subplans and modify exercise procedures and other terms and procedures, to the extent the Committee determines such actions to be necessary or advisable (and such subplans and/or modifications shall be attached to the Plan as appendices); provided, however, that no such subplans and/or modifications shall increase the share limitation contained in Section 3(a) hereof; and (v) take any action, before or after an Award is made, that the Committee determines to be necessary or advisable to obtain approval or comply with any local governmental regulatory exemptions or approvals.

SECTION 3. STOCK ISSUABLE UNDER THE PLAN; MERGERS AND OTHER TRANSACTIONS; SUBSTITUTION

(a) Stock Issuable. The maximum number of Shares reserved and available for issuance under the Plan shall be 3,361,345 Shares, subject to adjustment as provided in Section 3(b). For purposes of this limitation, the Shares underlying any Awards that are forfeited, canceled, reacquired by the Company prior to vesting, satisfied without the issuance of Stock or otherwise terminated (other than by exercise) and Shares that are withheld upon exercise of an Option or settlement of an Award to cover the exercise price or tax withholding shall be added back to the Shares available for issuance under the Plan. Subject to such overall limitations, Shares may be issued up to such maximum number pursuant to any type or types of Award, and no more than 33,613,450 Shares may be issued pursuant to Incentive Stock Options. The Shares available for issuance under the Plan may be authorized but unissued Shares or Shares reacquired by the Company. Beginning on the date that the Company becomes subject to Section 162(m) of the Code, Options with respect to no more than 3,361,345 Shares shall be granted to any one individual in any calendar year period.

(b) Changes in Stock. Subject to Section 3(c) hereof, if, as a result of any reorganization, recapitalization, reclassification, stock dividend, stock split, reverse stock split or other similar change in the Company's capital stock, the outstanding Shares are increased or decreased or are exchanged for a different number or kind of shares or other securities of the Company, or additional Shares or new or different shares or other securities of the Company or other non-cash assets are distributed with respect to such Shares or other securities, in each case, without the receipt of consideration by the Company, or, if, as a result of any merger or consolidation, or sale of all or substantially all of the assets of the Company, the outstanding Shares are converted into or exchanged for other securities of the Company or any successor entity (or a parent or subsidiary thereof), the Committee shall make an appropriate and proportionate adjustment in (i) the maximum number of Shares reserved for issuance under the Plan, (ii) the number and kind of Shares or other securities subject to any then outstanding

Awards under the Plan, (iii) the repurchase price, if any, per Share subject to each outstanding Award, and (iv) the exercise price for each Share subject to any then outstanding Stock Options under the Plan, without changing the aggregate exercise price (i.e., the exercise price multiplied by the number of Stock Options) as to which such Stock Options remain exercisable. The Committee shall in any event make such adjustments as may be required by Section 25102(o) of the California Corporation Code and the rules and regulations promulgated thereunder. The adjustment by the Committee shall be final, binding and conclusive. No fractional Shares shall be issued under the Plan resulting from any such adjustment, but the Committee in its discretion may make a cash payment in lieu of fractional shares.

(c) Sale Events.

(i) Options.

(A) In the case of and subject to the consummation of a Sale Event, the Plan and all outstanding Options issued hereunder shall terminate upon the effective time of any such Sale Event unless assumed or continued by the successor entity, or new stock options or other awards of the successor entity or parent thereof are substituted therefor, with an equitable or proportionate adjustment as to the number and kind of shares and, if appropriate, the per share exercise prices, as such parties shall agree (after taking into account any acceleration hereunder and/or pursuant to the terms of any Award Agreement).

(B) In the event of the termination of the Plan and all outstanding Options issued hereunder pursuant to Section 3(c), each Holder of Options shall be permitted, within a period of time prior to the consummation of the Sale Event as specified by the Committee, to exercise all such Options which are then exercisable or will become exercisable as of the effective time of the Sale Event; *provided*, *however*, that the exercise of Options not exercisable prior to the Sale Event shall be subject to the consummation of the Sale Event.

(C) Notwithstanding anything to the contrary in Section 3(c)(i)(A), in the event of a Sale Event, the Company shall have the right, but not the obligation, to make or provide for a cash payment to the Holders of Options, without any consent of the Holders, in exchange for the cancellation thereof, in an amount equal to the difference between (A) the value as determined by the Committee of the consideration payable per share of Stock pursuant to the Sale Event (the "Sale Price") times the number of Shares subject to outstanding Options being cancelled (to the extent then vested and exercisable, including by reason of acceleration in connection with such Sale Event, at prices not in excess of the Sale Price) and (B) the aggregate exercise price of all such outstanding vested and exercisable Options.

(ii) Restricted Stock and Restricted Stock Unit Awards.

(A) In the case of and subject to the consummation of a Sale Event, all Restricted Stock and unvested Restricted Stock Unit Awards (other than those becoming vested as a result of the Sale Event) issued hereunder shall be forfeited immediately prior to the effective time of any such Sale Event unless assumed or continued by the successor entity, or awards of the successor entity or parent thereof are substituted therefor, with an equitable or proportionate adjustment as to the number and kind of shares subject to such awards as such parties shall agree (after taking into account any acceleration hereunder and/or pursuant to the terms of any Award Agreement).

(B) In the event of the forfeiture of Restricted Stock pursuant to Section 3(c)(ii)(A), such Restricted Stock shall be repurchased from the Holder thereof at a price per share equal to the lower of the original per share purchase price paid by the Holder (subject to adjustment as provided in Section 3(b)) or the current Fair Market Value of such Shares, determined immediately prior to the effective time of the Sale Event.

(C) Notwithstanding anything to the contrary in Section 3(c)(ii)(A), in the event of a Sale Event, the Company shall have the right, but not the obligation, to make or provide for a cash payment to the Holders of Restricted Stock or Restricted Stock Unit Awards, without consent of the Holders, in exchange for the cancellation thereof, in an amount equal to the Sale Price times the number of Shares subject to such Awards, to be paid at the time of such Sale Event or upon the later vesting of such Awards.

SECTION 4. ELIGIBILITY

Grantees under the Plan will be such full or part-time officers and other employees, directors, Consultants and key persons of the Company and any Subsidiary who are selected from time to time by the Committee in its sole discretion; provided, however, that Awards shall be granted only to those individuals described in Rule 701(c) of the Securities Act.

SECTION 5. STOCK OPTIONS

Upon the grant of a Stock Option, the Company and the grantee shall enter into an Award Agreement. The terms and conditions of each such Award Agreement shall be determined by the Committee, and such terms and conditions may differ among individual Awards and grantees.

Stock Options granted under the Plan may be either Incentive Stock Options or Non-Qualified Stock Options. Incentive Stock Options may be granted only to employees of the Company or any Subsidiary that is a “subsidiary corporation” within the meaning of Section 424(f) of the Code. To the extent that any Option does not qualify as an Incentive Stock Option, it shall be deemed a Non-Qualified Stock Option.

(a) Terms of Stock Options. The Committee in its discretion may grant Stock Options to those individuals who meet the eligibility requirements of Section 4. Stock Options shall be subject to the following terms and conditions and shall contain such additional terms and conditions, not inconsistent with the terms of the Plan, as the Committee shall deem desirable.

(i) Exercise Price. The exercise price per share for the Shares covered by a Stock Option shall be determined by the Committee at the time of grant but shall not be less than 100 percent of the Fair Market Value on the Grant Date. In the case of an Incentive Stock Option that is granted to a Ten Percent Owner, the exercise price per share for the Shares covered by such Incentive Stock Option shall not be less than 110 percent of the Fair Market Value on the Grant Date.

(ii) Option Term. The term of each Stock Option shall be fixed by the Committee, but no Stock Option shall be exercisable more than ten years from the Grant Date. In the case of an Incentive Stock Option that is granted to a Ten Percent Owner, the term of such Stock Option shall be no more than five years from the Grant Date.

(iii) Exercisability; Rights of a Stockholder. Stock Options shall become exercisable and/or vested at such time or times, whether or not in installments, as shall be determined by the Committee at or after the Grant Date. The Award Agreement may permit a grantee to exercise all or a portion of a Stock Option immediately at grant; provided that the Shares issued upon such exercise shall be subject to restrictions and a vesting schedule identical to the vesting schedule of the related Stock Option, such Shares shall be deemed to be Restricted Stock for purposes of the Plan, and the optionee may be required to enter into an additional or new Award Agreement as a condition to exercise of such Stock Option. An optionee shall have the rights of a stockholder only as to Shares acquired upon the exercise of a Stock Option and not as to unexercised Stock Options. An optionee shall not be deemed to have acquired any Shares unless and until a Stock Option shall have been exercised pursuant to the terms of the Award Agreement and this Plan and the optionee's name has been entered on the books of the Company as a stockholder.

(iv) Method of Exercise. Stock Options may be exercised by an optionee in whole or in part, by the optionee giving written or electronic notice of exercise to the Company, specifying the number of Shares to be purchased. Payment of the purchase price may be made by one or more of the following methods (or any combination thereof) to the extent provided in the Award Agreement:

(A) In cash, by certified or bank check, by wire transfer of immediately available funds, or other instrument acceptable to the Committee;

(B) If permitted by the Committee, by the optionee delivering to the Company a promissory note, if the Board has expressly authorized the loan of funds to the optionee for the purpose of enabling or assisting the optionee to effect the exercise of his or her Stock Option; provided, that at least so much of the exercise price as represents the par value of the Stock shall be paid in cash if required by state law;

(C) If permitted by the Committee and the Initial Public Offering has occurred (or the Stock otherwise becomes publicly-traded), through the delivery (or attestation to the ownership) of Shares that have been purchased by the optionee on the open market or that are beneficially owned by the optionee and are not then subject to restrictions under any Company plan. To the extent required to avoid variable accounting treatment under ASC 718 or other applicable accounting rules, such surrendered Shares if originally purchased from the Company shall have been owned by the optionee for at least six months. Such surrendered Shares shall be valued at Fair Market Value on the exercise date;

(D) If permitted by the Committee and the Initial Public Offering has occurred (or the Stock otherwise becomes publicly-traded), by the optionee delivering to the Company a properly executed exercise notice together with irrevocable instructions to a broker to promptly deliver to the Company cash or a check payable and acceptable to the Company for the purchase price; provided that in the event the optionee chooses to pay the purchase price as so provided, the optionee and the broker shall comply with such procedures and enter into such agreements of indemnity and other agreements as the Committee shall prescribe as a condition of such payment procedure; or

(E) If permitted by the Committee, and only with respect to Stock Options that are not Incentive Stock Options, by a "net exercise" arrangement pursuant to which the Company will reduce the number of Shares issuable upon exercise by the largest whole number of Shares with a Fair Market Value that does not exceed the aggregate exercise price.

Payment instruments will be received subject to collection. No certificates for Shares so purchased will be issued to the optionee or, with respect to uncertificated Stock, no transfer to the optionee on the records of the Company will take place, until the Company has completed all steps it has deemed necessary to satisfy legal requirements relating to the issuance and sale of the Shares, which steps may include, without limitation, (i) receipt of a representation from the optionee at the time of exercise of the Option that the optionee is purchasing the Shares for the optionee's own account and not with a view to any sale or distribution of the Shares or other representations relating to compliance with applicable law governing the issuance of securities, (ii) the legending of the certificate (or notation on any book entry) representing the Shares to evidence the foregoing restrictions, and (iii) obtaining from optionee payment or provision for all withholding taxes due as a result of the exercise of the Option. The delivery of certificates representing the shares of Stock (or the transfer to the optionee on the records of the Company with respect to uncertificated Stock) to be purchased pursuant to the exercise of a Stock Option will be contingent upon (A) receipt from the optionee (or a purchaser acting in his or her stead in accordance with the provisions of the Stock Option) by the Company of the full purchase price for such Shares and the fulfillment of any other requirements contained in the Award Agreement or applicable provisions of laws and (B) if required by the Company, the optionee shall have entered into any stockholders agreements or other agreements with the Company and/or certain other of the Company's stockholders relating to the Stock. In the event an optionee chooses to pay the purchase price by previously-owned Shares through the attestation method, the number of Shares transferred to the optionee upon the exercise of the Stock Option shall be net of the number of Shares attested to.

(b) Annual Limit on Incentive Stock Options. To the extent required for "incentive stock option" treatment under Section 422 of the Code, the aggregate Fair Market Value (determined as of the Grant Date) of the Shares with respect to which Incentive Stock Options granted under the Plan and any other plan of the Company or its parent and any Subsidiary that become exercisable for the first time by an optionee during any calendar year shall not exceed $100,000 or such other limit as may be in effect from time to time under Section 422 of the Code. To the extent that any Stock Option exceeds this limit, it shall constitute a Non-Qualified Stock Option.

(c) Termination. Any portion of a Stock Option that is not vested and exercisable on the date of termination of an optionee's Service Relationship shall immediately expire and be null and void. Once any portion of the Stock Option becomes vested and exercisable, the optionee's right to exercise such portion of the Stock Option (or the optionee's representatives and legatees as applicable) in the event of a termination of the optionee's Service Relationship shall continue until the earliest of: (i) the date which is: (A) 12 months following the date on which the optionee's Service Relationship terminates due to death or Disability (or such longer period of time as determined by the Committee and set forth in the applicable Award Agreement), or (B) three months following the date on which the optionee's Service Relationship terminates if the termination is due to any reason other than death or Disability (or such longer period of time as determined by the Committee and set forth in the applicable Award Agreement), or (ii) the Expiration Date set forth in the Award Agreement; provided that notwithstanding the foregoing, an Award Agreement may provide that if the optionee's Service Relationship is terminated for Cause, the Stock Option shall terminate immediately and be null and void upon the date of the optionee's termination and shall not thereafter be exercisable.

SECTION 6. RESTRICTED STOCK AWARDS

(a) Nature of Restricted Stock Awards. The Committee may, in its sole discretion, grant (or sell at par value or such other purchase price determined by the Committee) to an eligible individual under Section 4 hereof a Restricted Stock Award under the Plan. The Committee shall determine the restrictions and conditions applicable to each Restricted Stock Award at the time of grant. Conditions may be based on continuing employment (or other Service Relationship), achievement of pre-established performance goals and objectives and/or such other criteria as the Committee may determine. Upon the grant of a Restricted Stock Award, the Company and the grantee shall enter into an Award Agreement. The terms and conditions of each such Award Agreement shall be determined by the Committee, and such terms and conditions may differ among individual Awards and grantees.

(b) Rights as a Stockholder. Upon the grant of the Restricted Stock Award and payment of any applicable purchase price, a grantee of Restricted Stock shall be considered the record owner of and shall be entitled to vote the Restricted Stock if, and to the extent, such Shares are entitled to voting rights, subject to such conditions contained in the Award Agreement. The grantee shall be entitled to receive all dividends and any other distributions declared on the Shares; provided, however, that the Company is under no duty to declare any such dividends or to make any such distribution. Unless the Committee shall otherwise determine, certificates evidencing the Restricted Stock shall remain in the possession of the Company until such Restricted Stock is vested as provided in subsection (d) below of this Section, and the grantee shall be required, as a condition of the grant, to deliver to the Company a stock power endorsed in blank and such other instruments of transfer as the Committee may prescribe.

(c) Restrictions. Restricted Stock may not be sold, assigned, transferred, pledged or otherwise encumbered or disposed of except as specifically provided herein or in the Award Agreement. Except as may otherwise be provided by the Committee either in the Award Agreement or, subject to Section 12 below, in writing after the Award Agreement is issued, if a grantee's Service Relationship with the Company and any Subsidiary terminates, the Company or its assigns shall have the right, as may be specified in the relevant instrument, to repurchase some or all of the Shares subject to the Award at such purchase price as is set forth in the Award Agreement.

(d) Vesting of Restricted Stock. The Committee at the time of grant shall specify in the Award Agreement the date or dates and/or the attainment of pre-established performance goals, objectives and other conditions on which the substantial risk of forfeiture imposed shall lapse and the Restricted Stock shall become vested, subject to such further rights of the Company or its assigns as may be specified in the Award Agreement.

SECTION 7. UNRESTRICTED STOCK AWARDS

The Committee may, in its sole discretion, grant (or sell at par value or such other purchase price determined by the Committee) to an eligible person under Section 4 hereof an Unrestricted Stock Award under the Plan. Unrestricted Stock Awards may be granted in respect of past services or other valid consideration, or in lieu of cash compensation due to such grantee.

SECTION 8. RESTRICTED STOCK UNITS

(a) Nature of Restricted Stock Units. The Committee may, in its sole discretion, grant to an eligible person under Section 4 hereof Restricted Stock Units under the Plan. The Committee shall determine the restrictions and conditions applicable to each Restricted Stock Unit at the time of grant. Vesting conditions may be based on continuing employment (or other Service Relationship), achievement of pre-established performance goals and objectives and/or other such criteria as the Committee may determine. Upon the grant of Restricted Stock Units, the grantee and the Company shall enter into an Award Agreement. The terms and conditions of each such Award Agreement shall be determined by the Committee and may differ among individual Awards and grantees. On or promptly following the vesting date or dates applicable to any Restricted Stock Unit, but in no event later than March 15 of the year following the year in which such vesting occurs, such Restricted Stock Unit(s) shall be settled in the form of cash or shares of Stock, as specified in the Award Agreement. Restricted Stock Units may not be sold, assigned, transferred, pledged, or otherwise encumbered or disposed of.

(b) Rights as a Stockholder. A grantee shall have the rights of a stockholder only as to Shares, if any, acquired upon settlement of Restricted Stock Units. A grantee shall not be deemed to have acquired any such Shares unless and until the Restricted Stock Units shall have been settled in Shares pursuant to the terms of the Plan and the Award Agreement, the Company shall have issued and delivered a certificate representing the Shares to the grantee (or transferred on the records of the Company with respect to uncertificated stock), and the grantee's name has been entered in the books of the Company as a stockholder.

(c) Termination. Except as may otherwise be provided by the Committee either in the Award Agreement or in writing after the Award Agreement is issued, a grantee's right in all Restricted Stock Units that have not vested shall automatically terminate upon the grantee's cessation of Service Relationship with the Company and any Subsidiary for any reason.

SECTION 9. TRANSFER RESTRICTIONS; COMPANY RIGHT OF FIRST REFUSAL; COMPANY REPURCHASE RIGHTS

(a) Restrictions on Transfer.

(i) Non-Transferability of Stock Options. Stock Options and, prior to exercise, the Shares issuable upon exercise of such Stock Option, shall not be transferable by the optionee otherwise than by will, or by the laws of descent and distribution, and all Stock Options shall be exercisable, during the optionee's lifetime, only by the optionee, or by the optionee's legal representative or guardian in the event of the optionee's incapacity. Notwithstanding the foregoing, the Committee, in its sole discretion, may provide in the Award Agreement regarding a given Stock Option that the optionee may transfer by gift, without consideration for the transfer, his or her Non-Qualified Stock Options to his or her family members (as defined in Rule 701 of the Securities Act), to trusts for the benefit of such family members, or to partnerships in which such family members are the only partners (to the extent such trusts or partnerships are considered "family members" for purposes of Rule 701 of the Securities Act), provided that the transferee agrees in writing with the Company to be bound by all of the terms and conditions of this Plan and the applicable Award Agreement, including the execution of a stock power upon the issuance of Shares. Stock Options, and the Shares issuable upon exercise of such Stock Options, shall be restricted as to any pledge, hypothecation, or other transfer, including any short position, any "put equivalent position" (as defined in the Exchange Act) or any "call equivalent position" (as defined in the Exchange Act) prior to exercise.

(ii) Shares. No Shares shall be sold, assigned, transferred, pledged, hypothecated, given away or in any other manner disposed of or encumbered, whether voluntarily or by operation of law, unless (i) the transfer is in compliance with the terms of the applicable Award Agreement, all applicable securities laws (including, without limitation, the Securities Act), and with the terms and conditions of this Section 9, (ii) the transfer does not cause the Company to become subject to the reporting requirements of the Exchange Act, and (iii) the transferee consents in writing to be bound by the provisions of the Plan and the Award Agreement, including this Section 9. In connection with any proposed transfer, the Committee may require the transferor to provide at the transferor's own expense an opinion of counsel to the transferor, satisfactory to the Committee, that such transfer is in compliance with all foreign, federal and state securities laws (including, without limitation, the Securities Act). Any attempted transfer of Shares not in accordance with the terms and conditions of this Section 9 shall be null and void, and the Company shall not reflect on its records any change in record ownership of any Shares as a result of any such transfer, shall otherwise refuse to recognize any such transfer and shall not in any way give effect to any such transfer of Shares. The Company shall be entitled to seek protective orders, injunctive relief and other remedies available at law or in equity including, without limitation, seeking specific performance or the rescission of any transfer not made in strict compliance with the provisions of this Section 9. Subject to the foregoing general provisions, and unless otherwise provided in the applicable Award Agreement, Shares may be transferred pursuant to the following specific terms and conditions (provided that with respect to any transfer of Restricted Stock, all vesting and forfeiture provisions shall continue to apply with respect to the original recipient):

(A) Transfers to Permitted Transferees. The Holder may transfer any or all of the Shares to one or more Permitted Transferees; *provided, however*, that following such transfer, such Shares shall continue to be subject to the terms of this Plan (including this Section 9) and such Permitted Transferee(s) shall, as a condition to any such transfer, deliver a written acknowledgment to that effect to the Company and shall deliver a stock power to the Company with respect to the Shares. Notwithstanding the foregoing, the Holder may not transfer any of the Shares to a Person whom the Company reasonably determines is a direct competitor or a potential competitor of the Company or any of its Subsidiaries.

(B) Transfers Upon Death. Upon the death of the Holder, any Shares then held by the Holder at the time of such death and any Shares acquired after the Holder's death by the Holder's legal representative shall be subject to the provisions of this Plan, and the Holder's estate, executors, administrators, personal representatives, heirs, legatees and distributees shall be obligated to convey such Shares to the Company or its assigns under the terms contemplated by the Plan and the Award Agreement.

(b) Right of First Refusal. In the event that a Holder desires at any time to sell or otherwise transfer all or any part of his or her Shares (other than shares of Restricted Stock which by their terms are not transferrable), the Holder first shall give written notice to the Company of the Holder's intention to make such transfer. Such notice shall state the number of Shares that the Holder proposes to sell (the "Offered Shares"), the price and the terms at which the proposed sale is to be made and the name and address of the proposed transferee. At any time within 30 days after the receipt of such notice by the Company, the Company or its assigns may elect to purchase all or any portion of the Offered Shares at the price and on the terms offered by the proposed transferee and specified in the notice. The Company or its assigns shall exercise this right by mailing or delivering written notice to the Holder within the foregoing 30-day period. If the Company or its assigns elect to exercise its purchase rights under this Section 9(b), the closing for such purchase shall, in any event, take place within 45 days after the receipt by the Company of the initial notice from the Holder. In the event that the Company or its assigns do not elect to exercise such purchase right, or in the event that the Company or its assigns do not pay the full purchase price within such 45-day period, the Holder may, within 60 days thereafter, sell the Offered Shares to the proposed transferee and at the same price and on the same terms as specified in the Holder's notice. Any Shares not sold to the proposed transferee shall remain subject to the Plan. If the Holder is a party to any stockholders agreements or other agreements with the Company and/or certain other of the Company's stockholders relating to the Shares, (i) the transferring Holder shall comply with the requirements of such stockholders agreements or other agreements relating to any proposed transfer of the Offered Shares, and (ii) any proposed transferee that purchases Offered Shares shall enter into such stockholders agreements or other agreements with the Company and/or certain of the Company's stockholders relating to the Offered Shares on the same terms and in the same capacity as the transferring Holder.

(c) Company's Right of Repurchase.

(i) Right of Repurchase for Shares Issued Upon the Exercise of an Option. Upon a Termination Event, the Company or its assigns shall have the right and option to repurchase from a Holder of Shares acquired upon exercise of a Stock Option which are still subject to a risk of forfeiture as of the Termination Event. Additionally, notwithstanding anything to the contrary contained in this Plan, upon a Termination Event for Cause, the Company or its assigns shall have the right and option to repurchase from a Holder of Shares acquired upon exercise of a Stock Option whether or not they are still subject to a risk of forfeiture as of such Termination Event for Cause. Such repurchase rights may be exercised by the Company within the later of (A) six months following the date of such Termination Event or (B) seven months after the acquisition of Shares upon exercise of a Stock Option. The repurchase price shall be equal to the lower of the original per share price paid by the Holder, subject to adjustment as provided in Section 3(b) of the Plan, or the current Fair Market Value of such Shares as of the date the Company elects to exercise its repurchase rights.

(ii) Right of Repurchase With Respect to Restricted Stock. Upon a Termination Event, the Company or its assigns shall have the right and option to repurchase from a Holder of Shares received pursuant to a Restricted Stock Award any Shares that are still subject to a risk of forfeiture as of the Termination Event. Such repurchase right may be exercised by the Company within six months following the date of such Termination Event. Additionally, notwithstanding anything to the contrary contained in this Plan, upon a Termination Event for Cause, the Company or its assigns shall have the right and option to repurchase from a Holder of Shares received pursuant to a Restricted Stock Award any Shares whether or not they are still subject to a risk of forfeiture as of such Termination Event for Cause. Such repurchase right may be exercised by the Company within six months following the date of such Termination Event. The repurchase price shall be the lower of the original per share purchase price paid by the Holder, subject to adjustment as provided in Section 3(b) of the Plan, or the current Fair Market Value of such Shares as of the date the Company elects to exercise its repurchase rights.

(iii) Procedure. Any repurchase right of the Company shall be exercised by the Company or its assigns by giving the Holder written notice on or before the last day of the repurchase period of its intention to exercise such repurchase right. Upon such notification, the Holder shall promptly surrender to the Company, free and clear of any liens or encumbrances, any certificates representing the Shares being purchased, together with a duly executed stock power for the transfer of such Shares to the Company or the Company's assignee or assignees. Upon the Company's or its assignee's receipt of the certificates from the Holder, the Company or its assignee or assignees shall deliver to him, her or them a check for the applicable repurchase price; *provided*, *however*, that the Company may pay the repurchase price by offsetting and canceling any indebtedness then owed by the Holder to the Company.

(d) Reserved.

(e) Escrow Arrangement.

(i) Escrow. In order to carry out the provisions of this Section 9 of this Plan more effectively, the Company shall hold any Shares issued pursuant to Awards granted under the Plan in escrow together with separate stock powers executed by the Holder in blank for transfer. The Company shall not dispose of the Shares except as otherwise provided in this Plan. In the event of any repurchase by the Company (or any of its assigns), the Company is hereby authorized by the Holder, as the Holder's attorney-in-fact, to date and complete the stock powers necessary for the transfer of the Shares being purchased and to transfer such Shares in accordance with the terms hereof. At such time as any Shares are no longer subject to the Company's repurchase and first refusal rights, the Company shall, at the written request of the Holder, deliver to the Holder a certificate representing such Shares with the balance of the Shares to be held in escrow pursuant to this Section.

(ii) Remedy. Without limitation of any other provision of this Plan or other rights, in the event that a Holder or any other Person is required to sell a Holder's Shares pursuant to the provisions of Sections 9(b) or (c) hereof and in the further event that he or she refuses or for any reason fails to deliver to the Company or its designated purchaser of such Shares the certificate or certificates evidencing such Shares together with a related stock power, the Company or such designated purchaser may deposit the applicable purchase price for such Shares with a bank designated by the Company, or with the Company's independent public accounting firm, as agent or trustee, or in escrow, for such Holder or other Person, to be held by such bank or accounting firm for the benefit of and for delivery to him, her, them or it, and/or, in its discretion, pay such purchase price by offsetting any indebtedness then owed by such Holder as provided above. Upon any such deposit and/or offset by the Company or its designated purchaser of such amount and upon notice to the Person who was required to sell the Shares to be sold pursuant to the provisions of Sections 9(b) or (c), such Shares shall at such time be deemed to have been sold, assigned, transferred and conveyed to such purchaser, such Holder shall have no further rights thereto (other than the right to withdraw the payment thereof held in escrow, if applicable), and the Company shall record such transfer in its stock transfer book or in any appropriate manner.

(f) Lockup Provision. If requested by the Company, a Holder shall not sell or otherwise transfer or dispose of any Shares (including, without limitation, pursuant to Rule 144 under the Securities Act) held by him or her for such period following the effective date of a public offering by the Company of Shares as the Company shall specify reasonably and in good faith. If requested by the underwriter engaged by the Company, each Holder shall execute a separate letter confirming his or her agreement to comply with this Section.

(g) Adjustments for Changes in Capital Structure. If, as a result of any reorganization, recapitalization, reclassification, stock dividend, stock split, reverse stock split or other similar change in the Common Stock, the outstanding Shares are increased or decreased or are exchanged for a different number or kind of securities of the Company, the restrictions contained in this Section 9 shall apply with equal force to additional and/or substitute securities, if any, received by Holder in exchange for, or by virtue of his or her ownership of, Shares.

(h) Termination. The terms and provisions of Section 9(b) and Section 9(c) (except for the Company's right to repurchase Shares still subject to a risk of forfeiture upon a Termination Event) shall terminate upon the closing of the Company's Initial Public Offering or upon consummation of any Sale Event, in either case as a result of which Shares are registered under Section 12 of the Exchange Act and publicly-traded on any national security exchange.

SECTION 10. TAX WITHHOLDING

(a) Payment by Grantee. Each grantee shall, no later than the date as of which the value of an Award or of any Shares or other amounts received thereunder first becomes includable in the gross income of the grantee for income tax purposes, pay to the Company, or make arrangements satisfactory to the Committee regarding payment of, any Federal, state, or local taxes of any kind required by law to be withheld by the Company with respect to such income. The Company and any Subsidiary shall, to the extent permitted by law, have the right to deduct any such taxes from any payment of any kind otherwise due to the grantee. The Company's obligation to deliver stock certificates (or evidence of book entry) to any grantee is subject to and conditioned on any such tax withholding obligations being satisfied by the grantee.

(b) Payment in Stock. The Company's minimum required tax withholding obligation may be satisfied, in whole or in part, by the Company withholding from Shares to be issued pursuant to an Award a number of Shares having an aggregate Fair Market Value (as of the date the withholding is effected) that would satisfy the minimum withholding amount due.

SECTION 11. SECTION 409A AWARDS.

To the extent that any Award is determined to constitute "nonqualified deferred compensation" within the meaning of Section 409A (a "409A Award"), the Award shall be subject to such additional rules and requirements as may be specified by the Committee from time to time. In this regard, if any amount under a 409A Award is payable upon a "separation from service" (within the meaning of Section 409A) to a grantee who is considered a "specified employee" (within the meaning of Section 409A), then no such payment shall be made prior to the date that is the earlier of (i) six months and one day after the grantee's separation from service, or (ii) the grantee's death, but only to the extent such delay is necessary to prevent such payment from being subject to interest, penalties and/or additional tax imposed pursuant to Section 409A. The Company makes no representation or warranty and shall have no liability to any grantee under the Plan or any other Person with respect to any penalties or taxes under Section 409A that are, or may be, imposed with respect to any Award.

SECTION 12. AMENDMENTS AND TERMINATION

The Board may, at any time, amend or discontinue the Plan and the Committee may, at any time, amend or cancel any outstanding Award for the purpose of satisfying changes in law or for any other lawful purpose, but no such action shall adversely affect rights under any outstanding Award without the consent of the holder of the Award. The Committee may exercise its discretion to reduce the exercise price of outstanding Stock Options or effect repricing through cancellation of outstanding Stock Options and by granting such holders new Awards in replacement of the cancelled Stock Options. To the extent determined by the Committee to be required either by the Code to ensure that Incentive Stock Options granted under the Plan are qualified under Section 422 of the Code or otherwise, Plan amendments shall be subject to approval by the Company stockholders entitled to vote at a meeting of stockholders. Nothing in this Section 12 shall limit the Board's or Committee's authority to take any action permitted pursuant to Section 3(c). The Board reserves the right to amend the Plan and/or the terms of any outstanding Stock Options to the extent reasonably necessary to comply with the requirements of the exemption pursuant to paragraph (f)(4) of Rule 12h-1 of the Exchange Act.

SECTION 13. STATUS OF PLAN

With respect to the portion of any Award that has not been exercised and any payments in cash, Stock or other consideration not received by a grantee, a grantee shall have no rights greater than those of a general creditor of the Company unless the Committee shall otherwise expressly so determine in connection with any Award.

SECTION 14. GENERAL PROVISIONS

(a) No Distribution; Compliance with Legal Requirements. The Committee may require each person acquiring Shares pursuant to an Award to represent to and agree with the Company in writing that such person is acquiring the Shares without a view to distribution thereof. No Shares shall be issued pursuant to an Award until all applicable securities law and other legal and stock exchange or similar requirements have been satisfied. The Committee may require the placing of such stop-orders and restrictive legends on certificates for Stock and Awards as it deems appropriate.

(b) Delivery of Stock Certificates. Stock certificates to grantees under the Plan shall be deemed delivered for all purposes when the Company or a stock transfer agent of the Company shall have mailed such certificates in the United States mail, addressed to the grantee, at the grantee's last known address on file with the Company; provided that stock certificates to be held in escrow pursuant to Section 9 of the Plan shall be deemed delivered when the Company shall have recorded the issuance in its records. Uncertificated Stock shall be deemed delivered for all purposes when the Company or a stock transfer agent of the Company shall have given to the grantee by electronic mail (with proof of receipt) or by United States mail, addressed to the grantee, at the grantee's last known address on file with the Company, notice of issuance and recorded the issuance in its records (which may include electronic "book entry" records).

(c) No Employment Rights**.** The adoption of the Plan and the grant of Awards do not confer upon any Person any right to continued employment or Service Relationship with the Company or any Subsidiary.

(d) Trading Policy Restrictions. Option exercises and other Awards under the Plan shall be subject to the Company's insider trading policy-related restrictions, terms and conditions as may be established by the Committee, or in accordance with policies set by the Committee, from time to time.

(e) Designation of Beneficiary. Each grantee to whom an Award has been made under the Plan may designate a beneficiary or beneficiaries to exercise any Award on or after the grantee's death or receive any payment under any Award payable on or after the grantee's death. Any such designation shall be on a form provided for that purpose by the Committee and shall not be effective until received by the Committee. If no beneficiary has been designated by a deceased grantee, or if the designated beneficiaries have predeceased the grantee, the beneficiary shall be the grantee's estate.

(f) Legend. Any certificate(s) representing the Shares shall carry substantially the following legend (and with respect to uncertificated Stock, the book entries evidencing such shares shall contain the following notation):

> The transferability of this certificate and the shares of stock represented hereby are subject to the restrictions, terms and conditions (including repurchase and restrictions against transfers) contained in the AvroBio, Inc. Amended and Restated 2015 Stock Option and Grant Plan and any agreements entered into thereunder by and between the company and the holder of this certificate (a copy of which is available at the offices of the company for examination).

(g) Information to Holders of Options. In the event the Company is relying on the exemption from the registration requirements of Section 12(g) of the Exchange Act contained in paragraph (f)(1) of Rule 12h-1 of the Exchange Act, the Company shall provide the information described in Rule 701(e)(3), (4) and (5) of the Securities Act to all holders of Options in accordance with the requirements thereunder. The foregoing notwithstanding, the Company shall not be required to provide such information unless the optionholder has agreed in writing, on a form prescribed by the Company, to keep such information confidential.

SECTION 15. EFFECTIVE DATE OF PLAN

The Plan shall become effective upon adoption by the Board and shall be approved by stockholders in accordance with applicable state law and the Company's articles of incorporation and bylaws within 12 months thereafter. If the stockholders fail to approve the Plan within 12 months after its adoption by the Board of Directors, then any Awards granted or sold under the Plan shall be rescinded and no additional grants or sales shall thereafter be made under the Plan. Subject to such approval by stockholders and to the requirement that no Shares may be issued hereunder prior to such approval, Stock Options and other Awards may be granted hereunder on and after adoption of the Plan by the Board. No grants of Stock Options and other Awards may be made hereunder after the tenth anniversary of the date the Plan is adopted by the Board or the date the Plan is approved by the Company's stockholders, whichever is earlier.

SECTION 16. GOVERNING LAW

This Plan, all Awards and any controversy arising out of or relating to this Plan and all Awards shall be governed by and construed in accordance with the General Corporation Law of the State of Delaware as to matters within the scope thereof, and as to all other matters shall be governed by and construed in accordance with the internal laws of Massachusetts, without regard to conflict of law principles that would result in the application of any law other than the law of the Commonwealth of Massachusetts.

DATE ADOPTED BY THE BOARD OF DIRECTORS: July 21, 2016

DATE APPROVED BY THE STOCKHOLDERS: July 21, 2016

AVROBIO, INC.

AMENDMENT NO. 1 TO

AMENDED AND RESTATED 2015 STOCK OPTION AND GRANT PLAN

WHEREAS, the Board of Directors of AvroBio, Inc. (the "Company") approved and adopted the Amended and Restated 2015 Stock Option and Grant Plan (the "Plan") of the Company on July 21, 2016, and the stockholders of the Company approved and adopted the Plan on July 21, 2016; and

WHEREAS, the Board of Directors and the stockholders of the Company have determined that it is in the best interest of the Company to amend the Plan as set forth in this Amendment.

NOW, THEREFORE, the Plan is amended as follows:

1. Amendment of the Plan

1.01. Section 3(a) of the Plan is hereby amended and restated in its entirety to read as follows:

(a) "Stock Issuable. The maximum number of Shares reserved and available for issuance under the Plan shall be 5,536,966 Shares, subject to adjustment as provided in Section 3(b). For purposes of this limitation, the Shares underlying any Awards that are forfeited, canceled, reacquired by the Company prior to vesting, satisfied without the issuance of Stock or otherwise terminated (other than by exercise) and Shares that are withheld upon exercise of an Option or settlement of an Award to cover the exercise price or tax withholding shall be added back to the Shares available for issuance under the Plan. Subject to such overall limitations, Shares may be issued up to such maximum number pursuant to any type or types of Award, and no more than 55,369,660 Shares may be issued pursuant to Incentive Stock Options. The Shares available for issuance under the Plan may be authorized but unissued Shares or Shares reacquired by the Company. Beginning on the date that the Company becomes subject to Section 162(m) of the Code, Options with respect to no more than 5,536,966 Shares shall be granted to any one individual in any calendar year period.

2. Miscellaneous.

2.01. Effect. Except as amended hereby, the Plan shall remain in full force and effect.

2.02. Defined Terms. All capitalized terms used but not specifically defined herein shall have the same meanings given such terms in the Plan unless the context clearly indicates or dictates a contrary meaning.

2.03. Governing Law. This Amendment shall be governed by and construed in accordance with the General Corporation Law of the State of Delaware as to matters within the scope thereof, and as to all other matters shall be governed by and construed in accordance with the internal laws of Massachusetts, without regard to conflict of law principles that would result in the application of any law other than the law of the Commonwealth of Massachusetts.

ADOPTED BY BOARD OF DIRECTORS: March 30, 2017

APPROVED BY STOCKHOLDERS: March 30, 2017

INCENTIVE STOCK OPTION GRANT NOTICE
UNDER THE AVROBIO, INC.
2015 STOCK OPTION AND GRANT PLAN

Pursuant to the AVROBIO, Inc. 2015 Stock Option and Grant Plan (the "Plan"), AVROBIO, Inc., a Delaware corporation (together with any successor, the "Company"), has granted to the individual named below, an option (the "Stock Option") to purchase on or prior to the Expiration Date, or such earlier date as is specified herein, all or any part of the number of shares of Common Stock, par value $0.0001 per share ("Common Stock"), of the Company indicated below (the "Shares"), at the Option Exercise Price per share, subject to the terms and conditions set forth in this Incentive Stock Option Grant Notice (the "Grant Notice"), the attached Incentive Stock Option Agreement (the "Agreement") and the Plan. This Stock Option is intended to qualify as an "incentive stock option" as defined in Section 422(b) of the Internal Revenue Code of 1986, as amended from time to time (the "Code"). To the extent that any portion of the Stock Option does not so qualify, it shall be deemed a non-qualified stock option.

Name of Optionee:	_____ (the "Optionee")
No. of Shares:	_____ Shares of Common Stock
Grant Date:	
Vesting Commencement Date:	_____ (the "Vesting Commencement Date")
Expiration Date:	_____ (the "Expiration Date")
Option Exercise Price/Share:	$_____ (the "Option Exercise Price")
Vesting Schedule:	[25] percent of the Shares shall vest and become exercisable on the first anniversary of the Vesting Commencement Date; provided that the Optionee continues to have a Service Relationship with the Company at such time. Thereafter, the remaining [75] percent of the Shares shall vest and become exercisable in [36] equal monthly installments following the first anniversary of the Vesting Commencement Date, provided the Optionee continues to have a Service Relationship with the Company at such time. Notwithstanding anything in the Agreement to the contrary, in the case of a Sale Event, this Stock Option and the Shares shall be treated as provided in Section 3(c) of the Plan**.**

Attachments: Incentive Stock Option Agreement, 2015 Stock Option and Grant Plan

INCENTIVE STOCK OPTION AGREEMENT
UNDER THE AVROBIO, INC.
2015 STOCK OPTION AND GRANT PLAN

All capitalized terms used herein and not otherwise defined shall have the respective meanings set forth in the Grant Notice and the Plan.

1. Vesting, Exercisability and Termination.

(a) No portion of this Stock Option may be exercised until such portion shall have vested and become exercisable.

(b) Except as set forth below, and subject to the determination of the Committee in its sole discretion to accelerate the vesting schedule hereunder, this Stock Option shall be vested and exercisable on the respective dates indicated below:

(i) This Stock Option shall initially be unvested and unexercisable.

(ii) This Stock Option shall vest and become exercisable in accordance with the Vesting Schedule set forth in the Grant Notice.

(c) Termination. Except as may otherwise be provided by the Committee, if the Optionee's Service Relationship is terminated, the period within which to exercise this Stock Option will be subject to earlier termination as set forth below (and if not exercised within such period, shall thereafter terminate subject, in each case, to Section 3(c) of the Plan):

(i) Termination Due to Death or Disability. If the Optionee's Service Relationship terminates by reason of such Optionee's death or Disability, this Stock Option may be exercised, to the extent exercisable on the date of such termination, by the Optionee, the Optionee's legal representative or legatee for a period of 12 months from the date of death or Disability or until the Expiration Date, if earlier.

(ii) Other Termination. If the Optionee's Service Relationship terminates for any reason other than death or Disability, and unless otherwise determined by the Committee, this Stock Option may be exercised, to the extent exercisable on the date of termination, for a period of 90 days from the date of termination or until the Expiration Date, if earlier; provided however, if the Optionee's Service Relationship is terminated for Cause, this Stock Option shall terminate immediately upon the date of such termination.

For purposes hereof, the Committee's determination of the reason for termination of the Optionee's Service Relationship shall be conclusive and binding on the Optionee and his or her representatives or legatees. Any portion of this Stock Option that is not vested and exercisable on the date of termination of the Service Relationship shall terminate immediately and be null and void.

(d) It is understood and intended that this Stock Option is intended to qualify as an "incentive stock option" as defined in Section 422 of the Code to the extent permitted under applicable law. Accordingly, the Optionee understands that in order to obtain the benefits of an incentive stock option under Section 422 of the Code, no sale or other disposition may be made of Shares for which incentive stock option treatment is desired within the one-year period beginning on the day after the day of the transfer of such Shares to him or her, nor within the two-year period beginning on the day after Grant Date of this Stock Option and further that this Stock Option must be exercised within three months after termination of employment as an employee (or 12 months in the case of death or disability) to qualify as an incentive stock option. If the Optionee disposes (whether by sale, gift, transfer or otherwise) of any such Shares within either of these periods, he or she will notify the Company within 30 days after such disposition. The Optionee also agrees to provide the Company with any information concerning any such dispositions required by the Company for tax purposes. Further, to the extent this Stock Option and any other incentive stock options of the Optionee having an aggregate Fair Market Value in excess of $100,000 (determined as of the Grant Date) first become exercisable in any year, such options will not qualify as incentive stock options.

2. Exercise of Stock Option.

(a) The Optionee may exercise this Stock Option only in the following manner: Prior to the Expiration Date, the Optionee may deliver a Stock Option exercise notice (an "Exercise Notice") in the form of Appendix A hereto indicating his or her election to purchase some or all of the Shares with respect to which this Stock Option is then exercisable. Such notice shall specify the number of Shares to be purchased. Payment of the purchase price may be made by one or more of the methods described in Section 5 of the Plan, subject to the limitations contained in such Section of the Plan, including the requirement that the Committee specifically approve in advance certain payment methods.

(b) Notwithstanding any other provision hereof or of the Plan, no portion of this Stock Option shall be exercisable after the Expiration Date.

3. Incorporation of Plan. Notwithstanding anything herein to the contrary, this Stock Option shall be subject to and governed by all the terms and conditions of the Plan.

4. Transferability of Stock Option. This Stock Option is personal to the Optionee and is not transferable by the Optionee in any manner other than by will or by the laws of descent and distribution. The Stock Option may be exercised during the Optionee's lifetime only by the Optionee (or by the Optionee's guardian or personal representative in the event of the Optionee's incapacity). The Optionee may elect to designate a beneficiary by providing written notice of the name of such beneficiary to the Company, and may revoke or change such designation at any time by filing written notice of revocation or change with the Company; such beneficiary may exercise the Optionee's Stock Option in the event of the Optionee's death to the extent provided herein. If the Optionee does not designate a beneficiary, or if the designated beneficiary predeceases the Optionee, the legal representative of the Optionee may exercise this Stock Option to the extent provided herein in the event of the Optionee's death.

5. Restrictions on Transfer of Shares. The Shares acquired upon exercise of the Stock Option shall be subject to certain transfer restrictions and other limitations including, without limitation, the provisions contained in Section 9 of the Plan.

6. Miscellaneous Provisions.

(a) Equitable Relief. The parties hereto agree and declare that legal remedies may be inadequate to enforce the provisions of this Agreement and that equitable relief, including specific performance and injunctive relief, may be used to enforce the provisions of this Agreement.

(b) Adjustments for Changes in Capital Structure. If, as a result of any reorganization, recapitalization, reincorporation, reclassification, stock dividend, stock split, reverse stock split or other similar change in the Common Stock, the outstanding shares of Common Stock are increased or decreased or are exchanged for a different number or kind of securities of the Company, the restrictions contained in this Agreement shall apply with equal force to additional and/or substitute securities, if any, received by the Optionee in exchange for, or by virtue of his or her ownership of, this Stock Option or Shares acquired pursuant thereto.

(c) Change and Modifications. This Agreement may not be orally changed, modified or terminated, nor shall any oral waiver of any of its terms be effective. This Agreement may be changed, modified or terminated only by an agreement in writing signed by the Company and the Optionee.

(d) Governing Law. This Agreement shall be governed by and construed in accordance with the General Corporation Law of the State of Delaware as to matters within the scope thereof, and as to all other matters shall be governed by and construed in accordance with the internal laws of Massachusetts, without regard to conflict of law principles that would result in the application of any law other than the law of the Commonwealth of Massachusetts.

(e) Headings. The headings are intended only for convenience in finding the subject matter and do not constitute part of the text of this Agreement and shall not be considered in the interpretation of this Agreement.

(f) Saving Clause. If any provision(s) of this Agreement shall be determined to be illegal or unenforceable, such determination shall in no manner affect the legality or enforceability of any other provision hereof.

(g) Notices. All notices, requests, consents and other communications shall be in writing and be deemed given when delivered personally, by telex or facsimile transmission or when received if mailed by first class registered or certified mail, postage prepaid. Notices to the Company or the Optionee shall be addressed as set forth underneath their signatures below, or to such other address or addresses as may have been furnished by such party in writing to the other.

(h) Benefit and Binding Effect. This Agreement shall be binding upon and shall inure to the benefit of the parties hereto, their respective successors, assigns, and legal representatives. The Company has the right to assign this Agreement, and such assignee shall become entitled to all the rights of the Company hereunder to the extent of such assignment.

(i) Counterparts. For the convenience of the parties and to facilitate execution, this Agreement may be executed in two or more counterparts, each of which shall be deemed an original, but all of which shall constitute one and the same document.

(j) Integration. This Agreement constitutes the entire agreement between the parties with respect to this Stock Option and supersedes all prior agreements and discussions between the parties concerning such subject matter.

7. Dispute Resolution.

(a) Except as provided below, any dispute arising out of or relating to the Plan or this Stock Option, this Agreement, or the breach, termination or validity of the Plan, this Stock Option or this Agreement, shall be finally settled by binding arbitration conducted expeditiously in accordance with the J.A.M.S./Endispute Comprehensive Arbitration Rules and Procedures (the "J.A.M.S. Rules"). The arbitration shall be governed by the United States Arbitration Act, 9 U.S.C. Sections 1 16, and judgment upon the award rendered by the arbitrators may be entered by any court having jurisdiction thereof. The place of arbitration shall be Boston, MA.

(b) The arbitration shall commence within 60 days of the date on which a written demand for arbitration is filed by any party hereto. In connection with the arbitration proceeding, the arbitrator shall have the power to order the production of documents by each party and any third-party witnesses. In addition, each party may take up to three depositions as of right, and the arbitrator may in his or her discretion allow additional depositions upon good cause shown by the moving party. However, the arbitrator shall not have the power to order the answering of interrogatories or the response to requests for admission. In connection with any arbitration, each party to the arbitration shall provide to the other, no later than seven business days before the date of the arbitration, the identity of all persons that may testify at the arbitration and a copy of all documents that may be introduced at the arbitration or considered or used by a party's witness or expert. The arbitrator's decision and award shall be made and delivered within six months of the selection of the arbitrator. The arbitrator's decision shall set forth a reasoned basis for any award of damages or finding of liability. The arbitrator shall not have power to award damages in excess of actual compensatory damages and shall not multiply actual damages or award punitive damages, and each party hereby irrevocably waives any claim to such damages.

(c) The Company, the Optionee, each party to the Agreement and any other holder of Shares issued pursuant to this Agreement (each, a "Party") covenants and agrees that such party will participate in the arbitration in good faith. This Section 7 applies equally to requests for temporary, preliminary or permanent injunctive relief, except that in the case of temporary or preliminary injunctive relief any party may proceed in court without prior arbitration for the limited purpose of avoiding immediate and irreparable harm.

(d) Each Party (i) hereby irrevocably submits to the jurisdiction of any United States District Court of competent jurisdiction for the purpose of enforcing the award or decision in any such proceeding, (ii) hereby waives, and agrees not to assert, by way of motion, as a defense, or otherwise, in any such suit, action or proceeding, any claim that it is not subject personally to the jurisdiction of the above named courts, that its property is exempt or immune from attachment or execution (except as protected by applicable law), that the suit, action or proceeding is brought in an inconvenient forum, that the venue of the suit, action or proceeding is improper or that this Agreement or the subject matter hereof may not be enforced in or by such court, and (iii) hereby waives and agrees not to seek any review by any court of any other jurisdiction which may be called upon to grant an enforcement of the judgment of any such court. Each Party hereby consents to service of process by registered mail at the address to which notices are to be given. Each Party agrees that its, his or her submission to jurisdiction and its, his or her consent to service of process by mail is made for the express benefit of each other Party. Final judgment against any Party in any such action, suit or proceeding may be enforced in other jurisdictions by suit, action or proceeding on the judgment, or in any other manner provided by or pursuant to the laws of such other jurisdiction.

[SIGNATURE PAGE FOLLOWS]

The foregoing Agreement is hereby accepted and the terms and conditions thereof hereby agreed to by the undersigned as of the date first above written.

AVROBIO, INC.

By: _____
Name:
Title:

Address:

_____

_____

_____

The undersigned hereby acknowledges receiving and reviewing a copy of the Plan, including, without limitation, Section 9 thereof, and understands that this Stock Option is subject to the terms of the Plan and of this Agreement. This Agreement is hereby accepted, and the terms and conditions of the Plan, the Grant Notice and this Agreement, SPECIFICALLY INCLUDING THE ARBITRATION PROVISIONS SET FORTH IN SECTION 7 OF THIS AGREEMENT, are hereby agreed to, by the undersigned as of the date first above written.

OPTIONEE:

_____

Name:

Address:

_____

_____

Appendix A

STOCK OPTION EXERCISE NOTICE

AVROBIO, Inc.
Attn: President

_____
_____
_____

Pursuant to the terms of the grant notice and stock option agreement between the undersigned and AVROBIO, Inc. (the "Company") dated (the "Agreement") under the AVROBIO, Inc. 2015 Stock Option and Grant Plan, I, [Insert Name] , hereby [Circle One] partially/fully exercise such option by including herein payment in the amount of $ representing the purchase price for [Fill in number of Shares] Shares. I have chosen the following form(s) of payment:

☐ 1. Cash

☐ 2. Certified or bank check payable to AVROBIO, Inc.

☐ 3. Other (as referenced in the Agreement and described in the Plan (please describe))

_____.

In connection with my exercise of the option as set forth above, I hereby represent and warrant to the Company as follows:

(i) I am purchasing the Shares for my own account for investment only, and not for resale or with a view to the distribution thereof.

(ii) I have had such an opportunity as I have deemed adequate to obtain from the Company such information as is necessary to permit me to evaluate the merits and risks of my investment in the Company and have consulted with my own advisers with respect to my investment in the Company.

(iii) I have sufficient experience in business, financial and investment matters to be able to evaluate the risks involved in the purchase of the Shares and to make an informed investment decision with respect to such purchase.

(iv) I can afford a complete loss of the value of the Shares and am able to bear the economic risk of holding such Shares for an indefinite period of time.

(v) I understand that the Shares may not be registered under the Securities Act of 1933 (it being understood that the Shares are being issued and sold in reliance on the exemption provided in Rule 701 thereunder) or any applicable state securities or "blue sky" laws and may not be sold or otherwise transferred or disposed of in the absence of an effective registration statement under the Securities Act of 1933 and

under any applicable state securities or “blue sky” laws (or exemptions from the registration requirement thereof). I further acknowledge that certificates representing Shares will bear restrictive legends reflecting the foregoing and/or that book entries for uncertificated Shares will include similar restrictive notations.

(vi) I have read and understand the Plan and acknowledge and agree that the Shares are subject to all of the relevant terms of the Plan, including without limitation, the transfer restrictions set forth in Section 9 of the Plan.

(vii) I understand and agree that the Company has a right of first refusal with respect to the Shares pursuant to Section 9(b) of the Plan.

(viii) I understand and agree that the Company has certain repurchase rights with respect to the Shares pursuant to Section 9(c) of the Plan.

(ix) I understand and agree that I may not sell or otherwise transfer or dispose of the Shares for a period of time following the effective date of a public offering by the Company as described in Section 9(f) of the Plan.

Sincerely yours,

_____

Name:

Address:

_____

_____

NON-QUALIFIED STOCK OPTION GRANT NOTICE
UNDER THE AVROBIO, INC.
2015 STOCK OPTION AND GRANT PLAN

Pursuant to the AVROBIO, Inc. 2015 Stock Option and Grant Plan (the "Plan"), AVROBIO, Inc., a Delaware corporation (together with any successor, the "Company"), has granted to the individual named below, an option (the "Stock Option") to purchase on or prior to the Expiration Date, or such earlier date as is specified herein, all or any part of the number of shares of Common Stock, par value $0.0001 per share ("Common Stock"), of the Company indicated below (the "Shares"), at the Option Exercise Price per share, subject to the terms and conditions set forth in this Non-Qualified Stock Option Grant Notice (the "Grant Notice"), the attached Non-Qualified Stock Option Agreement (the "Agreement") and the Plan. This Stock Option is not intended to qualify as an "incentive stock option" as defined in Section 422(b) of the Internal Revenue Code of 1986, as amended from time to time (the "Code").

Name of Optionee:	_____ (the "Optionee")
No. of Shares:	_____ Shares of Common Stock
Grant Date:	
Vesting Commencement Date:	_____ (the "Vesting Commencement Date")
Expiration Date:	_____ (the "Expiration Date")
Option Exercise Price/Share:	$_____ (the "Option Exercise Price")
Vesting Schedule:	[25] percent of the Shares shall vest and become exercisable on the first anniversary of the Vesting Commencement Date, provided that the Optionee continues to have a Service Relationship with the Company at such time. Thereafter, the remaining [75] percent of the Shares shall vest and become exercisable in [36] equal monthly installments following the first anniversary of the Vesting Commencement Date, provided the Optionee continues to have a Service Relationship with the Company at such time. Notwithstanding anything in the Agreement to the contrary, in the case of a Sale Event, this Stock Option and the Shares shall be treated as provided in Section 3(c) of the Plan**.**

Attachments: Non-Qualified Stock Option Agreement, 2015 Stock Option and Grant Plan

NON-QUALIFIED STOCK OPTION AGREEMENT
UNDER THE AVROBIO, INC.
2015 STOCK OPTION AND GRANT PLAN

All capitalized terms used herein and not otherwise defined shall have the respective meanings set forth in the Grant Notice and the Plan.

1. Vesting, Exercisability and Termination.

(a) No portion of this Stock Option may be exercised until such portion shall have vested and become exercisable.

(b) Except as set forth below, and subject to the determination of the Committee in its sole discretion to accelerate the vesting schedule hereunder, this Stock Option shall be vested and exercisable on the respective dates indicated below:

(i) This Stock Option shall initially be unvested and unexercisable.

(ii) This Stock Option shall vest and become exercisable in accordance with the Vesting Schedule set forth in the Grant Notice.

(c) Termination. Except as may otherwise be provided by the Committee, if the Optionee's Service Relationship is terminated, the period within which to exercise this Stock Option will be subject to earlier termination as set forth below (and if not exercised within such period, shall thereafter terminate subject, in each case, to Section 3(c) of the Plan):

(i) Termination Due to Death or Disability. If the Optionee's Service Relationship terminates by reason of such Optionee's death or Disability, this Stock Option may be exercised, to the extent exercisable on the date of such termination, by the Optionee, the Optionee's legal representative or legatee for a period of 12 months from the date of death or Disability or until the Expiration Date, if earlier.

(ii) Other Termination. If the Optionee's Service Relationship terminates for any reason other than death or Disability, and unless otherwise determined by the Committee, this Stock Option may be exercised, to the extent exercisable on the date of termination, for a period of 90 days from the date of termination or until the Expiration Date, if earlier; provided however, if the Optionee's Service Relationship is terminated for Cause, this Stock Option shall terminate immediately upon the date of such termination.

For purposes hereof, the Committee's determination of the reason for termination of the Optionee's Service Relationship shall be conclusive and binding on the Optionee and his or her representatives or legatees and any Permitted Transferee. Any portion of this Stock Option that is not vested and exercisable on the date of termination of the Service Relationship shall terminate immediately and be null and void.

2. Exercise of Stock Option.

(a) The Optionee may exercise this Stock Option only in the following manner: Prior to the Expiration Date, the Optionee may deliver a Stock Option exercise notice (an "Exercise Notice") in the form of Appendix A hereto indicating his or her election to purchase some or all of the Shares with respect to which this Stock Option is then exercisable. Such notice shall specify the number of Shares to be purchased. Payment of the purchase price may be made by one or more of the methods described in Section 5 of the Plan, subject to the limitations contained in such Section of the Plan, including the requirement that the Committee specifically approve in advance certain payment methods.

(b) Notwithstanding any other provision hereof or of the Plan, no portion of this Stock Option shall be exercisable after the Expiration Date.

3. Incorporation of Plan. Notwithstanding anything herein to the contrary, this Stock Option shall be subject to and governed by all the terms and conditions of the Plan.

4. Transferability of Stock Option. This Stock Option is personal to the Optionee and is not transferable by the Optionee in any manner other than by will or by the laws of descent and distribution. The Stock Option may be exercised during the Optionee's lifetime only by the Optionee (or by the Optionee's guardian or personal representative in the event of the Optionee's incapacity). The Optionee may elect to designate a beneficiary by providing written notice of the name of such beneficiary to the Company, and may revoke or change such designation at any time by filing written notice of revocation or change with the Company; such beneficiary may exercise the Optionee's Stock Option in the event of the Optionee's death to the extent provided herein. If the Optionee does not designate a beneficiary, or if the designated beneficiary predeceases the Optionee, the legal representative of the Optionee may exercise this Stock Option to the extent provided herein in the event of the Optionee's death.

5. Restrictions on Transfer of Shares. The Shares acquired upon exercise of the Stock Option shall be subject to certain transfer restrictions and other limitations including, without limitation, the provisions contained in Section 9 of the Plan.

6. Miscellaneous Provisions.

(a) Equitable Relief. The parties hereto agree and declare that legal remedies may be inadequate to enforce the provisions of this Agreement and that equitable relief, including specific performance and injunctive relief, may be used to enforce the provisions of this Agreement.

(b) Adjustments for Changes in Capital Structure. If, as a result of any reorganization, recapitalization, reincorporation, reclassification, stock dividend, stock split, reverse stock split or other similar change in the Common Stock, the outstanding shares of Common Stock are increased or decreased or are exchanged for a different number or kind of securities of the Company, the restrictions contained in this Agreement shall apply with equal force to additional and/or substitute securities, if any, received by the Optionee in exchange for, or by virtue of his or her ownership of, this Stock Option or Shares acquired pursuant thereto.

(c) Change and Modifications. This Agreement may not be orally changed, modified or terminated, nor shall any oral waiver of any of its terms be effective. This Agreement may be changed, modified or terminated only by an agreement in writing signed by the Company and the Optionee.

(d) Governing Law. This Agreement shall be governed by and construed in accordance with the General Corporation Law of the State of Delaware as to matters within the scope thereof, and as to all other matters shall be governed by and construed in accordance with the internal laws of Massachusetts, without regard to conflict of law principles that would result in the application of any law other than the law of the Commonwealth of Massachusetts.

(e) Headings. The headings are intended only for convenience in finding the subject matter and do not constitute part of the text of this Agreement and shall not be considered in the interpretation of this Agreement.

(f) Saving Clause. If any provision(s) of this Agreement shall be determined to be illegal or unenforceable, such determination shall in no manner affect the legality or enforceability of any other provision hereof.

(g) Notices. All notices, requests, consents and other communications shall be in writing and be deemed given when delivered personally, by telex or facsimile transmission or when received if mailed by first class registered or certified mail, postage prepaid. Notices to the Company or the Optionee shall be addressed as set forth underneath their signatures below, or to such other address or addresses as may have been furnished by such party in writing to the other.

(h) Benefit and Binding Effect. This Agreement shall be binding upon and shall inure to the benefit of the parties hereto, their respective successors, assigns, and legal representatives. The Company has the right to assign this Agreement, and such assignee shall become entitled to all the rights of the Company hereunder to the extent of such assignment.

(i) Counterparts. For the convenience of the parties and to facilitate execution, this Agreement may be executed in two or more counterparts, each of which shall be deemed an original, but all of which shall constitute one and the same document.

(j) Integration. This Agreement constitutes the entire agreement between the parties with respect to this Stock Option and supersedes all prior agreements and discussions between the parties concerning such subject matter.

7. Dispute Resolution.

(a) Except as provided below, any dispute arising out of or relating to the Plan or this Stock Option, this Agreement, or the breach, termination or validity of the Plan, this Stock Option or this Agreement, shall be finally settled by binding arbitration conducted expeditiously in accordance with the J.A.M.S./Endispute Comprehensive Arbitration Rules and Procedures (the "J.A.M.S. Rules"). The arbitration shall be governed by the United States Arbitration Act, 9 U.S.C. Sections 1-16, and judgment upon the award rendered by the arbitrators may be entered by any court having jurisdiction thereof. The place of arbitration shall be Boston, MA.

(b) The arbitration shall commence within 60 days of the date on which a written demand for arbitration is filed by any party hereto. In connection with the arbitration proceeding, the arbitrator shall have the power to order the production of documents by each party and any third-party witnesses. In addition, each party may take up to three depositions as of right, and the arbitrator may in his or her discretion allow additional depositions upon good cause shown by the moving party. However, the arbitrator shall not have the power to order the answering of interrogatories or the response to requests for admission. In connection with any arbitration, each party to the arbitration shall provide to the other, no later than seven business days before the date of the arbitration, the identity of all persons that may testify at the arbitration and a copy of all documents that may be introduced at the arbitration or considered or used by a party's witness or expert. The arbitrator's decision and award shall be made and delivered within six months of the selection of the arbitrator. The arbitrator's decision shall set forth a reasoned basis for any award of damages or finding of liability. The arbitrator shall not have power to award damages in excess of actual compensatory damages and shall not multiply actual damages or award punitive damages, and each party hereby irrevocably waives any claim to such damages.

(c) The Company, the Optionee, each party to the Agreement and any other holder of Shares issued pursuant to this Agreement (each, a "Party") covenants and agrees that such party will participate in the arbitration in good faith. This Section 7 applies equally to requests for temporary, preliminary or permanent injunctive relief, except that in the case of temporary or preliminary injunctive relief any party may proceed in court without prior arbitration for the limited purpose of avoiding immediate and irreparable harm.

(d) Each Party (i) hereby irrevocably submits to the jurisdiction of any United States District Court of competent jurisdiction for the purpose of enforcing the award or decision in any such proceeding, (ii) hereby waives, and agrees not to assert, by way of motion, as a defense, or otherwise, in any such suit, action or proceeding, any claim that it is not subject personally to the jurisdiction of the above named courts, that its property is exempt or immune from attachment or execution (except as protected by applicable law), that the suit, action or proceeding is brought in an inconvenient forum, that the venue of the suit, action or proceeding is improper or that this Agreement or the subject matter hereof may not be enforced in or by such court, and (iii) hereby waives and agrees not to seek any review by any court of any other jurisdiction which may be called upon to grant an enforcement of the judgment of any such court. Each Party hereby consents to service of process by registered mail at the address to which notices are to be given. Each Party agrees that its, his or her submission to jurisdiction and its, his or her consent to service of process by mail is made for the express benefit of each other Party. Final judgment against any Party in any such action, suit or proceeding may be enforced in other jurisdictions by suit, action or proceeding on the judgment, or in any other manner provided by or pursuant to the laws of such other jurisdiction.

[SIGNATURE PAGE FOLLOWS]

The foregoing Agreement is hereby accepted and the terms and conditions thereof hereby agreed to by the undersigned as of the date first above written.

AVROBIO, INC.

By: _____
Name:
Title:

Address:

_____

_____

_____

The undersigned hereby acknowledges receiving and reviewing a copy of the Plan, including, The undersigned hereby acknowledges receiving and reviewing a copy of the Plan, including, without limitation, Section 9 thereof, and understands that this Stock Option is subject to the terms of the Plan and of this Agreement. This Agreement is hereby accepted, and the terms and conditions of the Plan, the Grant Notice and this Agreement, SPECIFICALLY INCLUDING THE ARBITRATION PROVISIONS SET FORTH IN SECTION 7 OF THIS AGREEMENT, are hereby agreed to, by the undersigned as of the date first above written.

OPTIONEE:

_____
Name:

Address:

_____

_____

Appendix A

STOCK OPTION EXERCISE NOTICE

AVROBIO, Inc.
Attn: President

_____
_____
_____

Pursuant to the terms of the grant notice and stock option agreement between the undersigned and AVROBIO, Inc. (the "Company") dated (the "Agreement") under the AVROBIO, Inc. 2015 Stock Option and Grant Plan, I, [Insert Name] , hereby [Circle One] partially/fully exercise such option by including herein payment in the amount of $ representing the purchase price for [Fill in number of Shares] Shares. I have chosen the following form(s) of payment:

☐ 1. Cash

☐ 2. Certified or bank check payable to AVROBIO, Inc.

☐ 3. Other (as referenced in the Agreement and described in the Plan (please describe))

_____.

In connection with my exercise of the option as set forth above, I hereby represent and warrant to the Company as follows:

(i) I am purchasing the Shares for my own account for investment only, and not for resale or with a view to the distribution thereof.

(ii) I have had such an opportunity as I have deemed adequate to obtain from the Company such information as is necessary to permit me to evaluate the merits and risks of my investment in the Company and have consulted with my own advisers with respect to my investment in the Company.

(iii) I have sufficient experience in business, financial and investment matters to be able to evaluate the risks involved in the purchase of the Shares and to make an informed investment decision with respect to such purchase.

(iv) I can afford a complete loss of the value of the Shares and am able to bear the economic risk of holding such Shares for an indefinite period of time.

(v) I understand that the Shares may not be registered under the Securities Act of 1933 (it being understood that the Shares are being issued and sold in reliance on the exemption provided in Rule 701 thereunder) or any applicable state securities or "blue sky" laws and may not be sold or otherwise transferred or disposed of

in the absence of an effective registration statement under the Securities Act of 1933 and under any applicable state securities or "blue sky" laws (or exemptions from the registration requirement thereof). I further acknowledge that certificates representing Shares will bear restrictive legends reflecting the foregoing and/or that book entries for uncertificated Shares will include similar restrictive notations.

(vi) I have read and understand the Plan and acknowledge and agree that the Shares are subject to all of the relevant terms of the Plan, including without limitation, the transfer restrictions set forth in Section 9 of the Plan.

(vii) I understand and agree that the Company has a right of first refusal with respect to the Shares pursuant to Section 9(b) of the Plan.

(viii) I understand and agree that the Company has certain repurchase rights with respect to the Shares pursuant to Section 9(c) of the Plan.

(ix) I understand and agree that I may not sell or otherwise transfer or dispose of the Shares for a period of time following the effective date of a public offering by the Company as described in Section 9(f) of the Plan.

Sincerely yours,

_____

Name:

Address:

_____

_____

RESTRICTED STOCK AWARD NOTICE
UNDER THE AVROBIO, INC.
2015 STOCK OPTION AND GRANT PLAN

Pursuant to the AvroBio, Inc. 2015 Stock Option and Grant Plan (the "Plan"), AvroBio, Inc., a Delaware corporation (together with any successor, the "Company"), hereby grants, sells and issues to the individual named below, the Shares at the Per Share Purchase Price, subject to the terms and conditions set forth in this Restricted Stock Award Notice (the "Award Notice"), the attached Restricted Stock Agreement (the "Agreement") and the Plan. The Grantee agrees to the provisions set forth herein and acknowledges that each such provision is a material condition of the Company's agreement to issue and sell the Shares to him or her. The Company hereby acknowledges receipt of $[ ] in full payment for the Shares. All references to share prices and amounts herein shall be equitably adjusted to reflect stock splits, stock dividends, recapitalizations, mergers, reorganizations and similar changes affecting the capital stock of the Company, and any shares of capital stock of the Company received on or in respect of Shares in connection with any such event (including any shares of capital stock or any right, option or warrant to receive the same or any security convertible into or exchangeable for any such shares or received upon conversion of any such shares) shall be subject to this Agreement on the same basis and extent at the relevant time as the Shares in respect of which they were issued, and shall be deemed Shares as if and to the same extent they were issued at the date hereof.

Name of Grantee:	_____ (the "Grantee")
No. of Shares:	_____ Shares of Common Stock (the "Shares")
Grant Date:	_____
Vesting Commencement Date:	_____ (the "Vesting Commencement Date")
Per Share Purchase Price:	$0.0001 (the "Per Share Purchase Price")
Vesting Schedule:	25 percent of the Shares shall vest on the first anniversary of the Vesting Commencement Date; provided that the Grantee continues to have a Service Relationship with the Company at such time. Thereafter, the remaining 75 percent of the Shares shall vest in 36 equal monthly installments following the first anniversary of the Vesting Commencement Date, provided the Grantee continues to have a Service Relationship with the Company at such time. Notwithstanding anything in the Agreement to the contrary in the case of a Sale Event, the Shares of Restricted Stock shall be treated as provided in Section 3(c) of the Plan.

Attachments: Restricted Stock Agreement, 2015 Stock Option and Grant Plan

RESTRICTED STOCK AGREEMENT
UNDER THE AVROBIO, INC.
2015 STOCK OPTION AND GRANT PLAN

All capitalized terms used herein and not otherwise defined shall have the respective meanings set forth in the Award Notice and the Plan.

1. Purchase and Sale of Shares; Vesting; Investment Representations.

(a) Purchase and Sale. The Company hereby sells to the Grantee, and the Grantee hereby purchases from the Company, the number of Shares set forth in the Award Notice for the Per Share Purchase Price.

(b) Vesting. Initially, all of the Shares are non-transferable and subject to a substantial risk of forfeiture and are Shares of Restricted Stock. The risk of forfeiture shall lapse with respect to the Shares on the respective dates indicated on the Vesting Schedule set forth in the Award Notice.

(c) Investment Representations. In connection with the purchase and sale of the Shares contemplated by Section 1(a) above, the Grantee hereby represents and warrants to the Company as follows:

(i) The Grantee is purchasing the Shares for the Grantee's own account for investment only, and not for resale or with a view to the distribution thereof.

(ii) The Grantee has had such an opportunity as he or she has deemed adequate to obtain from the Company such information as is necessary to permit him or her to evaluate the merits and risks of the Grantee's investment in the Company and has consulted with the Grantee's own advisers with respect to the Grantee's investment in the Company.

(iii) The Grantee has sufficient experience in business, financial and investment matters to be able to evaluate the risks involved in the purchase of the Shares and to make an informed investment decision with respect to such purchase.

(iv) The Grantee can afford a complete loss of the value of the Shares and is able to bear the economic risk of holding such Shares for an indefinite period.

(v) The Grantee understands that the Shares are not registered under the Act (it being understood that the Shares are being issued and sold in reliance on the exemption provided in Rule 701 thereunder) or any applicable state securities or "blue sky" laws and may not be sold or otherwise transferred or disposed of in the absence of an effective registration statement under the Act and under any applicable state securities or "blue sky" laws (or exemptions from the registration requirements thereof). The Grantee further acknowledges that certificates representing the Shares will bear restrictive legends reflecting the foregoing and/or that book entries for uncertificated Shares will include similar restrictive notations.

(vi) The Grantee has read and understands the Plan and acknowledges and agrees that the Shares are subject to all of the relevant terms of the Plan, including without limitation, the transfer restrictions set forth in Section 9 of the Plan.

(vii) The Grantee understands and agrees that the Company has a right of first refusal with respect to the Shares pursuant to Section 9(b) of the Plan.

(viii) The Grantee understands and agree that the Company has certain repurchase rights with respect to the Shares pursuant to Section 9(c) of the Plan.

(ix) The Grantee understands and agrees that the Grantee may not sell or otherwise transfer or dispose of the Shares for a period of time following the effective date of a public offering by the Company as described in Section 9(f) of the Plan.

2. Repurchase Right. Upon a Termination Event, the Company shall have the right to repurchase Shares of Restricted Stock that are unvested as of the date of such Termination Event as set forth in Section 9(c) of the Plan.

3. Restrictions on Transfer of Shares. The Shares (whether or not vested) shall be subject to certain transfer restrictions and other limitations including, without limitation, the provisions contained in Section 9 of the Plan.

4. Incorporation of Plan. Notwithstanding anything herein to the contrary, this Restricted Stock Award shall be subject to and governed by all the terms and conditions of the Plan.

5. Miscellaneous Provisions.

(a) Record Owner; Dividends. The Grantee and any Permitted Transferees, during the duration of this Agreement, shall be considered the record owners of and shall be entitled to vote the Shares if and to the extent the Shares are entitled to voting rights. The Grantee and any Permitted Transferees shall be entitled to receive all dividends and any other distributions declared on the Shares; provided, however, that the Company is under no duty to declare any such dividends or to make any such distribution.

(b) Section 83(b) Election. The Grantee shall consult with the Grantee's tax advisor to determine whether it would be appropriate for the Grantee to make an election under Section 83(b) of the Code with respect to this Award. Any such election must be filed with the Internal Revenue Service within 30 days of the date of this Award. If the Grantee makes an election under Section 83(b) of the Code, the Grantee shall give prompt notice to the Company (and provide a copy of such election to the Company).

(c) Equitable Relief. The parties hereto agree and declare that legal remedies may be inadequate to enforce the provisions of this Agreement and that equitable relief, including specific performance and injunctive relief, may be used to enforce the provisions of this Agreement.

(d) Change and Modifications. This Agreement may not be orally changed, modified or terminated, nor shall any oral waiver of any of its terms be effective. This Agreement may be changed, modified or terminated only by an agreement in writing signed by the Company and the Grantee.

(e) Governing Law. This Agreement shall be governed by and construed in accordance with the General Corporation Law of the State of Delaware as to matters within the scope thereof, and as to all other matters shall be governed by and construed in accordance with the internal laws of Massachusetts, without regard to conflict of law principles that would result in the application of any law other than the law of the Commonwealth of Massachusetts.

(f) Headings. The headings are intended only for convenience in finding the subject matter and do not constitute part of the text of this Agreement and shall not be considered in the interpretation of this Agreement.

(g) Saving Clause. If any provision(s) of this Agreement shall be determined to be illegal or unenforceable, such determination shall in no manner affect the legality or enforceability of any other provision hereof.

(h) Notices. All notices, requests, consents and other communications shall be in writing and be deemed given when delivered personally, by telex or facsimile transmission or when received if mailed by first class registered or certified mail, postage prepaid. Notices to the Company or the Grantee shall be addressed as set forth underneath their signatures below, or to such other address or addresses as may have been furnished by such party in writing to the other.

(i) Benefit and Binding Effect. This Agreement shall be binding upon and shall inure to the benefit of the parties hereto, their respective successors, assigns, and legal representatives. The Company has the right to assign this Agreement, and such assignee shall become entitled to all the rights of the Company hereunder to the extent of such assignment.

(j) Counterparts. For the convenience of the parties and to facilitate execution, this Agreement may be executed in two or more counterparts, each of which shall be deemed an original, but all of which shall constitute one and the same document.

(k) Integration. This Agreement constitutes the entire agreement between the parties with respect to this Award and supersedes all prior agreements and discussions between the parties concerning such subject matter.

6. Dispute Resolution.

(a) Except as provided below, any dispute arising out of or relating to the Plan or the Shares, this Agreement, or the breach, termination or validity of the Plan, the Shares or this Agreement, shall be finally settled by binding arbitration conducted expeditiously in accordance with the J.A.M.S./Endispute Comprehensive Arbitration Rules and Procedures (the

"J.A.M.S. Rules"). The arbitration shall be governed by the United States Arbitration Act, 9 U.S.C. Sections 1—16, and judgment upon the award rendered by the arbitrators may be entered by any court having jurisdiction thereof. The place of arbitration shall be Boston, MA.

(b) The arbitration shall commence within 60 days of the date on which a written demand for arbitration is filed by any party hereto. In connection with the arbitration proceeding, the arbitrator shall have the power to order the production of documents by each party and any third-party witnesses. In addition, each party may take up to three depositions as of right, and the arbitrator may in his or her discretion allow additional depositions upon good cause shown by the moving party. However, the arbitrator shall not have the power to order the answering of interrogatories or the response to requests for admission. In connection with any arbitration, each party to the arbitration shall provide to the other, no later than seven business days before the date of the arbitration, the identity of all persons that may testify at the arbitration and a copy of all documents that may be introduced at the arbitration or considered or used by a party's witness or expert. The arbitrator's decision and award shall be made and delivered within six months of the selection of the arbitrator. The arbitrator's decision shall set forth a reasoned basis for any award of damages or finding of liability. The arbitrator shall not have power to award damages in excess of actual compensatory damages and shall not multiply actual damages or award punitive damages, and each party hereby irrevocably waives any claim to such damages.

(c) The Company, the Grantee, each party to the Agreement and any other holder of Shares issued pursuant to this Agreement (each, a "Party") covenants and agrees that such party will participate in the arbitration in good faith. This Section 6 applies equally to requests for temporary, preliminary or permanent injunctive relief, except that in the case of temporary or preliminary injunctive relief any party may proceed in court without prior arbitration for the limited purpose of avoiding immediate and irreparable harm.

(d) Each Party (i) hereby irrevocably submits to the jurisdiction of any United States District Court of competent jurisdiction for the purpose of enforcing the award or decision in any such proceeding, (ii) hereby waives, and agrees not to assert, by way of motion, as a defense, or otherwise, in any such suit, action or proceeding, any claim that it is not subject personally to the jurisdiction of the above named courts, that its property is exempt or immune from attachment or execution (except as protected by applicable law), that the suit, action or proceeding is brought in an inconvenient forum, that the venue of the suit, action or proceeding is improper or that this Agreement or the subject matter hereof may not be enforced in or by such court, and (iii) hereby waives and agrees not to seek any review by any court of any other jurisdiction which may be called upon to grant an enforcement of the judgment of any such court. Each Party hereby consents to service of process by registered mail at the address to which notices are to be given. Each Party agrees that its, his or her submission to jurisdiction and its, his or her consent to service of process by mail is made for the express benefit of each other Party. Final judgment against any Party in any such action, suit or proceeding may be enforced in other jurisdictions by suit, action or proceeding on the judgment, or in any other manner provided by or pursuant to the laws of such other jurisdiction.

[SIGNATURE PAGE FOLLOWS]

The foregoing Restricted Stock Agreement is hereby accepted and the terms and conditions thereof are hereby agreed to by the undersigned as of the date first above written.

AVROBIO, INC.

By: _____
Name:
Title:

Address:

_____

_____

_____

The undersigned hereby acknowledges receiving and reviewing a copy of the Plan, including, without limitation, Section 9 thereof and understands that the Shares granted hereby are subject to the terms of the Plan and of this Agreement. This Agreement is hereby accepted, and the terms and conditions of the Plan, the Award Notice and this Agreement, SPECIFICALLY INCLUDING THE ARBITRATION PROVISIONS SET FORTH IN SECTION 6 OF THIS AGREEMENT, are hereby agreed to, by the undersigned as of the date first above written.

GRANTEE:

_____
Name:

Address:

_____

_____

CERTAIN CONFIDENTIAL PORTIONS OF THIS EXHIBIT WERE OMITTED AND REPLACED WITH "[***]". A COMPLETE VERSION OF THIS EXHIBIT HAS BEEN FILED SEPARATELY WITH THE SECRETARY OF THE SECURITIES AND EXCHANGE COMMISSION PURSUANT TO AN APPLICATION REQUESTING CONFIDENTIAL TREATMENT PURSUANT TO RULE 406 PROMULGATED UNDER THE SECURITIES ACT OF 1933, AS AMENDED.

EXCLUSIVE LICENSE AGREEMENT

This Exclusive License Agreement (this "**Agreement**") is made effective as of November 4, 2016 (the "**Effective Date**") between:

> **UNIVERSITY HEALTH NETWORK**, an Ontario corporation incorporated by special statute under the *University Health Network Act, 1997*, having a principal office at 190 Elizabeth Street, R. Fraser Elliott Building—Room 1S-417, Toronto, Ontario M5G 2C4 ("**UHN**")
>
> -AND-
>
> **AvroBio**, **Inc**., a Delaware corporation, with offices at 400 Technology Square, 10th Floor, Cambridge, MA 02139 ("**Avro**")

In this Agreement, UHN and Avro may be referred to individually as a "**Party**", or collectively as the "**Parties**".

BACKGROUND:

UHN principal investigator Dr. Jeffrey Medin (the "**Principal Investigator**"**;** as further defined below) has created, conceived or developed compositions and methods for use in the treatment of Fabry disease.

UHN owns and controls certain intellectual property rights relating to the treatment of Fabry disease.

Avro wishes to license from UHN rights under such intellectual property rights so as to allow Avro to research, develop, manufacture and commercialize products in accordance with the following terms and conditions.

UHN and Avro entered into an option agreement, dated as of January 27, 2016, pursuant to which UHN exclusively optioned to Avro the right to exclusively license all UHN owned or controlled intellectual property rights relating to UHN developed compositions and methods for use in the treatment of Fabry disease (the "**Option Agreement**").

The parties wish to enter into this Agreement in accordance with the terms and conditions set forth herein.

ARTICLE 1 - INTERPRETATION

1.1 **Defined Terms**. For the purposes of this Agreement, the following terms shall have the respective meanings set out below and grammatical variations of such terms shall have corresponding meanings:

1.1.1 "**Affiliate**" means, with respect to any Person, a Person directly or indirectly controlled by, controlling, or under common control with such Person. For the purposes of this definition, except as otherwise expressly set out in this Agreement, "control" means (a) direct or indirect beneficial ownership of at least fifty percent (50%) of the voting stock of such Person or (b) with the power to direct the management and policies of such entities.

1.1.2 "**Agreement**" means this Exclusive License Agreement, and all of its Schedules, and the terms "herein", "hereunder", "hereto" and such similar expressions shall refer to this Agreement.

1.1.3 "**Avro Insurance**" shall have the meaning provided in Section 13.1.

1.1.4 "**Calendar Year**" means each twelve (12) month period beginning on January 1 and each subsequent anniversary thereof; provided, however, that (a) the first Calendar Year of this Agreement will commence on the Effective Date and end on December 31 of the same year, and (b) the last Calendar Year of this Agreement will commence on January 1 of the Calendar Year in which this Agreement terminates or expires and end on the date of expiration or termination of this Agreement.

1.1.5 "**Claims**" shall have the meaning provided in Section 12.1.

1.1.6 "**Clinical Trial Application**" or "**CTA**" has the meaning accorded this term in accordance with the requirements of Health Canada, including all amendments and supplements to such application, or any IND or other equivalent filing with any other Regulatory Authority.

1.1.7 "**Clinical Trial Data**" means all Patient Data generated from the one or more of the clinical trial sites (including UHN, Calgary and Halifax), but excludes Sample Processing Data. For greater certainty, investigator suspected adverse events are not separately identified within the Clinical Trial Data, but are reviewed in accordance with the Clinical Trial Protocol and reported to Avro in accordance with obligations as outlined in Sections 2.4.4 to 2.4.6.

1.1.8 "**Clinical Trial Protocol**" means the protocol governing the UHN Planned Trial. The Clinical Trial Protocol may be amended from time to time by agreement of the Parties subject to funding being available to support the costs of changes as required by the amendment.

1.1.9 "**Combination Product**" means a Licensed Product sold or used in combination with one or more other products which are not Licensed Products.

1.1.10 "**Confidential Information**" of a Party means any and all confidential or proprietary information of and disclosed by or on behalf of a Party and/or any of its Affiliates (a "**Disclosing Party**") which has or does come into the possession or knowledge of the other Party and/or any of its Affiliates (a "**Receiving Party**") in connection with or as a result of entering into this Agreement and which is (a) marked as confidential or identified as confidential at the time of disclosure, or (b) given the nature of the information or circumstances of disclosure, would be recognized as confidential or proprietary by a reasonable person, in each case including information concerning the Disclosing Party's past, present and future business, research and development, technology, customers and suppliers.

Information shall not be considered "Confidential Information" to the extent that the information:

(a) is part of the public domain at the time of disclosure,

(b) subsequently becomes part of the public domain through no act or fault of the Receiving Party or its Representatives in violation of this Agreement,

(c) can be demonstrated by the Receiving Party's written records or other credible evidence to have been known or otherwise

(d) available to the Receiving Party prior to the disclosure by the Disclosing Party,

(e) can be demonstrated by the Receiving Party's written records or other credible evidence, to have been provided to the Receiving Party, without restriction, by a Third Party who is not under a duty of confidentiality respecting the information disclosed,

(f) can be demonstrated by the Receiving Party's written records, or other credible evidence, to have been independently developed by or on behalf of the Receiving Party without use of or reference to the disclosed Confidential Information, or

(g) is identified in writing by the Disclosing Party as no longer constituting Confidential information.

1.1.11 "**Disclosing Party**" shall have the meaning provided in Section 1.1.10.

1.1.12 "**Exclusively Licensed Know-How**" means (a) any and all Fabry Know-How, (b) any and all Licensed Trial Related Data, and (c) the Clinical Trial Protocol.

1.1.13 "**Fabry Know-How**" means any and all Know-How (A) existing as of the Effective Date that (i) was created, conceived or developed by (1) the Principal Investigator; (2) by UHN employees or agents under the direction or supervision of the Principal Investigator, or (3) the UHN CRO; (ii) is owned or controlled by UHN and (iii) is listed or otherwise defined in Schedule "A", or Schedule "B", or (B) existing as of the Effective Date or during the Term that was (i) created, conceived or developed by one or more third party(ies) in collaboration with UHN or the Principal Investigator (or UHN employees or agents of UHN under the direction or supervision of the Principal Investigator) in connection with the UHN Planned Trial and for which UHN has been granted exclusive rights pursuant to a Fabry Trial Team Agreement. In the event that there exists as of the Effective Date other Know-How which is (a) relevant to the Field of Use, (b) created, conceived or developed by (1) the Principal Investigator, (2) by UHN employees or agents under the direction or supervision of the Principal Investigator, or (3) the UHN CRO, and (c) owned or controlled by UHN and is not Improved Therapies Know-How, the Parties will update Schedule A and/or Schedule B accordingly. For greater certainty Fabry Know-How does not include Fabry Patents, Improved Therapies Patents or Improvement Patents or any Patent Rights in the SRA Intellectual Property.

1.1.14 "**Fabry Non-Exclusive Know-How**" means any and all Know-How existing as of the Effective Date or during the Term that was created, conceived or developed by one or more third party(ies) in collaboration with the Principal Investigator (or UHN employees or agents of UHN under the direction or supervision of the Principal Investigator) in connection with the UHN Planned Trial and for which UHN has been granted non-exclusive rights pursuant to a Fabry Trial Team Agreement.

1.1.15 "**Fabry Patents**" means (a) the patents and patent applications listed on Schedule "C", (b) any Canadian or U.S. or other foreign patent application corresponding or claiming priority to the patents and applications listed in Schedule "C", and all patents issuing therefrom, (c) all divisionals, continuations and continuations-in part applications to the patents and applications listed in Schedule "C", and all patents issuing therefrom, with the proviso that any continuations-in-part applications and/or patents shall only apply to claims that are directed to subject matter specifically described in any patent or patent application described in clauses (a) or (b); (d) all foreign counterparts of any of the patents or applications in clauses (a), (b), and (c) (including, without limitation, any European Supplementary Protection Certificates or equivalents), and all patents issuing therefrom; and (e) all patents of addition, reissues, renewals, and/or extensions of any of the patents or patent applications set out in any of clauses (a), (b), (c), or (d), but excluding any patents or patent applications listed as "Excluded Patents" on Schedule C.

1.1.16 "**Fabry Vector**" means the Lentiviral a-Gal A expression vector utilized in the UHN Planned Trial.

1.1.17 "**Fabry Trial Team**" means the principal investigators in their appointment and capacity as investigators of their respective Fabry Trial Team Institution(s).

1.1.18 "**Fabry Trial Team Institution(s)**" means each of the institutions involved in the UHN Planned Trial. As of the Effective Date, the Fabry Trial Team Institutions include Hamilton Regional Laboratory Medicine Program ("Hamilton Service"), Hamilton Health Sciences Corporation ("Hamilton Clinical"), Universite de Sherbrooke ("Sherbrooke"), The Governors of the University of Calgary in conjunction with Alberta Health Services (collectively "Calgary"), London Health Sciences Centre ("London"), and Nova Scotia Health Authority ("Halifax"). The list of Fabry Trial Team Institutions(s) may be amended by agreement of the Parties.

1.1.19 "**Fabry Trial Team Agreement(s)**" means any agreement(s) to be entered into between Fabry Trial Team Institutions, UHN, and Avro governing, among other items, the transfer of certain Exclusively Licensed Know-How and Non-Exclusively Licensed Know-How from the Fabry Trial Team Institutions to UHN and Avro. The Fabry Trial Team Agreement(s) may be amended from time to time by agreement of the Parties.

1.1.20 "**FDA**" means the United States Food and Drug Administration and any successor agency thereto.

1.1.21 "**Field of Use**" means Fabry disease.

1.1.22 "**First Commercial Sale**" means, with respect to a Licensed Product and a country, the first arms-length commercial sale for monetary value of such Licensed Product to a Third Party in such country after Regulatory Approval allowing for the marketing and sale of such Licensed Product has been obtained in such country. Sales prior to receipt of Regulatory Approval for such Licensed Product, such as so-called "treatment IND sales," "named patient sales", "Health Canada Special Access Programme sales" and "compassionate use sales" shall not be construed as a First Commercial Sale.

1.1.23 "**Gross Revenue**" means the gross amount received by each of: (a) Avro and/or its Affiliates, and (b) any permitted Sublicensee, where such gross amount is received in respect of the sale or transfer or other disposition of a Licensed Product to a Third Party.

1.1.24 "**IL-12 Agreement**" means the Exclusive License Agreement, dated January 27, 2016, by and between Avro and UHN (and as further amended or restated from time to time).

1.1.25 "**Improvements**" means any and all discoveries, derivatives, adaptations, changes, inventions, enhancements and modifications (whether patentable or not) of the Fabry Patents or Fabry Know-How that are created, conceived, developed or reduced to practice either (a) prior to the Effective Date or during the Option Term, by (i) the Principal Investigator (ii) any employees or agents of UHN under the direction or supervision of the Principal Investigator or (iii) the UHN CRO, where same are owned or controlled by UHN and relevant to the Field of Use, or (b) arising from the UHN Planned Trial; but, in each case ((a)-(b)), are not (i) Improved Therapies or (ii) in connection with or in performance of an SRA.

1.1.26 "**Improved Therapies**" means any and all discoveries, derivatives, adaptations, changes, inventions, enhancements or modifications (whether patentable or not) of the Fabry Patents or Fabry Know-How that are created, conceived, developed or reduced to practice prior to the Effective Date or during the Option Term by the Principal Investigator (or any employees or agents of UHN under the direction or supervision of the Principal Investigator) and relevant to the Field of Use, where the technology advancement relates to a new product or a method relating thereto which is distinct from the technology encompassed by the UHN Planned Trial and requires the submission of a new IND or foreign equivalent thereof. For clarity, addition of TMPK to the Fabry Vector is NOT considered a new product.

1.1.27 "**Improved Therapies Know-How**" means any and all Know-How that exists within any of the Improved Therapies.

1.1.28 "**Improved Therapies Patents**" means any and all Patent Rights that claim or cover any of the Improved Therapies.

1.1.29 "**Improvements Know-How**" means any and all Know-How that exists within any of the Improvements.

1.1.30 "**Improvements Patents**" means Patent Rights that claim or cover any of the Improvements.

1.1.31 "**IND**" means with respect to a product, an Investigational New Drug Application filed with the FDA with respect to such product pursuant to 21 C.F.R. § 312 before the commencement of human clinical trials involving such product.

1.1.32 "**Know-How**" means any and all commercial, technical, regulatory, scientific and other know-how, information, knowledge, technology, methods, processes, practices, standard operating procedures, formulae, instructions, skills, techniques, procedures, assay protocols, experiences, ideas, technical assistance, designs, drawings, assembly procedures, specifications, data and results (including biological, chemical, pharmacological, toxicological, pharmaceutical, physical and analytical, pre-clinical, clinical, safety, regulatory, manufacturing and quality control data and know-how, including study designs and protocols), in all cases now known or hereafter developed, whether or not confidential or proprietary, in written, electronic or any other form. Know-How shall exclude Patent Rights (including rights in the Fabry Patents, Improved Therapies Patents, and Improvement Patents).

1.1.33 "**License**" shall have the meaning provided in Section 2.1.

1.1.34 "**Licensed Patents**" means: (a) any and all Fabry Patents, (b) any and all Optioned Improvement Patents, and (b) any and all Patent Rights within the Licensed SRA IP.

1.1.35 "**Licensed Product**" means any product in the Field of Use that (a) the manufacture, use or sale of which, but for the licenses granted herein, would infringe a Valid Claim in the Licensed Patents, or (b) incorporates, uses, or practices the Exclusively Licensed Know-How or Non-Exclusively Licensed Know-How. For greater certainty and clarity, a product in the Field of Use that (i) incorporates, uses or practices any preclinical data or clinical data within the Exclusively Licensed Know-How or Non-Exclusively Licensed Know-How, or (ii) [***] shall be considered a Licensed Product.

1.1.36 "**Licensed SRA IP**" means any and all SRA IP for which the Parties have agreed to incorporate such SRA IP into this Agreement per Section 3.1 (as such IP is further listed in Schedule "D" (as may be amended from time to time)).

1.1.37 "**Licensed Technology**" means any and all Licensed Patents, Exclusively Licensed Know-How and Non-Exclusively Licensed Know-How.

1.1.38 "**License Transfer Fee**" shall have the meaning provided in Section 16.4.2.

1.1.39 "**Licensed Trial Related Data**" means any and all information, data, results and reports (i) owned and controlled by UHN, or (ii) for which UHN has been granted rights and/or permission pursuant to a Fabry Trial Team Agreement and (ii) relating to the UHN Planned Trial, including Patient Data, regulatory documents (including Clinical Trial Applications, Q&As, investigator brochures), manufacturing data (including supplier agreements and batch records) and such other relevant data relating to the use of the Licensed Products in the conduct of the UHN Planned Trial.

1.1.40 "**Net Revenues**" means, the Gross Revenue net of any of the following:

(a) normal, customary and actual quantity, trade or cash allowance/discounts, credits or volume discounts, and other price reductions with respect to Licensed Products;

(b) credits, rebates or allowances because of billing errors, damaged, outdated, obsolete, nonconforming, rejected, re-worked or recalled goods or services or returns with respect to Licensed Product(s);

(c) freight, postage, shipping and insurance charges incurred in transporting the Licensed Product(s) to the Third Party or its designee; and

(d) taxes including sales, use, value-added, and other direct taxes, customs, duties, tariffs, surcharges, or other governmental charges (other than income taxes) levied on, absorbed or otherwise imposed on sales of Licensed Product(s);

with (a) - (d) to be as determined from the books and records of Avro and/or its Affiliate(s) and/or permitted Sublicensee(s), maintained in accordance with generally accepted accounting principles.

For the avoidance of doubt, transfers of a Licensed Product between any of Avro, an Affiliate or a Sublicensee for sale by the transferee shall not be considered Net Revenues hereunder. Net Sales shall not include transfers or dispositions for charitable, promotional, preclinical, clinical, regulatory, or governmental purposes.

In the event that a Licensed Product is sold as a Combination Product, Net Revenues, for the purposes of determining royalty payments on the Combination Product, means the gross amount collected for the Combination Product less the deductions set forth in clauses (a)—(d) above, multiplied by a proration factor that is determined as follows:

If all components of the Combination Product were sold separately during the same or immediately preceding Quarterly Period, the proration factor shall be determined by the formula [A / (A+B)], where A is the average gross sales price of all Licensed Product components (as applicable) during such period when sold separately from the other component(s), and B is the average gross sales price of the other component(s) during such period when sold separately from the Licensed Product components (as applicable); or

If all components of the Combination Product were not sold or provided separately during the same or immediately preceding Quarterly Period, the proration factor shall be determined by the Parties in good faith negotiations based on the reasonably estimated commercial value or relative value contributed by each component.

1.1.41 "**Non-Exclusively Licensed Know-How**" means (a) Fabry Non-Exclusive Know-How (b) any and all Improvements Know-How, and (c) any and all Know-How within the Licensed SRA IP.

1.1.42 "**Notice(s)**" shall have the meaning provided in Section 15.1.

1.1.43 "**Option Term**" means the period commencing on the Effective Date and ending on the [***] anniversary thereof, unless extended by the Parties in writing.

1.1.44 "**Optioned Improvements Patents**" means any and all Improvement Patents which the Parties have agreed to incorporate into this Agreement per Section 3.2.1, as further listed in Schedule "E" (or as may be amended from time to time).

1.1.45 "**Patent Rights**" means all rights in, to and under any patent applications or patents, whether domestic or foreign, or any equivalent thereof, including all direct or indirect divisionals, continuations, continuations-in-part, reissues, reexaminations, supplemental protection certificates or extensions thereof, and any patent that issues on any of the foregoing.

1.1.46 "**Patient Data**" means any and all anonymized and de-identified clinical data, information, results and reports arising from the performance of the UHN Planned Trial (including, for clarity, all raw data, cleaned data, final data, data summaries, 'Case Report Forms' or such similar documents for the UHN Planned Trial).

1.1.47 "**Person**" includes any individual, corporation or other incorporated organization, sole proprietorship, partnership, unincorporated association, unincorporated syndicate, unincorporated organization, trust, body corporate and a natural person in his or her capacity as trustee, executor, administrator or other legal representative.

1.1.48 "**Phase 1 Clinical Trial**" means a human clinical trial of a Licensed Product that would satisfy the requirements of 21 C.F.R. 312.21(a) or corresponding foreign regulations.

1.1.49 "**Phase 2 Clinical Trial**" means a human clinical trial of a Licensed Product that would satisfy the requirements of 21 C.F.R. 312.21(b) or corresponding foreign regulations.

1.1.50 "**Phase 3 Clinical Trial**" means a human clinical trial of a Licensed Product that would satisfy the requirements of 21 C.F.R. 312.21(c) or corresponding foreign regulations.

1.1.51 "**Phase 2/3 Clinical Trial**" means a human clinical trial of a Licensed Product that is not a Phase 2 Clinical Trial or a Phase 3 Clinical Trial, but some combination thereof.

1.1.52 "**Pivotal Trial**" means, with respect to any Licensed Product, a clinical trial that at the time of commencement, is intended by Avro to be the basis for Regulatory Approval with respect to clinical trials for such Licensed Product.

1.1.53 "**Principal Investigator**" shall mean Dr. Jeffrey Medin in his appointment and capacity as affiliate scientist. For purposes of clarity, Dr. Medin shall not be considered a Principal Investigator under this Agreement as it pertains to his appointment and scientific research activities at the Medical College of Wisconsin.

1.1.54 "**Quarterly Period**" means each successive three (3) calendar month period during the Term ending March 31, June 30, September 30 and December 31. The first and last Quarterly Periods may be less than three (3) calendar months and will commence on the Effective Date of this Agreement and terminate on the date this Agreement expires or is earlier terminated, respectively.

1.1.55 "**Receiving Party**" shall have the meaning provided in Section 1.1.10.

1.1.56 "**Regulatory Approval**" means those clearances or approvals of a Regulatory Authority, with respect to any jurisdiction, that are legally required for the marketing or sale of Licensed Products in such jurisdiction.

1.1.57 "**Regulatory Authority**" means any applicable government regulatory authority involved in granting clearances or approvals for the manufacturing or marketing of a Licensed Product, including, in the United States, the FDA, and in Canada, Health Canada.

1.1.58 "**Regulatory Exclusivity**" means any exclusive marketing rights or data exclusivity rights conferred by any regulatory authority with respect to a Licensed Product other than patents, including, without limitation, rights conferred in the United States under the Hatch-Waxman Act or the FDA Modernization Act of 1997 (including pediatric exclusivity), orphan drug exclusivity, rights conferred in Canada under the Patented Medicines (Notice of Compliance) Regulation, the data protection provisions contained in the Food and Drug Regulations (Canada) or rights similar thereto outside the United States or Canada.

1.1.59 "**Regulatory Filing**" means any documentation comprising or relating to or supporting any filing or application with any Regulatory Authority with respect to the UHN Planned Trial, including any documents submitted to any Regulatory Authority and all supporting data, including CTAs and INDs, and all correspondence with any Regulatory Authority with respect to the UHN Planned Trial (including minutes of any meetings, telephone conferences or discussions with any Regulatory Authority).

1.1.60 "**Representatives**" shall have the meaning provided in Section 9.1.

1.1.61 "**Reviewed Sample Processing Data**" means Sample Processing Data which UHN and/or UHN CRO have had in their possession for [***], irrespective of whether UHN Principal Investigator has reviewed such data. For greater certainty, the intent is that all Sample Processing Data is being sent by the Fabry Trial Team Institutions to UHN and UHN Principal Investigator concurrently. For greater certainty, investigator suspected adverse events are not separately identified within the Reviewed Sample Processing Data, but are reviewed in accordance with the Clinical Trial Protocol and reported to Avro in accordance with obligations as outlined in Sections 2.4.4 to 2.4.6.

1.1.62 "**Royalties**" shall have the meaning provided in Section 4.5.

1.1.63 "**Royalty Term**" means, on a Licensed Product-by-Licensed Product basis, the period commencing on the First Commercial Sale of the Licensed Product and continuing on a country-by-country basis as to each Licensed Product until the

later of (a) the expiration or termination of the last to expire Valid Claim within the Licensed Technology that covers such Licensed Product in such country, or (b) expiration of Regulatory Exclusivity for such Licensed Product in such country, or (c) ten (10) years from the date of First Commercial Sale of such Licensed Product in such country.

1.1.64 "**Sample Processing Data**" means all Patient Data generated from testing patient samples by or on behalf of UHN in connection with the UHN Planned Trial and pursuant to the Clinical Trial Protocol.

1.1.65 "**Series A Financing**" means Avro's Series A financing dated as of July 21, 2016.

1.1.66 "**Series B Financing**" shall be Avro's next round of financing after the Series A Financing.

1.1.67 "**Sponsored Research Agreement**" or "**SRA**" means an agreement between UHN and Avro, by which Avro provides financial support to conduct specific and defined research at UHN that relates to the Field of Use, and the Parties agree is intended to fall under this Agreement. Sponsored Research Agreements will include the research activities to be conducted, a budget for the conduct of the research activities, the UHN investigator under whose direction or supervision the research is to be conducted ("**SRA Investigator**"), and appropriate UHN overhead charges per UHN policies and practices (which may be subject to a reduced overhead rate for UHN "spin-out" companies per UHN policy and practice).

1.1.68 "**SRA Intellectual Property**" or "**SRA IP**" means any and all inventions, improvements, discoveries, and Know-How that are created, conceived, developed or reduced to practice in connection with or in performance of an SRA by the SRA Investigator or one or more employees or agents of UHN under the direction or supervision of the SRA Investigator, and any Patent Rights, copyrights or other intellectual property rights related thereto.

1.1.69 "**Sublicensee(s)**" means any non-Affiliate sublicensee of the rights granted by Avro pursuant to Section 2.3.

1.1.70 "**Sublicensing Revenue**" means, all consideration received by Avro or its Affiliate(s) from Sublicensees in consideration for sublicensing of Licensed Technology to such Sublicensees by Avro or its Affiliate(s), but excluding (a) amounts for research, development, or commercialization activities with respect to the Licensed Products or Licensed Technology (including, without limitation, payment for FTEs), (b) any loans, equity or debt investments in Avro or its Affiliates, (c) payments by Sublicensees for payment or reimbursement of patent filing, prosecution, defense, enforcement and maintenance and other related expenses, and (d) monies received as flow through royalty payments pursuant to Section 4.5. Notwithstanding the foregoing, exclusions under any of (a) and (b) are only excluded to the extent such remuneration is a bona fide payment in respect of such matters, and is not being made in order to reallocate what is otherwise intended to be upfront payments, milestones and royalties. For clarity, a License Transfer Fee shall not be deemed to be Sublicensing Revenue.

1.1.71 "**Sublicensing Fee**" shall have the meaning provided in Section 4.6.

1.1.72 "**Term**" shall have the meaning provided in Section 11.1.

1.1.73 "**Territory**" means the world.

1.1.74 "**Third Party**" means a Person other than a Party or its Affiliates.

1.1.75 "**TMPK**" [***].

1.1.76 "**UHN CRO**" means a contract research organization acting on behalf of UHN for purposes of providing management services for the UHN Planned Trial. As of the Effective Date, the UHN CRO is Ozmosis Research Inc. ("Ozmosis").

1.1.77 "**UHN Indemnitees**" shall have the meaning provided in Section 12.1.

1.1.78 "**UHN Planned Trial**" is the Phase 1 Clinical Trial entitled Clinical Pilot Study of Autologous Stem Cell Transplantation of CD34+ Cells Engineered to Express Alpha-Galactosidase A in Patients with Fabry Disease and is conducted under the direction or supervision of the Principal Investigator. For purposes of this Agreement, the UHN Planned Trial is currently described in the Clinical Trial Protocol as a clinical trial that will enroll and dose six (6) patients and will consist of four phases, the screening phase, the pre-treatment phase, the treatment phase and a five year follow-up phase.

1.1.79 "**Valid Claim**" means, on a country-by-country basis, (a) a claim of an issued and unexpired patent which has not been revoked or held unenforceable or invalid by a decision of a court or other governmental agency of competent jurisdiction, unappealable or unappealed within the time allowed for appeal, and which has not been admitted to be invalid or unenforceable through reissue or disclaimer or otherwise, or (b) a claim of a pending patent application that was filed and has been prosecuted in good faith and has not been (i) cancelled, withdrawn, abandoned or finally disallowed without the possibility of appeal or refiling of such application, or (ii) (A) pending for more than [***] since such claim was first presented or (B) is the result of amending another claim pending for more than [***] (either in the same application or in another application in the same jurisdiction) so as to add or delete an obvious limitation, so as to make a trivial or nonsubstantive change, or so as to change a matter of form; except that any claim that becomes invalid pursuant to (ii)(A), or (ii)(B), and later issues, shall be considered a Valid Claim from the date of issuance.

1.1.80 **Other Defined Terms**. All other defined terms in this Agreement shall have the meanings as otherwise specifically set out within the body of this Agreement.

1.2 **Sections and Headings**. The division of this Agreement into Articles, Sections and Subsections and the insertion of headings are for reference purposes only and shall not affect the interpretation of this Agreement. Unless otherwise indicated, any reference to a particular Article, Section, clause or Schedule refers to the specified Article, Section or clause of, or Schedule to, this Agreement.

1.3 **Number**, **Gender and Persons**. In this Agreement, words importing the singular number shall include the plural and vice versa, words importing gender shall include all genders and words importing persons shall include individuals, corporations, partnerships, associations, trusts, unincorporated organizations, governmental bodies and other legal or business entities.

1.4 **Currency**. All monetary amounts in this Agreement are in Canadian funds.

1.5 **Schedules**. The following Schedules are annexed to and form part of this Agreement:

Schedule “A” and Schedule “B” Fabry Know-How (as may be updated from time to time as dictated herein)

Schedule “C” - Fabry Patents (as may be updated from time to time)

Schedule “D” - Licensed SRA IP (as may be updated from time to time) Schedule “E”—Optioned Improvement Patents (as may be updated from time to time).

1.6 **Accounting Principles**. Any reference in this Agreement to “generally accepted accounting principles” refers to generally accepted accounting principles as approved from time to time by the Canadian Institute of Chartered Accountants or any successor institute, U.S. generally accepted accounting principles, or International Financial Reporting Standards.

1.7 **Best of Knowledge**. “To the best of the knowledge” or “to the knowledge”, unless otherwise qualified hereunder means a statement of the declaring Party’s knowledge of the actual facts or circumstances to which such phrase relates without having made any inquiries or investigations in connection with such facts and/or circumstances.

ARTICLE 2 - GRANT OF RIGHTS

2.1 **License Grant**. UHN hereby grants to Avro and its Affiliates during the Term (collectively, the “**License**”).

2.1.1 an exclusive (subject to Section 2.2), royalty-bearing, transferable (as set forth in Section 16.4) license, with the further right to grant sublicenses subject to Section 2.3, under the Exclusively Licensed Know-How and Licensed Patents, to research, have researched, develop, have developed, make, have made, use, have used, sell, have sold, offer for sale, have offered for sale, import, have imported, export and have exported Licensed Products in the Field of Use for the Territory.

2.1.2 a non-exclusive, royalty-bearing, transferable (as set forth in Section 16.4) license, with the further right to grant sublicenses subject to Section 2.3, under the Non-Exclusively Licensed Know-How, to research, have researched, develop, have developed, make, have made, use, have used, sell, have sold, offer for sale, have offered for sale, import, have imported, export and have exported Licensed Products in the Field of Use for the Territory.

2.2 **UHN Retention of Rights**.

2.2.1 The License granted to Avro under Section 2.1 is subject to UHN’s retention of its rights to use the Licensed Technology without charge, for (a) the conduct of the

UHN Planned Trial, (b) research conducted for noncommercial or academic purposes, (c) clinical trials of an academic or noncommercial nature, and (d) the right to grant non-exclusive licenses to Third Party non-profit academic or research institutes for the same purposes of items (a), (b) and (c), and subject to the terms and conditions outlined in Sections 3.2.1, and 3.2.2, and Articles 9 and 10.

In addition, UHN is responsible for conducting the UHN Planned Trial, and will (itself or with collaborating institutions) enroll and dose at least [***] patients in the UHN Planned Trial with a [***] follow-up phase pursuant to its retained rights and subject to Section 2.4; provided, however, that UHN shall not be deemed to be in breach of the foregoing obligation in the event that UHN discontinues the UHN Planned Trial due to events outside of the reasonable control of UHN (i.e., actions taken by Regulatory Authorities, due to a material safety issue of a Licensed Product, or due to Avro's uncured breach of its payment obligations in the Letter Agreement). In the event that UHN (i) does not enroll or dose any of the [***] patients in the UHN Planned Trial, (ii) does not complete the [***] follow-up phase for any such patients in the UHN Planned Trial, or (iii) otherwise discontinues or winds down the UHN Planned Trial for any reason, then UHN will promptly (and in any event within [***]) refund to Avro all monies paid in advance by Avro to UHN pursuant to the Letter Agreement for services or activities not performed (if any), other than any reasonable, non-cancellable Trial Costs (as defined in the Letter Agreement) incurred by UHN for the UHN Planned Trial.

2.2.2 If Avro elects to proceed on its own with a Phase 1 Clinical Trial with respect to the first Licensed Product ("**Avro Clinical Trial**"), Avro will consult with the Dr. Jeffrey Medin, and at his request, Dr. Medin will be included as an author on resulting publication(s), and subject to restrictions on publications as outlined in Section 2.2.4. For clarity, the obligation in the preceding sentence applies only to the first Phase 1 Clinical Study of the first Licensed Product conducted by Avro and is limited to Dr. Jeffrey Medin.

2.2.3 UHN agrees to keep Avro informed of any clinical research or development conducted (or contemplated to be conducted) by or on behalf of UHN with respect to the UHN Planned Trial involving the Licensed Technology as soon as reasonably practicable to ensure that UHN does not diminish or conflict with any licenses, options or other rights in Licensed Technology or Licensed Products granted to Avro, and to enable Avro and its Affiliates and Sublicensees to comply with their regulatory obligations. For certainty and clarity, clinical research or development conducted (or contemplated to be conducted) by or on behalf of UHN includes clinical research or development conducted pursuant to the rights retained under Section 2.2.1.

2.2.4 The UHN Principal Investigator, on behalf of UHN, retains the right to publish the final results of the UHN Planned Trial in a peer-reviewed journal or publication prior to any publication of the final results of the Avro Clinical Trial in a peer-review journal or publication; provided that such right of publication priority in favor of the UHN Principal Investigator, on behalf of UHN, shall expire upon the earlier of (a) the termination or discontinuation of the UHN Planned Trial for any reason, or (b) [***] after the last dose for the last patient has been administered for the Avro Clinical Trial.

2.2.5 Avro acknowledges and agrees that (a) its rights to the Licensed Technology further to the License are restricted in accordance with the terms and provisions of this Agreement, and (b) subject to the terms and conditions of Section 3.2 and this Section 2.2, UHN retains all rights to use, develop and commercially exploit the Licensed Technology outside the scope of the License.

2.3 **Sublicenses**. Avro and any of its Affiliates shall have the right to grant sublicense(s) through multiple tiers to the licenses and rights granted to it under this Agreement to any Sublicensee (the "**Sublicense(s)**"**);** provided, however, that:

2.3.1 the Sublicense shall not have any terms which are inconsistent with this Agreement, including for clarity publication rights under Section 2.2.4;

2.3.2 Sublicensee(s) shall be required to make records available to UHN in accordance with the obligations outlined in Sections 4.11 and 4.12; and

2.3.3 unless otherwise indemnified by Avro or its Affiliate directly, the Sublicense shall provide that the Sublicensee will directly indemnify UHN on terms at least as favourable as those in Article 12 unless approved otherwise in writing by UHN.

Upon termination of this Agreement for any reason, provided that a Sublicensee is not in material breach of its Sublicense, UHN shall grant to such Sublicensee license rights and terms equivalent to the sublicense rights and terms which Avro previously granted to such Sublicensee.

2.4 **Know-How Transfer and Right of Reference**.

2.4.1 UHN shall, at Avro's sole cost and expense, provide Avro with access to all of the Exclusively Licensed Know-How and Non-Exclusively Licensed Know-How as same arises, and as soon as reasonably practicable after the Effective Date with respect to any then-existing Exclusively Licensed Know-How and Non-Exclusively Licensed Know-How in UHN's and/or UHN's CRO's possession or control, in conjunction with the exercise by the Avro of its rights under the License. The Parties will (a) work collaboratively together to facilitate the process for transferring the Exclusively Licensed Know-How and Non-Exclusively Licensed Know-How and (b) use reasonable best efforts to meet the proposed timelines as set out in Schedule "A" and any amendment to the timelines shall be agreed to as between the Parties, each acting reasonably. The Parties will use reasonable best efforts to transfer all other Exclusively Licensed Know-How and Non-Exclusively Licensed Know-How in accordance with this Section 2.4 or as otherwise reasonably agreed by the Parties. Details regarding transfer of Exclusively Licensed Know-How and Non-Exclusively Licensed Know-How in the possession of the Fabry Trial Team shall be governed by Fabry Trial Team Agreements. For the avoidance of doubt, the licenses with respect to the Exclusively Licensed Know-How and Non-Exclusively Licensed Know-How in the possession of the Fabry Trial Team shall be governed by this Agreement (including Section 2.1).

2.4.2 Subject to UHN's retention of rights further to Section 2.2, UHN hereby grants Avro an exclusive right of reference in the Field of Use to any CTAs and other Regulatory Filings owned or controlled by UHN as of the Effective Date or during

the Term for Licensed Products to enable Avro to obtain Regulatory Approval of Licensed Products in the Territory or otherwise for any purpose in conjunction with the exercise by Avro of the License and its rights under this Agreement. Upon Avro's written request, UHN shall deliver to any Regulatory Authority an original letter authorizing Avro to reference and incorporate any such CTAs or other Regulatory Filings owned or controlled by UHN; provided that, such letter shall be reasonably acceptable to Avro and shall be signed by the appropriate representative of UHN so that it is received by the applicable Regulatory Authority as soon as reasonably practicable (but in no event later than [***] after Avro's written request). UHN shall provide Avro with a copy of such letter as transmitted to such Regulatory Authority no later than [***] after such transmission and provide to Avro proof of delivery of such letter. In the case of Indiana University acting as a contract manufacturer on behalf of UHN, to the extent UHN has such rights as set forth in its agreements with Indiana University, UHN hereby grants to Avro an exclusive right of reference to the DMF of Indiana University for Licensed Products to enable Avro to obtain Regulatory Approval of Licensed Products in the Territory or otherwise for any purpose in conjunction with the exercise by Avro of the License and its rights under this Agreement (taking into account that the DMF may contain confidential information of Indiana University that may not be shared with Avro).

2.4.3 UHN shall, at Avro's sole cost and expense, provide Avro with access to copies of all Regulatory Filings created for, submitted to or received from an applicable Regulatory Authority relating to the Licensed Products and all data contained therein, and any amendments, supplements, correspondence or further submissions (including adverse events and product complaints) to any of the foregoing, as well as the contents of any minutes from meetings (whether in person or by audio conference or videoconference) with Regulatory Authorities, in each case relating to the Licensed Products.

2.4.4 For each patient in the UHN Planned Trial who goes off-study after having been subject to treatment, UHN shall provide to Avro, at Avro's sole cost and expense, all Patient Data relating to said patient as soon as reasonably practicable after such information becomes available to UHN and/or UHN CRO after the date upon which such patient goes off-study, including all related Patient Data and the reason such patient went off-study. Details regarding transfer of off study Patient Data from the Fabry Trial Team to UHN and/or UHN CRO shall be governed by the Fabry Trial Team Agreements.

2.4.5 For each patient in the UHN Planned Trial, UHN and/or UHN CRO shall provide to Avro, at Avro's sole cost and expense, all Patient Data relating to said patient as soon as reasonably practicable upon such Patient Data becoming available to UHN and/or UHN CRO. Similarly, with respect to Sample Processing Data, provision of Reviewed Sample Processing Data by UHN and/or UHN CRO to Avro within [***] of data becoming Reviewed Sample Processing Data shall be considered as soon as reasonably practicable. In the event that any adverse event is determined to be a serious and unexpected adverse reaction event relating to the treatment ("SUSAR") in accordance with the process as outlined in the Clinical Trial Protocol, UHN shall provide such information to Avro within [***] of the decision to report such SUSAR to the relevant regulatory authority (or such other time period as the Parties may agree). Promptly following the disclosure of

a SUSAR to Avro, at Avro's request, the UNH CRO shall provide all Patient Data with respect to such SUSAR and other information that is reasonably requested by Avro to Avro or its designee(s), in each case for patient care purposes or to enable Avro or its Affiliates or Sublicensees to comply with any applicable laws, rules or regulations, and the UHN CRO shall discuss and answer all reasonable questions from Avro or its designee(s) relating thereto. Details regarding transfer of Clinical Trial Data, Sample Processing Data, and SUSAR data from the Fabry Trial Team to UHN shall be governed by the Fabry Trial Team Agreements. Similarly, to the extent Avro or an Affiliate or Sublicensee is conducting a clinical trial (including a Phase I Clinical Trial or a Pivotal Trial) relating to Fabry disease with the same vector in accordance with the Clinical Trial Protocol while the UHN Planned Trial is ongoing, and in the event that any adverse event is determined to be a SUSAR in accordance with the process as outlined in the Clinical Trial Protocol, Avro shall provide such information to UHN within [***] of the decision to report such SUSAR to the relevant regulatory authority (or such other time period as the Parties may agree). Promptly following the disclosure of a SUSAR to UHN, at UHN's request, Avro shall provide all patient data with respect to such SUSAR and other information that is reasonably requested by UHN to UHN, in each case for patient care purposes or to enable UHN to comply with any applicable laws, rules or regulations, and Avro shall discuss and answer all reasonable questions from UHN relating thereto.

2.4.6 At Avro's request, UHN and/or UHN CRO and Avro shall work jointly with an external contractor, at Avro's sole cost and expense, to prepare monthly reports to provide to Avro for Clinical Trial Data ("**Monthly Clinical Trial Report**"). UHN and/or UHN CRO shall provide such Monthly Clinical Trial Report to Avro within [***] after the end of each calendar month. The Parties shall work together to ensure such Monthly Clinical Trial Report is in a form acceptable to Avro. Subject to the approval of the requisite Research Ethics Board, UHN shall ensure that all informed consent form(s) under which any Patient Data will be obtained permit (a) UHN to provide such Patient Data to Avro and its Affiliates and Sublicensees, and (b) Avro and its Affiliates and Sublicensees to use such Patient Data in accordance with the terms of this Agreement.

2.4.7 In accordance with applicable laws and in a manner consistent with good clinical practice, UHN shall maintain, and shall cause its investigators and collaborating institutions (including the Fabry Trial Team) to maintain, complete and accurate records relating to the CTA, Regulatory Filings and the Patient Data to be provided to Avro. UHN, its investigators and collaborating institutions (including the Fabry Trial Team), as applicable, shall retain such records relating to CTA and Regulatory Filings for a period of at least [***] after the date of delivery of such information or reports to Avro (the "**Data Retention Period**"). During the Data Retention Period, Avro shall have the right, at its sole expense, during normal business hours, to provide a qualified person ("**Auditor**") to inspect such records of UHN, and its investigators and collaborating institutions (including the Fabry Trial Team), as applicable, for the purposes of verifying the accuracy of any information or reports delivered to Avro hereunder and UHN's compliance with the terms hereof; provided that, Avro shall give UHN and/or its investigators and collaborating institutions (including the Fabry Trial Team), as applicable, reasonable prior written notice (which shall be at least [***]) prior to Auditor conducting any such audit. UHN may require Avro to enter into an additional,

customary nondisclosure agreement(s) prior to undertaking any such inspection as required by law or UHN policy or collaborating institution policy (as applicable). Any and all books, records, reports and other documents of UHN that are inspected by Auditor pursuant to this Section 2.4.7 shall be deemed UHN Confidential Information. The Parties will comply with all applicable federal, state and provincial privacy legislation including (as applicable) the Personal Information Protection and Electronic Documents Act, S.C. 2000, c. 5 ("**PIPEDA**") and the Personal Health Information Protection Act, 2004, S.O. 2004, c. 3 ("**PHIPA**"). In the conduct of such audits, Auditor may be given access to personal information in order to validate case report forms through source documentation. Auditor shall not copy documents containing personal information or take notes of personal information. In the event that personal information about a UHN Planned Trial (or other clinical trial) subject is transferred to Avro and its employees or agents, Avro and its employees and agents shall only use the information for purposes authorized in writing by UHN or required by law; and shall appropriately protect the information against loss, theft, unauthorized access, copying, or modification; not publish the information in a form that could reasonably permit identification of the individual; not contact or attempt to contact the individual; and notify UHN and/or others as may be directed, immediately in writing upon becoming aware of any breach of this Section 2.4. Avro shall ensure that their employees and agents comply with the terms and conditions of this Section 2.4.

The report from the audit shall be deemed Avro Confidential Information. Avro may exercise the rights under this Section 2.4.7 only once during any Calendar Year. During the Data Retention Period, UHN shall, to the extent practicable, cause its investigators and collaborating institutions to comply with the terms of this Section 2.4.7. If such audit reveals that UHN or its investigators or collaborating institutions, as applicable, failed to provide information or data that should have been provided to Avro hereunder, or that any element of the information or reports delivered to Avro hereunder were incomplete or inaccurate, UHN promptly shall provide such missing information or data to Avro and/or complete and correct such information or reports and provide corrected information or reports to Avro.

2.4.8 UHN and Avro will use reasonable best efforts to execute the Fabry Trial Team Agreements in a form mutually agreed by UHN and Avro within [***] after the Effective Date. Each Party acknowledges that delays by one or more Fabry Trial Team Institution(s) is outside of the control of each of the Parties. The Parties further acknowledge that after using reasonable best efforts to present a draft Fabry Trial Team Agreement to the Fabry Trial Team Institution(s), the Parties can only act reasonably in considering any revisions requested by the Fabry Trial Team Institution(s).

2.4.9 UHN will ensure clinical trial site agreements with any investigator or collaborating institution (including the Fabry Trial Team) relating to the UHN Planned Trial are consistent with UHN's obligations, and, subject to the terms of any executed Fabry Trial Team Agreement(s), will not diminish or conflict with any licenses, options or other rights in Licensed Technology or Licensed Products granted to Avro, under this Article 2, including the License granted under Section 2.1 and the obligations outlined in this Section 2.4.

2.4.10 Notwithstanding anything herein to the contrary, all costs or expenses to be incurred by Avro, and the design and content of the related deliverables to be delivered to Avro, pursuant to this Section 2.4 must be pre-approved by Avro in writing, and will be paid pursuant to Section 4.4. For clarity, the costs or expenses to be incurred by Avro pursuant to this Section 2.4 shall be limited to reasonable, documented costs and expenses incurred by third parties only.

ARTICLE 3 - SRA IP & FURTHER OPTIONS

3.1 **SRA & Related Intellectual Property**. The Parties contemplate the execution of one or more Sponsored Research Agreement(s). Each SRA will include and incorporate appropriate provisions in respect of Avro rights and entitlements to SRA IP, including any agreement of the Parties to incorporate any such SRA IP (in whole or in part) into this Agreement as Licensed SRA IP. In such an event, the Parties shall execute all appropriate documentation to record such inclusion as Licensed SRA IP and shall further update Schedule "D" as required.

3.2 **Option Related to Improvements and Improved Therapies**

3.2.1 **Improvements Option**. During the Option Term, and subject to any Third Party rights of (i) University of Wisconsin that exist as of the Effective Date or that may arise during the Option Term, or (ii) that may arise as a result of UHN's exercise of its retained rights pursuant to Section 2.2.1, UHN hereby grants to Avro and its Affiliates an exclusive option to obtain an exclusive license under any or all of UHN's interests in the Improvement Patents to research, have researched, develop, have developed, make, have made, use, have used, sell, have sold, offer for sale, have offered for sale, import, have imported, export and have exported Licensed Products in the Field of Use for the Territory (the "**Option**"). From time to time during the Option Term, or upon Avro's written request during the Option Term, UHN shall (a) promptly inform Avro of the preparation or filing of any Improvements Patents, (b) provide to Avro a summary of all Improvements created, conceived, developed or reduced to practice during the Option Term that are incorporated into said Improvements Patents, and (c) afford Avro a reasonable opportunity during business hours to speak with UHN personnel (including the Principal Investigator) regarding the Improvements Patents in order to permit Avro to determine whether to exercise the Option. Within [***] of Avro's receipt of information from UHN regarding an Improvement Patent(s), Avro may (in its sole discretion) provide Notice to UHN of its intention to exercise the Option with respect to such Improvements Patent(s), such that such Improvements Patents become Optioned Improvements Patents. On UHN's receipt of such Notice, the Parties shall promptly (and in any event prior to the expiration of the Option Term) execute an amendment to this Agreement to include such Improvements Patents as Optioned Improvements Patents on the existing terms and conditions set forth in this Agreement (which includes, without limitation, the reimbursement of UHN patent costs and expenses). For clarity, Avro will have the right to exercise the Option from time to time during the Option Term as and when notified of such Improvements Patents in accordance with the terms of this Section 3.2.1. If UHN does not receive a Notice during the time period specified above from Avro of its intent to exercise the Option with respect to such disclosed Improvement Patents, the option with respect to such disclosed Improvement Patents shall lapse, and the license to any Improvements Know-How associated with such Improvement Patents, shall terminate and UHN will be free to dispose of the disclosed Improvement Patents in its sole and absolute discretion without any further notice or accounting to Avro.

3.2.2 **Improved Therapies Option.** During the Option Term, UHN hereby also grants to Avro and its Affiliates an exclusive option to negotiate any or all of the following licenses and rights (the "**Improved Therapies Option**"):

(a) subject to any Third Party rights of (i) University of Wisconsin that exist as of the Effective Date or that may arise during the Option Term or (ii) that may arise as a result of UHN's exercise of its retained rights pursuant to Section 2.2.1, an exclusive license under UHN's interest in any or all of the Improved Therapies Patents to research, have researched, develop, have developed, make, have made, use, have used, sell, have sold, offer for sale, have offered for sale, import, have imported, export and have exported products or services in the Field of Use for the Territory, to the extent such rights are available in law;

(b) subject to any Third Party rights (i) of University of Wisconsin that exist as of the Effective Date or that may arise during the Option Term or (ii) that may otherwise arise as a result of UHN's exercise of its retained rights pursuant to Section 2.2, a non-exclusive license under UHN's interest in any or all of the Improved Therapies Know-How to research, have researched, develop, have developed, make, have made, use, have used, sell, have sold, offer for sale, have offered for sale, import, have imported, export and have exported products or services in the Field of Use for the Territory, to the extent such rights are available in law;

From time to time during the Option Term, or upon Avro's written request during the Option Term, UHN shall (A) promptly inform Avro of the preparation or filing of any Improved Therapies Patents, (B) provide to Avro a summary of all Improvements created, conceived, developed or reduced to practice prior to the Effective Date or during the Option Term that are incorporated into said Improved Therapies Patents and (C) afford Avro a reasonable opportunity during business hours to speak with UHN personnel (including the Principal Investigator) regarding the Improved Therapies Patents and Improved Therapies Know-How in order to permit Avro to determine whether to exercise the Improved Therapies Option. Within [***] of receipt of information from UHN informing Avro of said Improved Therapies Patent(s), Avro may (in its sole discretion) provide Notice to UHN of its intention to exercise any or all of Improved Therapies Option regarding said Improved Therapies Patent(s). On UHN's receipt of such Notice, the Parties shall negotiate in good faith to enter into a license agreement on terms and conditions to be agreed to by the Parties, including financial terms at least as favourable to UHN as those of this Agreement (which includes, without limitation, the reimbursement of UHN patent costs and expenses). For clarity, Avro will have the right to exercise the Improved Therapies Option within [***] of such disclosure to Avro when any Improved Therapies are disclosed by UHN to Avro in accordance with the terms herein.

3.2.3 **Residual Rights**. In the event that:

(a) UHN does not receive the aforementioned Notice from Avro in respect of the Improved Therapies Option during the Option Term, or

(b) the Parties do not execute a license with respect to the Improved Therapies Option, or

(c) the Parties do enter into a license with respect to the Improved Therapies Option, but such license is terminated and the rights to exploit the Improved Therapies Patents is subsequently returned to UHN,

UHN will then have the right to license the Improved Therapies Patents for the purpose of research, development and commercialization of any products or services thereunder in the Field of Use in its sole discretion and without any further notice or accounting to Avro.

ARTICLE 4 - CONSIDERATION

4.1 **Payment**. Payments of funds to UHN shall be made to "University Health Network" and sent to the following address:

University Health Network
Technology Development & Commercialization
College Street - Suite 150
Heritage Building - MaRS Centre
Toronto, Ontario, Canada, M5G 1L7
Attention: tdc@uhnresearch.ca

4.2 **License Maintenance/Upfront Fee**. Upon execution of this Agreement, and on each anniversary of the Effective Date during the Term, Avro shall pay UHN (a) a non-refundable and non-creditable (towards any other consideration owing pursuant to this Agreement with the exception of Section 4.6) license fee payment of [***] until the first sale of a Licensed Product in [***], and (b) a non-refundable, non-creditable, one-time upfront fee of seventy five thousand Canadian dollars (C$75,000) upon the execution of this Agreement. UHN will maintain [***] of these funds in a separate UHN account, to be maintained in support of UHN's obligations pursuant to the accompanying letter agreement to be executed concurrently with this Agreement (the "**Letter Agreement**").

4.3 **Reimbursement of Past Patent Costs**. Avro shall reimburse UHN for all previously unreimbursed patent expenses incurred prior to and up to the Effective Date in respect of the filing, maintenance and prosecution of the Fabry Patents (the "**Patent Expenses**"). For information purposes only, such costs are estimated to be [***]. All past patent costs are due and payable upon execution of this Agreement.

4.4 **Reimbursement of Addition Costs and Expenses**. For any third party out-of-pocket costs and expenses that are pre-approved by Avro in writing in accordance with Section 2.4.10, within [***] after [***], the incurring party will invoice Avro for any amounts owed by Avro under Section 2.4 that are not otherwise accounted for in this Section 4. Avro will pay any undisputed amounts within [***] of receipt of the invoice, and any disputed amounts owed by a Party will be paid within [***] of resolution of the dispute.

4.5 Royalties.

4.5.1 **[***]**. During the Royalty Term, Avro shall, on a country-by-country and Licensed Product-by-Licensed Product basis, pay to UHN a running royalty in the amount of (a) (i) **[***] percent ([***]%)** of Net Revenues for annual sales of such Licensed Product up to [***], (ii) **[***] percent ([***]%)** of Net Revenues for annual sales of such Licensed Product between [***] up to [***], (iii) **[***] percent ([***]%)** of Net Revenues for annual sales of such Licensed Product between [***] up to [***], and (iv) **[***] percent ([***]%)** of Net Revenues for annual sales of such Licensed Product in excess of [***], during the period in which (A) such sale would but for the licenses granted herein infringe any Valid Claims contained in the Licensed Technology in such country, or (B) [***].

4.5.2 **[***]**. During the Royalty Term, Avro shall, on a country-by-country basis and Licensed Product-by-Licensed Product basis, in respect of countries in which [***], pay UHN a running royalty in the amount of **[***] percent ([***]%)** of Net Revenues for such Licensed Product sold in [***].

Amounts paid pursuant to this Section 4.5 shall be referred to as "**Royalties**".

Upon expiration of the Royalty Term with respect to a Licensed Product in a country, the license grant shall become fully paid-up, royalty-free, perpetual and irrevocable for such Licensed Product in such country.

To the extent that Avro or any of its Affiliates or Sublicenses obtains licenses to third party patent rights or other intellectual property in order to practice the Patent Rights in Licensed Technology or to research, develop, manufacture or commercialize any Licensed Products and the aggregate royalty burden payable on a Licensed Product is greater than [***] percent ([***]%) (i.e., [***] percent ([***]%) of the total Net Revenues of Licensed Product payable to UHN and any other Third Party), Avro and its Affiliates or Sublicensees may deduct from any royalty due to UHN hereunder [***] percent ([***]%) of the then applicable aggregate royalty burden over said [***] percent ([***]%) (the "**Deductible Third Party Royalties**") up to maximum reduction of [***] percent ([***]%) of the running Royalties owed UHN in any Quarterly Period hereunder (the "**Maximum Royalty Reduction**"), with any Deductible Third Party Royalties that exceed the Maximum Royalty Reduction in any Quarterly Period carried over into immediately succeeding Quarterly Period(s) until exhausted, however in no event shall the UHN Royalties owed in any such succeeding Quarterly Period(s) be reduced by greater than the Maximum Royalty Reduction.

If the manufacture, use or sale of any Licensed Product or is covered by more than one of patent rights within the Licensed Technology, multiple royalties shall not be due.

4.6 Sublicensing Fee.

In further partial consideration of the License, Avro shall pay to UHN **[***] percent ([***]%)** of all Sublicensing Revenue (the "**Sublicensing Fee**"). Any amounts paid to UHN further to Section 4.2 (License Maintenance/Upfront Fee) and Article 5 (Milestones) shall be creditable by Avro against amounts due to UHN further to this Section 4.6; however, the payments further to Section 4.2 and Article 5 shall not act as a cap on the payments owed further to this Section 4.6.

To the extent that patent rights, other intellectual property rights or other rights or obligations other than Licensed Technology are licensed, sublicensed or granted by Avro in addition to the Licensed Technology for which the Sublicensing Revenue is attributable, that portion of the consideration received by Avro and subject to this Section 4.6 shall be equitably apportioned between the Licensed Technology and those other rights and obligations, and such apportionment shall be reasonable and in accordance with customary standards in the industry. Avro shall promptly deliver to UHN a written report setting forth such apportionment. In the event UHN disagrees with the determination made by Avro, UHN shall so notify Avro within [***] of receipt of Avro's report and the Parties shall meet to discuss and resolve such disagreement in good faith. If the Parties are unable to agree in good faith as to such fair market values within [***] then (a) the matter shall be submitted in accordance with the dispute resolution process set forth in Article 14, and (b) UHN shall not be entitled to terminate this Agreement until a final determination has been made pursuant to Section 14.3.

4.7 **Royalty Payments**. The Royalties described in Section 4.5 shall accrue as of the date of receipt of Gross Revenue (either by Avro, its Affiliate or Sublicensee, as appropriate) and the Sublicensing Fee described in Section 4.6 shall accrue as of the date of receipt of Sublicensing Revenues by Avro, and all amounts owing pursuant to Sections 4.5 and 4.6 shall be paid by Avro within [***] after the end of each Quarterly Period in which said revenue/fee accrues.

4.8 **Interest**. All undisputed monies payable to UHN and not paid when due bear interest at the prime rate of interest quoted by the Bank of Canada, plus [***] percent ([***]%) per annum until the date paid to UHN. UHN will be entitled to that interest in addition to any other rights or remedies available to it in respect of any payment default.

4.9 **Withholdings**. In the event that Avro is required by any law to withhold and/or make payments to tax authorities in respect of any payments payable by Avro to UHN under this Agreement, the liability of Avro under this Agreement shall be to that extent satisfied, and such amounts shall be deemed to have been paid to UHN on their due dates, provided that Avro shall provide UHN with acceptable evidence of such payments.

4.10 **Royalty Report**. After the First Commercial Sale of a Licensed Product, Avro shall prepare a report (the "**Royalty Report**") at the end of each Quarterly Period, setting out the Gross Revenue, the Net Revenue (including an itemized statement of any permitted discounts, refunds and taxes deducted), the Sublicensing Revenue, and the number of Licensed Products sold, along with calculations of any Royalties and Sublicensing Fee that are payable to UHN. Royalty Reports shall be due within [***] of the end of the relevant Quarterly Period. If no payments are due for any Quarterly Period, then the Royalty Report shall so state.

4.11 **Complete Records**. Avro shall keep true and accurate records and books of account (in accordance with generally accepted accounting principles) containing all data reasonably required for the computing and verification of Gross Revenues, Net Revenues, Sublicensing Revenues and Royalties and Sublicensing Fee. Avro shall contractually require all Avro Affiliates and Sublicensees to keep same and provide a copy of same to Avro for purposes of inspection pursuant to Section 4.12. Such records shall be maintained and accessible to UHN for at least [***] from the date of the payment to which such records are relevant.

4.12 **Inspection of Records**. The records specified in this Agreement shall be available for inspection by UHN or their duly appointed auditor, but not more than once per Calendar Year, upon reasonable written notice and during normal business hours at the principal place of business of Avro, for the sole purpose of verifying payments owed under this Agreement. The costs of any such inspection shall be borne by UHN unless the report of an auditor shows that the Royalty Report was understated by more than [***] percent ([***]%) in respect of the period under review, in which case UHN's reasonable out of pocket costs of the examination shall be paid by Avro. Avro may require such auditor to enter into a commercially reasonable confidentiality agreement with Avro prior to being provided with any such records.

4.13 **Discrepancy in Records**. In the event that the records inspection conducted under Section 4.12 reveals any underpayment of royalties due to UHN, Avro will promptly pay UHN the full amount of that underpayment together with interest thereon at the rate of interest referred to in Section 4.8. In the event that the records inspection conducted under Section 4.12 reveals any overpayment of royalties by Avro, the overpaid amount will be credited against future amounts payable to UHN.

4.14 **Confidentiality**. The reports and records provided by Avro and its Affiliates and Sublicensees hereunder further to Sections 4.10, 4.11 and 4.12 shall be regarded as Avro's (or its Affiliates' or Sublicensees', as applicable) Confidential Information and UHN hereby covenants that it shall not use or disclose any information included in such reports for any purpose other than determining whether Avro, its Affiliates and Sublicensees have complied with their obligations under this Agreement. UHN further agrees that, until such time as such information is no longer confidential through no fault of UHN, it shall maintain such reports and any information included therein in strict confidence and treat such information in a manner at least as restrictive as its manner of treating its own Confidential Information of similar nature and in any event not less than with a reasonable degree of care. In addition, any summary of the audit report and analysis, and the Royalty Payments amounts received by UHN (both in total, and particularized on a country-by-country basis) shall be considered Confidential Information of Avro for purposes of this Section 4.14.

4.15 **Philanthropic Commitment**. Avro will donate funds equivalent to **[***] ([***]%)** of the (a) Royalties payable to UHN under Section 4.5 and (b) regulatory milestone payments payable to UHN under Section 5.8 to organizations for the benefit of the Canadian Fabry community; provided, that, in no event shall such donated amounts exceed [***] in any calendar year. UHN shall direct how such funds will be donated, subject to its consultation with Avro. Upon request by UHN, Avro shall provide all documentation and engage in such actions as reasonably requested by UHN to document and/or memorialize and/or verify any such donation.

ARTICLE 5 - MILESTONES

5.1 **Performance Milestones to Maintain License**. Avro, itself or through its Affiliates or Sublicensees, shall be responsible for achieving the following performance milestones in the time periods as noted, for purposes of maintaining the License:

5.1.1 [***]; and

5.1.2 [***].

The Parties acknowledge and agree that the Phase 1 Clinical Trial in Section 5.1.1 above may be conducted by UHN (including the UHN Planned Trial) or another university or academic institution for purposes of satisfying this performance milestone.

5.2 **Extension of Performance Milestone**. The Parties may agree to extend: (a) the timelines for the performance of the Section 5.1 milestones, or (b) the Negotiation Period (as defined below in Section 5.3). Any such agreement to extend such timelines shall be in writing.

5.3 **Failure to Fulfill Performance Milestone(s)**. In the event that Avro is unable to satisfy one or more of the Section 5.1 milestone(s) within the timeline(s) as noted (or within the timeline(s) as extended pursuant to Section 5.2 or Section 5.4) on the following basis: (a) for reasons beyond Avro's reasonable control (including reasons relating to regulatory requirements or events or UHN's failure to [***]), and (b) despite Avro having used, and continuing to use (during any Negotiation Period as outlined herein) commercially reasonable efforts to develop at least one Licensed Product, then UHN and Avro shall negotiate in good faith for up to a period of [***] ("**Negotiation Period**") to reach agreement on revised timelines and/or revised milestones, during which Negotiation Period UHN shall not terminate this Agreement. Absent either of: (i) an extension, or revision to the Section 5.1 milestones (such extension or revision not to be unreasonably withheld, conditioned or delayed), or (ii) Avro otherwise fulfilling the Section 5.1 milestone(s) within the Negotiation Period, UHN may terminate this Agreement for material breach pursuant to Section 11.3.3 within its sole and absolute discretion.

5.4 **Regulatory Authority Generated Delay**. If Avro is unable to meet any milestone timeline as noted in Section 5.1.1 or Section 5.1.2 as a result of the relevant Regulatory Authority requesting additional information or data or other Regulatory Authority delay, UHN and Avro shall negotiate in good faith, and acting reasonably, to agree upon the amount of time required to fulfill such request, and the relevant Section 5.1 milestone shall be extended by such amount of time.

5.5 **Licensed Product Development Milestone Payments**. UHN shall be paid the following one-time milestone payments for a first Licensed Product to reach such milestone (irrespective of indication and/or therapeutic area). Avro shall promptly provide Notice to UHN of the fulfillment of a milestone (whether fulfilled by Avro or its Affiliate or Sublicensee), and each noted milestone payment shall be due and payable by Avro within [***] from the date that such milestone is met, subject to the payment deferral terms of Section 5.7:

5.5.1 [***]; and

5.5.2 [***].

5.6 **[Reserved]**.

5.7 **Payment Deferral**. In respect of reimbursable patent costs (pursuant to Section 4.3), and milestone payments owed further to Section 5.5, (but only for such patent costs directly reimbursable by Avro and such milestones which have been achieved by Avro, and not by any acquirer or Sublicensee who achieves such milestone or is responsible for any such patent cost reimbursement), payment shall remain due as indicated in the

aforementioned section(s), but the Parties agree that any amount due and payable that exceeds [***] percent ([***]%) of the total amounts (i.e. gross total) of any investment raise(s) and financing(s) (e.g. any of seed financing, Series A Financing, Series B Financing or other series of financing) up to such date for which the relevant milestone and/or patent costs are due shall be deferred to the next investment raise/financing. As such, any outstanding amounts shall become payable upon the next investment raise, again subject to [***] percent ([***]%) cap of the total amount (i.e. gross total) of such investment raise/financing until such time as all unpaid amounts are paid in full. All unpaid amounts will collect interest as further set out in Section 4.8. All unpaid and deferred amounts owed pursuant to this Section 5.7 will become immediately payable upon the earlier to occur of: (a) closing of a merger or acquisition of Avro, (b) sale of substantially all of Avro's assets (including this Agreement) relating to the Licensed Products to a non-Affiliated Third Party during the term of this Agreement, (c) Avro granting an exclusive sublicense under the Licensed Technology to a Third Party for purposes of commercializing Licensed Products, or (d) upon an initial public offering (IPO) of Avro shares.

5.8 **Regulatory Approval Milestone Payments**. UHN shall be paid the following milestone payments in respect of each Licensed Product(s). Avro shall promptly provide Notice to UHN of the fulfillment of a milestone (whether such milestone is achieved by Avro or its Affiliate or Sublicensee). Each noted milestone payment is payable by Avro within [***] from the date that such milestone is met:

5.8.1 [***];

5.8.2 [***]; and

5.8.3 [***].

5.9 **[Reserved]**.

ARTICLE 6 - REPRESENTATIONS, WARRANTIES AND LIABILITY

6.1 **UHN Reps & Warranties**. UHN represents, warrants and covenants to Avro that:

6.1.1 it is duly incorporated and organized and validly existing under the laws of Ontario, and has all requisite corporate power and authority to enter into and perform its obligations under the Agreement;

6.1.2 it has taken all necessary corporate action, steps and proceedings to approve or authorize, validly and effectively, the execution and delivery of this Agreement and perform its obligations hereunder;

6.1.3 the execution and delivery of this Agreement by UHN and the performance of its obligations under the Agreement shall not result in either a breach or violation of any of the provisions of, or constitute a default under, or conflict with or cause the acceleration of, any obligation of UHN under:

(a) any agreement to which UHN is a party or is otherwise bound by;

(b) any judgment, decree, order or award of any court, governmental body or arbitrator having jurisdiction over UHN;

(c) any license, permit, approval, consent or authorization held by UHN; or

(d) any applicable law, statute, ordinance, regulation or rule;

6.1.4 as on the Effective Date, UHN is the sole owner of all right, title and interest in and to the Licensed Patents then listed in Schedules "C"; and

6.1.5 UHN will disclose all Improved Therapies that exist as of the Effective Date and of which UHN has knowledge, within [***] of the Effective Date.

6.2 Avro Reps & Warranties. Avro represents and warrants to UHN that:

6.2.1 it is duly incorporated and organized and validly existing under the laws of the State of Delaware and has all the requisite corporate power and authority to enter into and perform its obligations under the Agreement;

6.2.2 it has taken all necessary corporate action, steps and proceedings to approve or authorize, validly and effectively, the execution and delivery of the Agreement and the performance of its obligations hereunder and to cause all necessary meetings of directors and shareholders of Avro to be held for such purposes;

6.2.3 the execution and delivery of this Agreement by Avro and the performance of its obligations hereunder shall not result in either a breach or violation of any of the provisions of, or constitute a default under, or conflict with or cause the acceleration of, any obligation of Avro under:

(a) any agreement to which Avro is a party or is otherwise bound by;

(b) any of the terms and provisions of the organizing documents or bylaws, or resolutions of the board of directors (or any committee thereof), of Avro;

(c) any judgment, decree, order or award of any court, governmental body or arbitrator having jurisdiction over Avro;

(d) any license, permit, approval, consent or authorization held by Avro; and

(e) any applicable law, statute, ordinance, regulation or rule.

6.3 Limitations of Liability. EXCEPT AS OTHERWISE EXPRESSLY SET OUT IN THIS AGREEMENT:

6.3.1 EACH PARTY EXPRESSLY DISCLAIMS ANY AND ALL IMPLIED OR EXPRESS WARRANTIES AND MAKES NO EXPRESS OR IMPLIED WARRANTIES OF ANY KIND, INCLUDING WARRANTIES OF MERCHANTABILITY, SAFETY OR FITNESS FOR ANY PARTICULAR PURPOSE OF THE LICENSED TECHNOLOGY, OR THAT THE LICENSED TECHNOLOGY CAN BE EXPLOITED TO GENERATE REVENUES;

6.3.2 UHN DOES NOT WARRANT OR REPRESENT THAT ISSUED PATENTS ARE VALID, OR PENDING PATENT APPLICATIONS WILL ISSUE, OR WHEN ISSUED WILL BE VALID, OR THAT THE PRACTICE OR EXPLOITATION OF ANY LICENSED TECHNOLOGY PROVIDED PURSUANT TO THIS AGREEMENT, DOES NOT, OR WILL NOT, CONSTITUTE INFRINGEMENT OF RIGHTS OF THIRD PARTIES;

6.3.3 NEITHER PARTY SHALL BE LIABLE TO THE OTHER PARTY FOR ANY INDIRECT, SPECIAL, CONSEQUENTIAL, EXEMPLARY OR PUNITIVE DAMAGE OR LOSS OF BUSINESS OR LOSS OF PROFITS SUFFERED BY SUCH OTHER PARTY RESULTING FROM THE USE OR OTHER EXPLOITATION OF THE LICENSED TECHNOLOGY, INCLUDING WITHOUT LIMITATION THE SALE OF ANY LICENSED PRODUCTS. FURTHERMORE, UHN MAKES NO REPRESENTATION THAT THE LICENSED TECHNOLOGY IS FREE FROM DEFECT OR LIABILITY OF INTELLECTUAL PROPERTY INFRINGEMENT.

ARTICLE 7 - FURTHER COVENANTS AND OBLIGATIONS

7.1 **Avro Covenants/Obligations**. Avro covenants and agrees for the benefit of UHN that it shall:

7.1.1 use reasonable efforts to provide Notice to UHN in the event that the Principal Investigator becomes a shareholder of Avro;

7.1.2 not engage the Principal Investigator or other UHN employees for the conduct of research activities utilizing UHN resources and/or facilities absent a Sponsored Research Agreement or such other appropriate agreement, or otherwise the written consent of UHN; provided, for clarity, that this Section **7.1.2** shall apply to the Principal Investigator in his appointment and scientific research at UHN only (and not with respect to any other university, hospital, facility, institution or entity);

7.1.3 use commercially reasonable efforts to exercise the License granted herein and otherwise exploit the Licensed Technology in accordance with the terms of this Agreement, and with all applicable laws, statutes, ordinances, regulations, guidelines and rules, including all applicable statutes and regulations and applicable guidelines set forth by the Canadian Institutes of Health Research (CIHR), National Institutes of Health (NIH) or other governmental agencies where applicable;

7.1.4 ensure that all of its employees, representatives, agents, consultants, Sublicensee(s), Affiliate(s) and any other Third Parties having access to the subject matter of this Agreement are aware of any and all confidentiality obligations, and are legally bound by similar obligations;

7.1.5 cause to be applied to Licensed Product(s) (as appropriate) any markings required by applicable government statutes and laws to maintain continued validity and enforcement of proprietary rights in Licensed Technology (as applicable);

7.1.6 ensure that the terms and conditions of any Sublicense are consistent with the terms and conditions of this Agreement; and

7.1.7 in addition to any diligence requirements or obligations of this Agreement, use commercially reasonable efforts to develop and commercialize one or more Licensed Products.

7.2 **UHN Covenants**. UHN covenants and agrees for the benefit of Avro that it shall:

7.2.1 ensure that all employees, staff members, students, and any other UHN agents or representatives having access to the subject matter of this Agreement are aware of any and all obligations under this Agreement, including confidentiality obligations, and have agreed to be legally bound by them;

7.2.2 use reasonable best efforts to conduct and enroll and dose at least [***] patients in the UHN Planned Trial with a [***] follow-up phase; provided, however, that UHN shall not be deemed to be in breach of the foregoing obligation in the event that UHN discontinues the UHN Planned Trial due to events outside of the reasonable control of UHN (i.e., actions taken by Regulatory Authorities, due to a material safety issue of a Licensed Product, or due to Avro's uncured breach of its payment obligations in the Letter Agreement); and

7.2.3 not grant any rights in the Licensed Technology to any Person that would conflict with the rights granted to Avro hereunder.

ARTICLE 8 - MANAGEMENT OF INTELLECTUAL PROPERTY RIGHTS

8.1 **Responsibility for Patent Rights**. Avro will assume responsibility for the preparing, filing, prosecuting, maintaining and defending in all agency proceedings (e.g., reissues, reexaminations, oppositions and interferences), using patent counsel reasonably acceptable to UHN, patent rights within the Licensed Technology to the extent such patent rights are relevant to the Field of Use, or Avro is otherwise deemed to be responsible for prosecution in accordance with the terms of a Sponsored Research Agreement ("**Field Patent Rights**") during the Term. Avro shall copy UHN on all patent prosecution documents and give UHN reasonable opportunities to advise Avro on such filing, prosecution and maintenance. In the event Avro desires to abandon any patent or patent application within the Field Patent Rights, Avro shall provide UHN with reasonable prior written notice of such intended abandonment or decline of responsibility. If UHN elects to continue such patent or patent application, the Parties shall consult and Avro may elect to retain responsibility therefor. Otherwise, the right to prepare, file, prosecute, maintain and defend the relevant Field Patent Rights, at UHN's expense, shall revert to UHN. In such event, such UHN paid-for rights shall be removed from the definition of Licensed Patents under this Agreement and the licenses granted to Avro and its Affiliates as to such rights shall terminate. UHN retains its rights to prepare, file, prosecute, and maintain, and defend in all agency proceedings (e.g. reissues, reexaminations, oppositions and interferences), at UHN's expense, patent rights within the Licensed Technology that are relevant outside the Field of Use ("**UHN Patent Rights**"). To the extent that patent rights are relevant both inside and outside the Field of Use, during the Option Term the Parties shall work cooperatively to make decisions with respect to preparing, filing, prosecuting, maintaining and defending such patent rights in all agency proceedings such that neither Party's rights are jeopardized.

8.2 **Patent Extensions and Orange Book Listings**. If elections with respect to obtaining patent term extensions (including, without limitation, any available pediatric extensions) or supplemental protection certificates or their equivalents in any country with respect to Field Patent Rights are available, Avro shall have the sole and exclusive right to make any such elections based on Licensed Products. With respect to data exclusivity periods (such as those periods listed in the FDA's Orange Book (including, without limitation, any available pediatric extensions) or periods under national implementations of Article 10.1(a)(iii) of Directive 2001/EC/83 or orphan exclusivity periods, and all equivalents in any country), Avro shall have the sole and exclusive right to seek and maintain all such data exclusivity periods available for the Licensed Products. With respect to all of the rights and activities identified in this Section 8.2, UHN hereby appoints Avro as its agent for such purposes with the authority to act on UHN's behalf with respect to the Field Patent Rights in a manner consistent with this Agreement.

8.3 **Notification of Infringement**. Each Party agrees to provide written notice to the other Party promptly after becoming aware of any infringement of the Field Patent Rights or UHN Patent Rights by a Third Party and of any available evidence thereof.

8.4 **Right to Prosecute Infringements**.

8.4.1 **Avro Right to Prosecute**. As between the Parties, Avro shall have the first and exclusive right, but not the obligation, under its own control and at its own expense, to prosecute any Third Party infringement of the Field Patent Rights and/or UHN Patent Rights, subject to Sections 8.5 and 8.6. The total cost of any such infringement action commenced or defended solely by Avro shall be borne by Avro.

8.4.2 **UHN Right to Prosecute**. If within [***] after having been notified of any alleged infringement that is material and competitive in the marketplace Avro is unsuccessful in persuading the alleged infringer to desist and shall not have brought and shall not be diligently prosecuting an infringement action, then UHN shall have the right, but shall not be obligated, under its own control and at its own expense, to prosecute any infringement of the Field Patent Rights and/or UHN Patent Rights.

8.5 **Declaratory Judgment Actions**. If a declaratory judgment action is brought naming UHN or Avro or any of its Affiliates or Sublicensees as a defendant and alleging invalidity, unenforceability or non-infringement of any Field Patent Rights and/or UHN Patent Rights, Avro or UHN, as the case may be, shall promptly notify the other Party in writing. With regards to the Field Patent Rights, or to the extent litigation of the UHN Patent Rights remain under UHN's control, Avro may elect, upon written notice to UHN within [***] after receiving or giving notice of the commencement of such action, to take over the sole control of such action at its own expense. If Avro does not defend any such action, then UHN shall have the right, but shall not be obligated, to defend such action at UHN's expense.

8.6 **Recovery**. In the event that either Party exercises the rights conferred in this Article 8 and recovers any damages or other sums in such action, such damages or other sums recovered shall first be applied to all out-of-pocket costs and expenses incurred by the Parties in connection therewith (including, without limitation, attorneys fees). If such recovery is insufficient to cover all such costs and expenses of both Parties, [***]. If after

such reimbursement any funds shall remain from such damages or other sums recovered, such funds shall be retained by the Party that controlled the action or proceeding under this Article 8; provided, however, that (a) if Avro is the Party that controlled such action or proceeding, the remaining recovery received by Avro shall be shared [***] allocated to Avro, [***]) allocated to UHN, and (b) if UHN is the Party that controlled such action or proceeding, the remaining recovery received by UHN shall be shared [***] allocated to UHN, [***] allocated to Avro.

8.7 **Cooperation**. Each Party agrees to cooperate in any action under this Article 8 which is controlled by the other Party, including, without limitation, joining such action as a party plaintiff if necessary or desirable for initiation or continuation of such action; provided that the controlling Party reimburses the cooperating Party promptly for any reasonable costs and expenses incurred by the cooperating Party in connection with providing such assistance.

8.8 **Patent Certifications**. UHN shall notify and provide Avro with copies of any allegations of alleged patent invalidity, unenforceability or non-infringement of a Patent Right pursuant to a Paragraph IV Patent Certification by a Third Party filing an Abbreviated New Drug Application, an application under §505(b)(2) or any other similar patent certification by a third party, and any foreign equivalent thereof. Such notification and copies shall be provided to Avro within [***] after UHN receives such certification.

8.9 **Patent Challenges**. UHN will have the right to terminate this Agreement in full upon [***] prior written notice to Avro in the event that Avro or any of its Affiliates or Sublicensees (to the extent related to rights granted to a Sublicensee under this Agreement) institutes any claim in a legal or administrative proceeding challenging the validity of any Licensed Patents (except as a defense against a claim, action or proceeding asserted by UHN against Avro or its Affiliates or Sublicensees) (a "**Patent Challenge**")**;** provided, with respect to any such Patent Challenge by any Sublicensee of Avro, UHN will not have the right to terminate this Agreement under this Section 8.9 if Avro (a) causes such Patent Challenge to be terminated or dismissed or (b) if permitted in accordance with applicable Law, terminates such Sublicensee's sublicense to the Licensed Patents being challenged by the Sublicensee, in each case ((a) and (b)) within [***] of UHN's notice to Avro under this Section 8.9. Notwithstanding the foregoing, UHN's termination right under this Section 8.9 will not apply to any Affiliate of Avro that first becomes an Affiliate of Avro after the Effective Date of this Agreement in connection with a License Transfer, where such Affiliate of Avro was undertaking activities in connection with a Patent Challenge prior to such License Transfer.

ARTICLE 9 - CONFIDENTIAL INFORMATION

9.1 **Confidentiality**. The Receiving Party shall take all reasonable measures, and at least the same measures as it takes in respect of its own Confidential Information of a similar nature, to keep confidential the Confidential Information of the Disclosing Party. The Receiving Party may disclose such Confidential Information to those of its directors, officers, employees, subcontractors, consultants and agents (collectively, "**Representatives**") having a need to know such information in connection with exercising the Receiving Party's rights and/or fulfilling the Receiving Party's obligations under this Agreement. With respect to Avro, Representatives also include Affiliates and proposed and actual Sublicensee(s). The Receiving Party will ensure that any of its Representatives having access to the Confidential Information of the Disclosing Party

are under a legal obligation to maintain such Confidential Information in confidence and are duly informed of this obligation. The Receiving Party will neither use nor disclose to any other party any of the Confidential Information of the Disclosing Party except as expressly permitted under this Agreement. The terms of this Agreement are the Confidential Information of both Parties. During the Term, information relating to Licensed Product(s) in the Field of Use is the Confidential Information of Avro. The confidentiality provisions as outlined in this Article 9 shall survive expiration or earlier termination of this Agreement for a period of [***].

9.2 **Equitable Relief / Disputes**. The Parties acknowledge that a breach of this Article 9 by either Party or any of its Representatives may cause irreparable harm and that, notwithstanding any other term or provision of this Agreement, the non-breaching Party may be entitled to equitable relief, including injunction and specific performance, as a remedy for any such breach. Such remedies shall not be deemed to be the exclusive remedies but shall be in addition to all other remedies available at law or equity.

9.3 **Disclosure to Advisors**. Notwithstanding the confidentiality obligations of this Agreement, each Party shall be permitted to disclose the terms of this Agreement without the prior written consent of the other Party to those of its [***].

9.4 **Other Permitted Disclosures**. Notwithstanding the confidentiality obligations of this Agreement, the Receiving Party shall be permitted to disclose the Confidential Information of the Disclosing Party or any other information associated with the Agreement, without the prior written consent of the Disclosing Party, (a) to the extent required to be disclosed by law (including access to information laws, securities laws, regulations and listing requirements in Canada, United States and other jurisdictions) or an order of a court, tribunal, or government agency, provided that to the extent legally permissible the Receiving Party (i) gives to the Disclosing Party prompt written notice of the required disclosure of any Confidential Information in order to allow the Disclosing Party reasonable opportunity to seek a confidentiality order or the like, and (ii) cooperates with efforts of the Disclosing Party (at the Disclosing Party's expense) in connection therewith; and (b) as required to be disclosed in connection with the filing with, or approval, certification or endorsement from, any governmental body or medical protocol, in each case for a Licensed Product(s), provided that the information disclosed pursuant to this clause (b) is not the inventive subject matter of an unpublished patent application.

9.5 **Press Releases**. Avro or its Affiliates may prepare and disclose via press release any Patient Data for the UHN Planned Trial (a) after an academic publication, interim report, abstract or presentation of data/results from the UHN Planned Trial has been made or authorized by Dr. Jeff Medin or any other clinical trial site ("**Interim Disclosure**") (such publication or presentation subject to Sections 10.1 and 10.2) but restricted as follows: (i) the UHN Planned Trial data and results referred to or otherwise discussed in the press release shall be limited to published data/results and (ii) the UHN Principal Investigator shall be granted a reasonable opportunity to review and comment on the accuracy of technical and scientific data and conclusions relating to same prior to publication of the press release; or (b) as required by applicable laws, rules or regulations (including a press release corresponding to any securities disclosure, such as pursuant to a Form 8-K), including by the rules or regulations of the United States Securities and Exchange Commission or similar regulatory agency in a country other than the United States or of any stock exchange or listing entity. The intention of Dr. Jeff

Medin as of the Effective Date is to publish or present interim data, in one or more forums, as is reasonable in light of the data generated during the UHN Planned Trial. For clarity, the restrictions set forth in this paragraph apply only to the UHN Planned Trial.

Subject to Section 10.2.1, Avro or its Affiliates may prepare and disclose via any press release, publication or presentation any data, results or reports relating to the Licensed Products (including with respect to the Licensed Technology) in Avro's sole discretion without prior review and/or approval by UHN or Dr. Jeff Medin, other than the Patient Data for the UHN Planned Trial which is addressed by the paragraph above.

Other than as agreed to by the Parties, UHN shall only issue press releases with respect to the Licensed Technology in accordance with Sections 10.1 and 10.2.2.

ARTICLE 10 - PUBLICATION

10.1 **Publications**. Avro recognizes that, under UHN policies further to its obligations and responsibilities as an academic and teaching/research hospital affiliated with the University of Toronto, the results of research conducted at UHN (including ongoing research of the Principal Investigator with respect to the Licensed Technology) and research conducted jointly with other institutions (the UHN Planned Trial) must be publishable, and as such agrees that the Principal Investigator or the researchers employed by UHN who are engaged in any such research, as well as their collaborators, shall be permitted to present at symposia, national, or regional professional meetings, and to publish in journals, theses or dissertations, or otherwise, the methods and results of such research. Avro shall be furnished a copy of any proposed (a) publication (including publication in conjunction with collaborators under the UHN Planned Trial) at least [***] before submission of such proposed publication, and (b) public oral presentation/seminar at least [***] before delivery of such presentation/seminar. During that time, Avro shall have the right to (i) review the material for Confidential Information provided by Avro and (ii) assess the patentability of any invention described in the material. If Avro decides that a patent application should be filed, the publication or presentation may, at Avro's request, be delayed an additional [***]. At Avro's request, Confidential Information provided by Avro shall be deleted. Publications submitted by UHN to Avro pursuant to this Section 10.1 shall remain confidential, and may only be made the subject of a press release by Avro or its Affiliates (A) after the date of the first publication or disclosure, or (B) as permitted pursuant to Section 9.5.

10.2 **Use of Names / Additional Permitted Disclosures**.

10.2.1 Avro and its Affiliates and Sublicensees shall not use the name of "University Health Network" or any variation, adaptation, or abbreviation thereof, or of any of its trustees, officers, faculty, students, employees, clinical staff or agents, or any trademark owned by UHN, or any terms of this Agreement in any promotional material or other public announcement or disclosure without the prior written consent of UHN. The foregoing notwithstanding, without the consent of UHN, Avro may indicate that it is licensed by UHN under the Licensed Technology and identify the inventors (including the Principal Investigator), their affiliation with UHN, and their relationship to Avro, and further, Avro may comply with disclosure requirements of all applicable laws relating to its business, including, without limitation, United States and state securities laws.

10.2.2 UHN shall not use the name of Avro or its Affiliates or Sublicensees or any variation, adaptation, or abbreviation thereof, or of any of their respective Representatives, or any trademark owned by Avro or its Affiliates or Sublicensees, or any terms of this Agreement in any promotional material or other public announcement or disclosure without the prior written consent of Avro or its Affiliates or Sublicensees (as applicable). Notwithstanding any term or provision of this Agreement (including any obligation of Confidentiality), without the consent of Avro, UHN may indicate that it has licensed the Licensed Technology to Avro and identify the inventors (including the Principal Investigator), his affiliation with UHN, his relationship (if any) to Avro, and the achievement of clinical, regulatory or commercialization milestones hereunder and, to the extent required by applicable law, sums of monies received by UHN; and further, UHN may comply with disclosure requirements of all applicable laws relating to its business, including, without limitation, Provincial and Federal access to information laws.

ARTICLE 11 - TERM & TERMINATION

11.1 **Term**. Unless terminated pursuant to Sections 11.2, the term of this Agreement shall commence on the Effective Date and shall remain in effect until the expiration of the Royalty Term for all Licensed Products, unless earlier terminated in accordance with the provisions of this Agreement or otherwise mutually agreed (the "**Term**").

11.2 **Voluntary Termination by Avro**. Avro shall have the right to terminate this Agreement, for any reason, upon at least [***] prior written notice to UHN, such notice to state the date at least [***] in the future upon which termination is to be effective.

11.3 **Termination for Default**.

11.3.1 **Nonpayment and Insurance**. In the event Avro fails to pay any undisputed amounts due and payable to UHN hereunder, and fails to make such payments within [***] after receiving written notice of such failure, or in the event that Avro fails to have or maintain insurance as outlined in Section 13.6, UHN may terminate this Agreement upon written notice to Avro, subject to completion of the dispute resolution process set forth in Section 14.1 and Section 14.2 and a final determination pursuant to mandatory arbitration under Section 14.3 and unless otherwise cured further to said process as outlined therein.

11.3.2 **Material Breach by UHN**. In the event UHN commits a material breach of its obligations under this Agreement, and fails to cure that breach within [***] after receiving written notice thereof, Avro may terminate this Agreement immediately upon written notice to UHN, subject to completion of the dispute resolution process set forth in Section 14.1 and Section 14.2 unless otherwise cured further to said process as outlined therein.

11.3.3 **Material Breach by Avro**. In the event Avro commits a material breach of its obligations under this Agreement, except for breach as described in Section 11.3.1, and fails to cure that breach within [***] after receiving written notice thereof, UHN may terminate this Agreement immediately upon written notice to Avro, subject to completion of the dispute resolution process set forth in Section 14.1 and Section 14.2 unless otherwise cured further to said process as outlined therein.

11.3.4 **Modification for Material Breach by UHN of Sections 2.1, 2.4, 6.1, 7.2.2, or 7.2.3 or Article 9**. Notwithstanding any other provisions of this Agreement and in addition to the deductions otherwise permitted under this Agreement, (a) if Avro has the right to terminate this Agreement under Sections 2.1, 2.4, 6.1, 7.2.2, or 7.2.3 or Article 9 as a result of an uncured breach which has a demonstrable material impact on Avro (including expiration of all applicable cure periods thereunder and final determination pursuant to mandatory arbitration under Section 14.3), in lieu of exercising such termination right, Avro may elect by written notice to UHN before the end of such applicable cure period to have this Agreement continue in full force and effect and instead have, starting immediately after the end of such applicable cure period, each of the following will be reduced by [***] percent ([***]%): any future milestone payments payable under Sections 5.5 or 5.8, any Royalties under Section 4.5, any Sublicensing Revenue sharing under Section 4.6 and any License Transfer Fee attributable to this Agreement (but not the IL-12 Agreement) under Section 16.4.2.

11.3.5 **Modification for Material Breach by UHN of Letter Agreement**, **Supply Agreement or Purchase Order(s)**. If UHN or the Principal Investigator breaches any obligations pursuant to the Letter Agreement, Supply Agreement or Purchase Order(s), and said breach has a demonstrable material impact on Avro, and is not cured within [***] of notification of said breach, each of the following will be reduced by [***] percent ([***]%): any future milestone payments payable under Sections 5.5 or 5.8, any Royalties under Section 4.5, any Sublicensing Revenue sharing under Section 4.6 and any License Transfer Fee attributable to this Agreement (but not the IL-12 Agreement) under Section 16.4.2.

11.4 **Bankruptcy**. UHN may terminate this Agreement upon written notice to Avro if Avro becomes insolvent, is adjudged bankrupt, applies for judicial or extrajudicial settlement with its creditors, makes an assignment for the benefit of its creditors, voluntarily files for bankruptcy or has a receiver or trustee (or the like) in bankruptcy appointed by reason of its insolvency, or in the event an involuntary bankruptcy action is filed against Avro and not dismissed within [***], or if Avro becomes the subject of liquidation or dissolution proceedings or otherwise discontinues business.

11.5 **Disputed Termination Right**. If the non-terminating Party disputes in good faith the right of the other Party to terminate this Agreement for any reason other than Avro's right to terminate for convenience pursuant to Section 11.2, and such non-terminating Party provides the terminating Party written notice of such dispute within [***] after the terminating Party's notice, as applicable, then the terminating Party will not have the right to terminate this Agreement unless and until the Parties have followed with the dispute resolution mechanism as outlined in Section 14.1 and Section 14.2 and, as required, final determination pursuant to mandatory arbitration under Section 14.3, after which time the terminating Party has the right to terminate this Agreement in accordance with the terms and conditions set forth herein. It is understood and agreed that (a) during the pendency of such dispute, all of the terms and conditions of this Agreement will remain in effect, and (b) the non-terminating Party will have the right to cure such breach that is the subject matter of the dispute.

11.6 **Effects of Early Termination**. In the event of the termination of this Agreement:

11.6.1 the License will be terminated, all rights to the Licensed Technology shall revert to UHN, and Avro shall cease and desist any further use or exploitation of, and otherwise cease to derive any benefit from, the Licensed Technology, and within [***] either destroy or return to UHN, further to UHN's instructions all of UHN's property, including all Licensed Technology;

11.6.2 each Receiving Party shall return to the Disclosing Party or destroy (as directed by a Disclosing Party) all copies of said Disclosing Party's Confidential Information in a manner consistent with any applicable laws and regulations;

11.6.3 Avro shall within [***] of the date of such termination, pay UHN all current amounts then owed to UHN pursuant to this Agreement. For purposes of certainty and clarity, no term or provision of this Agreement shall be construed to waive the payment of any monies to UHN accrued at the date of said termination, or arising thereafter;

11.6.4 the Parties shall take all necessary steps in a prudent business manner to wind-down any ongoing activities and to effect the orderly termination of this Agreement; and

11.6.5 Avro and its Affiliates and Sublicensees may complete and sell any work-in-progress and inventory of Licensed Products that exist as of the effective date of termination, provided that (a) Avro pays UHN the applicable running royalty or other amounts due on such sales of Licensed Products in accordance with the terms and conditions of this Agreement, and (b) Avro and its Affiliates and Sublicensees shall complete and sell all work-in-progress and inventory of Licensed Products within [***] after the effective date of termination.

ARTICLE 12 - INDEMNIFICATION

12.1 **Indemnification**. Notwithstanding Section 6.3, Avro agrees to indemnify, save harmless, and defend UHN and its directors, officers, research staff, employees, clinical staff, research trainees, students, and agents (collectively, "**UHN Indemnitees**"), against any and all Third Party claims, suits, losses, damages, costs, fees, and expenses (including reasonable legal expenses) (collectively, "**Claims**"), arising out of (a) any liability claims with respect to any Licensed Product(s), (b) any Third Party intellectual property infringement or alleged infringement claims with respect to Licensed Product(s), and (c) any damages, losses, or liabilities whatsoever with respect to death or injury to any person and damage to any property arising from this Agreement and the License, including, without limitation, the manufacture, design, distribution, and offer for sale of Licensed Product(s) or otherwise arising from any exploitation of the Licensed Technology, except in each case to the extent caused by the negligence or willful misconduct of UHN Indemnitees or a breach of this Agreement by UHN.

ARTICLE 13 - INSURANCE

13.1 **Avro Insurance**. No later than [***] prior to the earlier of the (a) first use by Avro of Licensed Technology in humans, or (b) first sale by Avro of Licensed Product(s), Avro (at its expense) shall obtain and maintain (as appropriate) general liability, product

liability and clinical trial liability insurance (the "**Avro Insurance**") of a minimum of [***] per occurrence and [***] annual aggregate, naming UHN as an additional insured. Avro shall provide to UHN a "**Certificate of Insurance**" evidencing compliance with this provision within [***] prior to such first use. Avro shall, at its own expense, obtain and maintain the Avro Insurance from the initial date required by this Section 13.1 for the Term and for a period of [***] thereafter. In the alternative, Avro may self-insure subject to prior approval of UHN.

13.2 **Sublicensee Insurance**. Unless said activities are otherwise covered by Avro Insurance, any Sublicense shall require Sublicensee(s), at the Sublicensee(s) expense, to obtain and maintain liability insurance at a level commensurate with the Avro Insurance, naming Avro and UHN as additional insured; provided however, that if the Sublicensee is a substantial multi-national entity which has a policy of self-insuring, then Sublicensee may self-insure. Sublicense agreements shall require Sublicensee(s) to provide to Avro and to UHN a Certificate of Insurance evidencing compliance with this provision prior to the earlier of the first use of the Licensed Technology in humans or first sale of Licensed Product(s) under any Sublicense. In no event shall the Sublicensee(s) use the Licensed Technology in humans or engage in the sale of Licensed Product(s) under this or any Sublicense agreement prior to the delivery to UHN of the Certificate of Insurance or an indication of self-insurance, as applicable. The Sublicense shall provide that Sublicensee(s) (at no expense to UHN) shall obtain and maintain from the initial date required by this Section 13.2 until the end of the term of the Sublicense and an additional period of [***] thereafter, a policy of appropriate liability insurance (or self-insurance, if applicable) at a level commensurate with the Avro Insurance. In the event that Sublicensee does not have the insurance coverage required by this Section 13.2, Avro shall terminate said Sublicense or otherwise ensure subject to UHN prior approval, that the activities of said Sublicensee are insured by Avro.

13.3 **Qualified Insurance**. All insurance policies required in accordance with this Article 13 shall be obtained from an insurance company qualified to offer protection in the jurisdictions where Licensed Technology is to be exploited or Licensed Product(s) are offered for sale.

13.4 **Notice**. Avro shall provide [***] written notice to UHN by registered or certified mail in the event of any modification, cancellation or termination of such insurance policy.

13.5 **Copy of Policy**. Avro shall, on written request, provide UHN with a copy of the insurance policy in force at the time of the request and this provision shall survive the termination of this Agreement for a period of [***].

13.6 **Incomplete Insurance**. In the event Avro does not have the insurance coverage required by this Article 13, or if any portion of the Avro Insurance or other required coverage is cancelled and not immediately replaced, Avro shall promptly inform UHN and UHN shall be free to terminate this Agreement upon notice to Avro in accordance with Section 11.3.1.

ARTICLE 14 - DISPUTE RESOLUTION

14.1 **Good Faith Efforts**. Except as otherwise stated in this Agreement, the Parties agree to use good faith efforts to resolve amicably among themselves any dispute arising out of or relating to this Agreement.

14.2 **Referral for Resolution**. If the Parties are unable to resolve the dispute under Section 14.1 within [***] of written notice of one Party to the other Party of such dispute, the dispute shall be referred to the Executive Vice President, Research of UHN (or designate) and the CEO (or designate) of Avro for their discussion and resolution for an additional period of [***].

14.3 As mandated by Sections 4.6, 11.3.1, 11.3.2, 11.3.3 or 11.5, if a dispute is not resolved pursuant to Section 14.2, and mandatory arbitration is thereafter dictated, such dispute shall be finally settled under mandatory arbitration (such decision to be final and non-appealable) pursuant to the Rules of Arbitration of the International Chamber of Commerce ("**ICC**"). The legal place of arbitration shall be Toronto and the official language of the arbitration shall be English. The arbitration will be heard and determined by three (3) arbitrators who are retired judges or attorneys with at least ten (10) years of relevant experience in the pharmaceutical and biotechnology industry, each of whom will be impartial and independent. Each Party will appoint one (1) arbitrator and the third (3rd) arbitrator will be selected by the two (2) Party-appointed arbitrators, or, failing agreement within [***] following appointment of the second arbitrator, by the ICC. The arbitration award so given will be a final and binding determination of the dispute, will be fully enforceable in any court of competent jurisdiction, and will not include any damages expressly prohibited under Section 6.3.3. Fees, costs and expenses of arbitration are to be divided by the Parties in the following manner: UHN will pay for the arbitrator it chooses, Avro will pay for the arbitrator it chooses, and the Parties will share payment for the third arbitrator. Except in a proceeding to enforce the results of the arbitration or as otherwise required by Law, neither Party nor any arbitrator may disclose the existence, content or results of any arbitration hereunder without the prior written consent of both Parties.

14.4 **Interim Protection**. This Article 14 shall not prevent a Party from applying to a court of competent jurisdiction for equitable relief or interim protection such as, by way of example, an interim injunction for breaches of confidentiality pursuant to Article 9.

ARTICLE 15 - NOTICE

15.1 **Notice**. All notices which are required or permitted to be given hereunder ("**Notices**") including judicial payment notices must be in writing. All such Notices must be sent as follows:

to UHN:

Attention:
Director, Technology Development & Commercialization
UHN Health Network
101 College Street - Suite 150
Heritage Building - MaRS Centre
Toronto, Ontario, Canada M5G 1L7

to Avro:
AvroBio, Inc.
400 Technology Square, 10th Floor
Cambridge, MA 02139
Attention: CEO

or to such other address as a Party may designate by Notice given in accordance with this Article 15. Any such Notice may be delivered by hand or by overnight courier and will be deemed to have been delivered on the date of delivery.

ARTICLE 16 - GENERAL

16.1 **Entire Agreement**. The Parties acknowledge that this Agreement its Schedules, any SRAs, the Material Transfer Agreement, the Letter Agreement and any other related document required to effect the contemplated transactions, shall be the entire agreement and understanding of the Parties as to the subject matter of this Agreement, and supersedes all prior discussions, agreements and writings in respect of the subject matter of this Agreement, including, without limitation the Option Agreement. For the avoidance of doubt, this Agreement does not amend, restate, supplement or otherwise modify any of the terms or conditions of any other agreement between the Parties, including the IL-12 Agreement. The IL-12 Agreement shall remain in full force and effect in accordance with its terms and conditions.

16.2 **General Assurances**. The Parties agree to do all such things and to execute such instruments and documents as may be necessary or desirable in order to carry out the provisions and intent of this Agreement.

16.3 **Inure to Benefit**. This Agreement shall inure to the benefit of and be binding upon the respective Parties and, where the context admits or requires, their respective permitted successors or assigns.

16.4 **Assignment**.

16.4.1 Avro may assign its rights and obligations under this Agreement to (a) an Affiliate or (b) a Third Party in connection with the merger, consolidation, reorganization, or sale of all or substantially all of its assets or that portion of its business to which this Agreement relates.

16.4.2 In the event of (a) a merger or acquisition of Avro by a Third Party during the Term or (b) a sale of all or substantially all of Avro's assets (including this Agreement) relating to the Licensed Products to a Third Party during the Term (respectively a "**License Transfer**"), a "**License Transfer Fee**" shall be payable to UHN equal to [***] percent ([***]%) of proceeds from the License Transfer, subject to a total cap of License Transfer Fees as between this Agreement and any License Transfer Fee payable under the IL-12 Agreement of [***]. For certainty and clarity, a License Transfer shall exclude any equity or debt financing (other than, for clarity, in connection with a sale of all or substantially of Avro's assets (including this Agreement) relating to the Licensed Products to a Third Party), any initial public offering, or any transaction involving Avro or its Affiliates in which the stockholders of Avro or its Affiliates immediately preceding such transaction retain fifty percent (50%) or more of the outstanding shares, or fifty percent (50%) or more of the outstanding voting power, respectively, of the ultimate company or entity resulting from such transaction immediately after consummation thereof.

16.4.3 The License Transfer Fee payable in respect of the License Transfer will be due within [***] of the closing of the License Transfer (or actual receipt of consideration in the event of scheduled payments for the License Transfer), and will be payable in the same type of consideration (e.g., cash, securities, etc.) received by Avro or its stockholders. The License Transfer Fee shall only apply with respect to the first License Transfer and not with respect to any subsequent License Transfers. Notwithstanding the foregoing, (sub)licenses, licenses to manufacture, or licenses for distribution relating to Licensed Products or Licensed Technology, or sales of assets, (sub)licenses, licenses to manufacture, licenses for distribution or other transactions relating to other products, etc. shall not be deemed a License Transfer hereunder. The License Transfer Fee shall be in addition to any distributions due to UHN as a shareholder in Avro.

16.5 **No Joint Venture**. Each Party is and will remain at all times independent of each other. The Parties are not and shall not be considered to be joint venturers, partners or agents of each other and neither of them shall have the power to bind or obligate the other except as set forth in this Agreement. The Parties mutually covenant and agree that neither shall they, in any way, incur any contractual or other obligation in the name of the other, nor shall they have liability for any debts incurred by the other. No representation will be made or acts taken by any of the Parties which could establish any apparent relationship of agency, joint venture, partnership or employment.

16.6 **Waiver**. No amendment, supplement or waiver of any provision of this Agreement shall be binding on any Party unless consented to in writing by such Party. No waiver of any provision of this Agreement shall constitute a waiver of any other provision, nor shall any waiver constitute a continuing waiver unless otherwise expressly provided. Further, no failure or delay by any Party in exercising any right or remedy shall operate as a waiver of such right or remedy, nor shall any single or partial exercise or waiver of any right or remedy preclude its further exercise or the exercise of any other right or remedy.

16.7 **Joint Preparation**. This Agreement shall be deemed to be jointly prepared by the Parties, and any ambiguity herein shall not be construed for or against any single Party.

16.8 **Governing Law**. This Agreement shall be governed by the laws of the Province of Ontario and the laws of Canada applicable therein, and shall be treated as an Ontario contract. Subject to Article 14, the Parties irrevocably and unconditionally submit to the exclusive jurisdiction the courts of Ontario and all courts competent to hear appeals therefrom in connection with any matters arising under this Agreement, except for disputes under Sections 4.6,11.3.1,11.3.2,11.3.3 or 11.5, each of which shall be addressed pursuant to Section 14.3.

16.9 **Severability of Provisions**. In the event that any provisions of this Agreement is determined to be invalid or unenforceable by a court of competent jurisdiction in any jurisdiction, the remainder of this Agreement shall remain in full force and effect without said provision in said jurisdiction and such determination shall not affect the validity or enforceability of such provision or this Agreement in any other jurisdiction. The Parties shall in good faith negotiate a substitute clause for any provision declared invalid or unenforceable, which shall most nearly approximate the intent of the Parties in entering this Agreement.

16.10 **Force Majeure**. In the event that any one of the Parties is prevented from fulfilling any of its obligations herein by acts of God, war, terrorism, strikes, riots, storms, fires, governmental orders or restrictions or any other cause beyond its control, the payment of royalties or milestones or other required payments, or the applicable pro rata portion thereof, shall be suspended during the full period of any such prevention, but payment of Royalties, Sublicensing Fee(s), milestones or other required payments which have accrued for payment prior to, during or after such cause shall not be excused. UHN will have the right to immediately terminate this Agreement in the event that Avro is unable to fulfill its obligations further to this Section 16.10 for a period of [***].

16.11 **Survival**. The termination or expiration of this Agreement shall not relieve the Parties of any obligations accruing prior to such expiration or termination (including any payments accrued and delayed pursuant to Section 5.7), and any such expiration or termination shall be without prejudice to the rights of either Party against the other Party. Sections 2.3 (last sentence), 4.3, 4.11, 4.12, 4.13, 4.14, 6.3, 11.4, 11.5, 11.6, 12.1, 13.1, and 13.2 and Articles 1,9, 10, 14, 15 and 16 (excluding Section 16.4.2 and 16.4.3 if License Transfer occurs after expiration or termination) shall remain in force and effect after the expiration or earlier termination of this Agreement until such time as specifically noted in a particular Section or Article, or the Parties mutually agree to the release of the obligation (in whole or in part) contained therein.

16.12 **Counterparts**. This Agreement may be executed in counterparts each of which shall be deemed an original but all of which together shall constitute one and the same instrument. Transmission by facsimile, email or other form of electronic transmission of an executed counterpart of this Agreement shall be deemed to constitute due and sufficient delivery of such counterpart. Alternatively, the Agreement may be exchanged and executed by facsimile or other form of electronic transmission as a single document.

[SIGNATURE PAGE FOLLOWS]

The Parties are executing this Agreement so as to be effective on the Effective Date.

UNIVERSITY HEALTH NETWORK

Per: /s/ Bradly G. Wouters
Name: Dr. Bradly G. Wouters
Title: Executive Vice President Science and Research

AvroBio, **Inc**.

Per: /s/ Geoff MacKay
Name: Geoff MacKay
Title: President and Chief Executive Officer

Schedule "A"

Fabry Know-How

[***]	[***]	[***]
[***]	[***]	[***]
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*** Confidential Treatment Requested ***

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Schedule B

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Schedule "C"

Fabry Patents

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SCHEDULE D

Licensed SRA IP

(as amended and updated)

*** Confidential Treatment Requested ***

SCHEDULE E

Optioned Improvement Patent(s)

(as amended and updated)

*** Confidential Treatment Requested ***

CERTAIN CONFIDENTIAL PORTIONS OF THIS EXHIBIT WERE OMITTED AND REPLACED WITH "[***]". A COMPLETE VERSION OF THIS EXHIBIT HAS BEEN FILED SEPARATELY WITH THE SECRETARY OF THE SECURITIES AND EXCHANGE COMMISSION PURSUANT TO AN APPLICATION REQUESTING CONFIDENTIAL TREATMENT PURSUANT TO RULE 406 PROMULGATED UNDER THE SECURITIES ACT OF 1933, AS AMENDED.

LICENSE AGREEMENT

This License Agreement (the "**Agreement**") is made and entered into effective as of **August 31, 2017** (the "**Effective Date**"), by and between

BioMarin Pharmaceutical Inc., a Delaware corporation located at 770 Lindaro Street, San Rafael, CA 94901 ("**BioMarin**"),

and

AVROBIO, Inc., a Delaware corporation having a place of business at 700 Technology Square, Suite 101, Cambridge, MA 02139 ("**AVROBIO**").

BioMarin and AVROBIO each may be referred to herein individually as a "**Party**," or collectively as the "**Parties**."

RECITALS

A. BioMarin owns and/or controls certain patents and know-how pertaining to a fusion of a portion of the insulin-like growth factor 2 protein (the "**GILT Tag**") with acid alpha-glucosidase and its use in the treatment of Pompe disease.

B. AVROBIO desires to obtain an exclusive license under such patents and know-how for the purpose of developing, manufacturing, and commercializing Licensed Products in the Field (each as defined below), and BioMarin desires to grant AVROBIO such a license on the terms and conditions set forth in this Agreement.

In consideration of the foregoing premises, the mutual promises and covenants set forth in this Agreement, and other good and valuable consideration, the receipt and sufficiency of which are hereby acknowledged, BioMarin and AVROBIO hereby agree as follows:

AGREEMENT

1. DEFINITIONS

When used in this Agreement, the following capitalized terms will have the meanings as defined below. Unless the context indicates otherwise, the singular will include the plural and the plural will include the singular.

1.1 "Affiliate" means, with respect to a Party, any corporation, firm, partnership or other entity that directly or indirectly controls or is controlled by or is under common control with such Party, but only for so long as such control exists. As used in this definition, "control" means (with correlative meanings for the terms "controlled by" and "under common control with") that the applicable entity has the actual ability to direct and manage the business affairs of the Party, whether through ownership, directly or indirectly, of fifty percent (50%) or more of the shares of stock entitled to vote for the election of directors of the Party, in the case of a corporation, or fifty percent (50%) or more of the equity interests in the case of any other type of legal entity, status as a general partner in any partnership, or by contract or any other arrangement whereby such entity controls or has the right to control the business affairs of the Party.

1.2 “[***]” means [***].

1.3 “[***]” means [***].

1.4 “Change of Control” means with respect to AVROBIO: (a) a merger, reorganization or consolidation involving AVROBIO in which the voting securities of AVROBIO outstanding immediately prior thereto cease to represent at least fifty percent (50%) of the combined voting power of the surviving entity immediately after such merger, reorganization or consolidation; (b) a Third Party, or group of Third Parties acting in concert, acquire, directly or indirectly, other than in connection with a bona fide financing of AVROBIO, more than fifty percent (50%) of the voting equity securities or management control of AVROBIO; or (c) AVROBIO conveys, transfers, licenses (on an exclusive and worldwide basis) and/or leases all or substantially all of its assets to a Third Party.

1.5 “Commercialization” means all activities relating to the manufacture, marketing, obtaining pricing and reimbursement approvals, promotion, advertising, importing, selling, distribution and customer support of a Licensed Product in a country. The term “**Commercialize**” has a correlative meaning.

1.6 “Commercially Reasonable Efforts” means, with respect to AVROBIO’s obligations under this Agreement to Develop and Commercialize a Licensed Product, the carrying out of such obligations using good faith efforts equivalent to those efforts and resources [***].

1.7 “Controlled” means, with respect to any Know-How, Patent Right, or other intellectual property right, that the applicable Party owns or has a license under such Know-How, Patent Right, or other intellectual property right and has the ability to assign to the other Party, or grant to the other Party a license, sublicense or other right to or under, such Know-How, Patent Right or right as provided for herein without violating the terms of any agreement or other arrangements with any Third Party.

1.8 “Development” means non-clinical and clinical drug discovery, research and/or development activities that relate to (a) obtaining, maintaining or expanding Regulatory Approval(s) of Licensed Product or (b) developing the ability to manufacture clinical and commercial quantities of Licensed Product, including chemical synthesis, sequencing, toxicology, pharmacology and other discovery and pre-clinical efforts, test method development and stability testing, manufacturing process development, formulation development, delivery system development, quality assurance and quality control development, manufacturing, statistical analysis, and clinical studies. When used as a verb, **“Develop”** means to engage in Development.

1.9 “Dollars” or “**$**” means the legal tender of the U.S.

1.10 “**ERT**” means enzyme replacement therapy.

1.11 "FDA" means the United States Food and Drug Administration, or any successor agency thereto.

1.12 "Field" means Retroviridae-based gene therapy for the treatment, modification or prevention of Pompe disease (glycogen storage disease type II).

1.13 "First Commercial Sale" means, with respect to a given Licensed Product in a particular country, the first sale to a Third Party of such Licensed Product in such country, after obtaining all required Regulatory Approvals in such country. "First Commercial Sale" shall not include the supply of any unreimbursed Licensed Product for use in clinical trials or for compassionate use.

1.14 "IND" means an Investigational New Drug application filed with the FDA and sufficient to satisfy the requirements of 21 CFR 312.20, or any comparable filing with any relevant Regulatory Authority in any other jurisdiction.

1.15 "Know-How" means any non-public, documented or otherwise recorded or memorialized knowledge, experience, know-how, technology, technical information, results, trade secrets, data and all other information, including formulas and formulations, processes, techniques, unpatented inventions, discoveries, ideas, and developments, test procedures, and results, together with all documents and files embodying the foregoing, and including relevant proprietary materials. For clarity, Know-How excludes Patent Rights claiming or otherwise covering any of the foregoing.

1.16 "Licensed Know-How" means Know-How Controlled by BioMarin or its Affiliates as of the Effective Date or during the Term that is necessary to Develop and/or Commercialize Licensed Products in the Field, solely to the extent set forth on Schedule B attached hereto.

1.17 "**Licensed Patent Rights**" means: (a) any of the Patent Rights listed in Schedule A, and (b) any divisional, continuation, or continuation-in-part (but only to the extent directed to subject matter specifically described in a patent or patent application set forth on Schedule A) claiming priority to such listed patents and patent applications; any reissue, reexamination, substitution, renewal and/or extension of any of the foregoing patents and patent applications; and any foreign counterpart patent or patent application of any of the foregoing.

1.18 "**Licensed Product**" means any product the composition, formulation, delivery, manufacture, use, sale, or importation of which: (a) is claimed or otherwise covered by a Valid Claim of the Licensed Patent Rights in any country in which it is made, used or sold; or (b) uses Licensed Know-How.

1.19 "Licensed Technology" means the Licensed Patent Rights and the Licensed Know-How.

1.20 "Major European Country" means any of the following countries: [***].

1.21 "Net Sales" shall mean the amount invoiced or otherwise accrued by AVROBIO, its Affiliates or sublicensees for commercial sales of a Licensed Product to Third Party purchasers (but excluding sales to AVROBIO's sublicensees for resale) less the following deductions, to the extent applicable to such sales of the Licensed Product for:

(i) [***];

(ii) [***];

(iii) [***];

(iv) [***]; and

(v) [***].

Net Sales shall be determined in accordance with United States Generally Accepted Accounting Principles. Transfers of free Licensed Products solely for research or clinical testing purposes shall be excluded from the computation of Net Sales.

1.22 "Patent Rights" means (a) all patents and patent applications in any country or supranational jurisdiction; (b) any divisional, continuation, or continuation-in-part, reissue, reexamination, substitution, renewal and/or extension of any such patents and patent applications; and (c) any foreign counterpart patent or patent application of any of the foregoing.

1.23 "Phase I Clinical Trial" shall mean a human clinical trial of a Licensed Product that is designed to satisfy the requirements of 21 CFR 312.21(a), regardless of whether such human clinical trial also satisfies the requirements of 21 CFR. 312.21(b) or any other requirements, or a similar clinical study prescribed by the Regulatory Authorities in a country other than the United States.

1.24 "Pivotal Trial" means a clinical study in humans of the efficacy and safety of a Licensed Product that is prospectively designed to demonstrate with statistical significance that such product is effective and safe for use in a particular indication in a manner sufficient to file for Marketing Approval of such product and would satisfy the requirements of 21 CFR 312.21(c), or a similar clinical study prescribed by the Regulatory Authorities in a country other than the United States.

1.25 "Preferred Stock" means shares of the series of preferred stock issued in the Preferred Stock Financing.

1.26 "Preferred Stock Financing" means AVROBIO's first issuance and sale of shares of a newly-authorized series of preferred stock (e.g., Series B preferred stock) after the date of this Agreement to venture capital funds or other institutional investors in an equity financing with gross proceeds to the Company from sales occurring after the date of this Agreement of not less than [***].

1.27 "Preferred Stock Financing Deadline" means [***].

1.28 "Preferred Stock Issuance Price" means the lowest price per share paid by purchasers of the Preferred Stock as of the date of issuance of Preferred Stock to BioMarin (as adjusted for stock splits, combinations and the like occurring after such purchase but before the issuance of Preferred Stock to BioMarin).

1.29 "Regulatory Approvals" means, with respect to a Licensed Product, the approvals, registrations, licenses and permits of any Regulatory Authority in a country, including pricing and/or reimbursement approvals, that are necessary to be obtained in order to market and sell commercially such Licensed Product in that country.

1.30 "Regulatory Authority" means any federal, state or local regulatory agency, department, bureau or other government entity, including the FDA, which has responsibility for granting any licenses or approvals or granting pricing and/or reimbursement approvals necessary for the marketing and sale of a Licensed Product in any country.

1.31 "Regulatory Exclusivity" means market exclusivity granted by a Regulatory Authority designed to prevent the entry of generic product(s) onto the market, including without limitation new use or indication exclusivity, new formulation exclusivity, orphan drug exclusivity, pediatric exclusivity and any exclusivity applicable to biologic products, or any equivalent of the foregoing.

1.32 "[***]" means [***].

1.33 "Royalty Term" has the meaning assigned to it in Section 4.3.3.

1.34 "Term" has the meaning assigned to it in Section 8.1.

1.35 "Territory" means all countries of the world.

1.36 "Third Party" means any party other than BioMarin, AVROBIO, or their respective Affiliates.

1.37 "Valid Claim" means either (a) a claim of an issued and unexpired patent or a supplementary protection certificate, which has not been held permanently revoked, unenforceable or invalid by a decision of a court, patent office or other forum of competent jurisdiction, unappealable or unappealed within the time allowed for appeal and that is not admitted to be invalid or unenforceable through reissue, disclaimer or otherwise (i.e., only to the extent the subject matter is disclaimed or is sought to be deleted or amended through reissue), or (b) a claim of a pending patent application that has not been abandoned, finally rejected or expired without the possibility of appeal or refiling.

2. LICENSES

2.1 License Grant. Subject to the terms and conditions of this Agreement, BioMarin hereby grants to AVROBIO an exclusive, royalty-bearing license under the Licensed Patent Rights and Licensed Know-How to research, have researched, develop, have developed, make, have made, use, have used, sell, have sold, offer for sale, have offered for sale, import, have imported, export and have exported Licensed Products in the Field in the Territory, including the right to grant sublicenses through multiple tiers, subject to any limitations on sublicensing expressly set forth in this Agreement (the **"License"**). For clarity, AVROBIO shall have no license rights either outside the Field or with respect to products other than Licensed Products.

2.2 Reservation of Rights; Restrictive Covenants.

2.2.1 AVROBIO hereby covenants that it shall not, nor shall it cause or permit any Affiliate or sublicensee to, use or practice, directly or indirectly, any Licensed Technology for any purposes other than those expressly permitted by this Agreement. BioMarin retains the sole right to practice the Licensed Technology with respect to any and all purposes and areas of use outside the Field and with respect to the Development and/or Commercialization of any product or service other than Licensed Products.

2.2.2 No implied licenses are granted under this Agreement, and each Party reserves all rights to all of its technology except for the rights expressly granted herein.

2.2.3 [***].

2.3 Right to Sublicense. AVROBIO may grant sublicenses under the license set forth in Section 2.1 to its Affiliates and Third Parties, subject to the terms and conditions set forth in this Section 2.3. An existing sublicensee in good standing may grant further sublicenses, also subject to such terms and conditions.

2.3.1 Each sublicense agreement shall be consistent with and subject to the terms and conditions of this Agreement. AVROBIO shall remain responsible for the performance of all sublicensees under any such sublicenses as if such performance were carried out by AVROBIO itself, including, without limitation, the payment of any royalties or other payments provided for hereunder.

2.3.2 Each sublicense agreement shall include (a) diligence obligations consistent with efforts that will allow AVROBIO to meet relevant obligations set forth in Section 3 below; (b) a direct indemnity by the sublicensee in favor of BioMarin similar in scope to that set forth in Section 9; and (c) a provision making BioMarin an express third party beneficiary of such sublicense agreement with respect to such indemnification provisions.

2.3.3 AVROBIO will provide BioMarin with a copy of each sublicense agreement within [***] of execution of such agreement, [***].

2.4 Technology Transfer. BioMarin will provide to AVROBIO, [***], copies of the Licensed Know-How set forth in Schedule B, which information shall be provided to AVROBIO within [***] of the Effective Date to the extent practicable, and in any event within [***] after the Effective Date. In addition, [***]. For purposes hereof, MAA means (a) a Biologics License Application as defined in the United States Federal Food, Drug and Cosmetics Act, as amended, and the regulations promulgated thereunder, or (b) a Marketing Authorization Application in the European Union.

2.5 Other Technology. AVROBIO shall be solely responsible for obtaining, at its sole expense, any agreements with Third Parties required in order for AVROBIO to conduct the Development and Commercialization of Licensed Products in the Field in the Territory. AVROBIO's right to credit any costs and expenses that it incurs under or as a result of such Third Party agreements against amounts due under this Agreement shall be solely as set forth in Section 4.3.2.

3. DEVELOPMENT AND COMMERCIALIZATION OF LICENSED PRODUCTS

3.1 Responsibilities. Subject to the terms and conditions of this Agreement (including without limitation this Section 3), AVROBIO (and/or its Affiliates and sublicensees) will be solely responsible, at AVROBIO's expense, for the Development and Commercialization of Licensed Products in the Field in the Territory, using Commercially Reasonable Efforts. AVROBIO will conduct, and will cause its Affiliates and sublicensees to conduct, such activities in a good scientific manner and in compliance in all material respects with all applicable laws.

3.2 Communication. Each Party will appoint one of its employees to serve as a liaison and alliance manager hereunder (**"Alliance Manager"**) with responsibility for overseeing communications between the Parties relevant to this Agreement, including without limitation communications regarding: (a) the transfer of the Licensed Know-How to AVROBIO as contemplated in Section 2.4 above, (b) patent matters, and (c) AVROBIO's diligence obligations. The initial Alliance Manager for AVROBIO shall be [***] and for BioMarin shall be [***]. Each Party may replace its Alliance Manager at any time by notice in writing to the other Party.

3.3 Diligence. AVROBIO will use Commercially Reasonable Efforts to Develop and Commercialize one or more Licensed Products in the United States and in the Major European Countries. In addition, and without limiting the generality of the foregoing, AVROBIO shall initiate an IND-enabling pharmacology/toxicology study of a Licensed Product within [***] of the Effective Date. In the event that BioMarin believes AVROBIO is in material breach of its obligation to use Commercially Reasonable Efforts under this Section 3.3, then BioMarin may so notify AVROBIO in writing, which notice shall provide available details regarding the basis for its belief and specifying that such notice (a "**Diligence Breach Notice**") is being provided by BioMarin pursuant to this Section 3.3. If a Diligence Breach Notice is provided to AVROBIO, AVROBIO may, within a further period of [***] after receipt of such notice, provide a written report to BioMarin to justify why AVROBIO believes it is not in such material breach of such diligence obligation. If no such report is provided by AVROBIO by the end of such time period, BioMarin shall be permitted to terminate this Agreement pursuant to Section 8.2. If AVROBIO provides a response, the Parties shall then conduct an initial meeting within [***] after delivery of such a written report from AVROBIO to discuss in good faith the concerns raised by BioMarin and shall conduct such additional meetings as are reasonably necessary to reach agreement as to whether or not AVROBIO is in material breach of its obligations under this Section 3.3 for an additional [***] after such initial meeting. If after such [***] period following the initial meeting, the Parties cannot reach agreement then, upon request of either Party, the matter shall be referred to the dispute resolution procedure outlined under Section 11.3, which procedure shall be required to: (a) determine whether there was, in fact, a material breach by AVROBIO of its diligence obligation, and (b) if it is determined that there was an uncured material breach, specify what additional efforts AVROBIO must undertake to cure such breach, and the time period during which such efforts must be commenced and completed (which time period shall be commercially reasonable). If such procedure determines that there was a material

breach of the diligence obligation hereunder, and AVROBIO does not commence or complete the cure efforts specified by the arbitration result (in response to the clause (b) requirement above) by the required relevant dates, then BioMarin may terminate the Agreement pursuant to Section 8.2. All efforts of AVROBIO's Affiliates, Third Party contractors and sublicensees will be considered efforts of AVROBIO for the purpose of determining AVROBIO's compliance with its obligations under this Section 3.3.

3.4 Reports. AVROBIO will keep BioMarin reasonably informed regarding the progress and results of AVROBIO's Development and Commercialization activities and those of its Affiliates, sublicensees, and Third Party contractors as set forth below. [***] each year, no later than [***], AVROBIO shall provide BioMarin with a written report that summarizes, in reasonable detail, the Development and Commercialization activities performed by AVROBIO and its Affiliates, sublicensees, and Third Party contractors with respect to Licensed Products during the preceding [***] period, as well as AVROBIO's expected future Development and Commercialization timeline for Licensed Products.

4. FINANCIAL TERMS

4.1 Initial License Fee. As initial consideration for the grant of rights set forth herein, AVROBIO will (a) pay to BioMarin a non-creditable, non-refundable initial license fee of five hundred thousand Dollars ($500,000), payable within [***] of the Effective Date, and (b) on or before the Preferred Stock Financing Deadline, issue to BioMarin that number of shares of Preferred Stock equal to five hundred thousand Dollars ($500,000) divided by the Preferred Stock Issuance Price, rounded to the nearest whole share, for no additional cash but otherwise on the same terms and conditions at which such shares of Preferred Stock were sold by AVROBIO to the other investor(s) in the Preferred Stock Financing. As a condition to its receipt of any Preferred Stock, BioMarin will enter into AVROBIO's investor rights agreement, voting agreement, and right of first refusal and co-sale agreement, or other similar agreements, all on the same terms and conditions as the other investor(s) in the Preferred Stock Financing. [***]. Notwithstanding clause (b) above, in the event AVROBIO completes a Change of Control prior to the closing of the Preferred Stock Financing, then AVROBIO will pay to BioMarin a non-creditable, non-refundable payment of [***], in cash, payable within [***] of the date on which such Change of Control becomes effective and will not have the right to issue shares of Preferred Stock to BioMarin as set forth in clause (b) above. Unless a Change of Control has occurred prior to such time. AVROBIO shall notify BioMarin of the completion of the Preferred Stock Financing within [***] after such completion and shall notify BioMarin of any failure to complete the Preferred Stock Financing no later than [***] following the Preferred Stock Financing Deadline. In the event AVROBIO does not complete the Preferred Stock Financing by the Preferred Stock Financing Deadline and has not completed a Change of Control, then AVROBIO shall pay to BioMarin a non-creditable, non-refundable license fee of [***] within [***] of the Preferred Stock Financing Deadline in lieu of the obligation to issue Preferred Stock set forth in clause (b) above.

4.2 Milestone Payments.

4.2.1 Development Milestones. AVROBIO will pay to BioMarin the following non-creditable, non-refundable milestone payments within [***] following the first achievement of the corresponding events described in the table below by the first Licensed Product being Developed by or on behalf of AVROBIO, its Affiliates or sublicensees to achieve such event. For clarity, each Development Milestone payment below shall be made only once, upon the first attainment of the applicable milestone event by any Licensed Product being Developed by or on behalf of AVROBIO, its Affiliates or sublicensees.

MILESTONE EVENT	MILESTONE PAYMENT
1. [***]	$[***]
2. [***]	$[***]
3. [***]	$[***]
4. [***]	$[***]

[***].

4.3 Royalties.

4.3.1 **Royalty Rates**. During the applicable Royalty Term, AVROBIO will pay to BioMarin a royalty of [***] on Net Sales by AVROBIO, its Affiliates and sublicensees of those Licensed Products the composition, formulation, delivery, manufacture, use, sale, or importation of which is claimed or otherwise covered by a Valid Claim of the Licensed Patent Rights in at least one country in which it is made, used or sold.

4.3.2 [***]

4.3.3 **Royalty Term**. AVROBIO's royalty payment obligations under this Section 4.3 will expire, with respect to a particular Licensed Product sold in a given country (on a Licensed Product-by-Licensed Product and country-by-country basis), upon the expiration of the period (the "**Royalty Term**" for such Licensed Product in such country) commencing upon First Commercial Sale of the applicable Licensed Product in such country and ending upon the latest of: [***].

4.4 Royalty Reports; Payment. Following the First Commercial Sale of any Licensed Product for which royalties are due pursuant to Section 4.3, and continuing for so long as royalties are due hereunder, within [***] after the end of each [***], AVROBIO shall provide a royalty-report showing, on a Licensed Product-by-Licensed Product and country-by-country basis:

(a) gross sales of Licensed Products sold by AVROBIO, its Affiliates and sublicensees during such [***] reporting period (on a Licensed Product by Licensed Product and country by country basis);

(b) an itemized calculation of the Net Sales (showing all deductions taken pursuant to Section 1.20) of each Licensed Product sold by AVROBIO, its Affiliates and sublicensees during such [***] reporting period, along with cumulative Net Sales for the then-current calendar year;

(c) the royalties payable in United States Dollars which shall have accrued hereunder with respect to such Net Sales;

(d) Withholding Taxes (as defined in Section 4.9), if any, required by applicable law to be deducted with respect to such royalties; and

(e) the rate of exchange with supporting calculations, determined in accordance with Section 4.5, used by AVROBIO in determining the amount of United States Dollars payable hereunder.

AVROBIO shall pay to BioMarin the royalties for each [***] at the time of submission of AVROBIO's royalty report. If no royalty is due for any royalty period hereunder following commencement of the reporting obligation, AVROBIO shall so report.

4.5 Currency Exchange. In the case of Net Sales outside the United States, the rate of exchange to be used in computing the amount of currency equivalent in United States Dollars shall be the closing exchange rate reported in *The Wall Street Journal* (U.S., Eastern Edition) on the last business day of the applicable [***] for which the payment is made.

4.6 Records; Audit, Records and Audits. AVROBIO shall keep, and shall require its Affiliates and (sub)licensees to keep (all in accordance with U.S. generally accepted accounting principles, consistently applied), complete and accurate records in sufficient detail to properly reflect Net Sales and to enable any milestones payable hereunder to be determined. Upon the written request of BioMarin and not more than once in each calendar year, AVROBIO and its Affiliates shall permit an independent certified public accounting firm of nationally recognized standing selected by BioMarin and reasonably acceptable to AVROBIO, at BioMarin's expense, to have access during normal business hours to such records of AVROBIO and/or its Affiliates as may be reasonably necessary to verify the accuracy of the payments hereunder for any calendar year ending not more than [***] prior to the date of such request. These rights with respect to any calendar year shall terminate [***] after the end of any such calendar year. BioMarin shall provide AVROBIO with a copy of the accounting firm's written report within [***] of completion of such report. If such accounting firm correctly concludes that an underpayment was made, then AVROBIO shall pay the amount due within [***] of the date BioMarin delivers to AVROBIO such accounting firm's written report so correctly concluding. BioMarin shall bear the full cost of such audit, unless such audit correctly discloses that the additional payment payable by AVROBIO for the audited period is more than [***] percent ([***]%) of the amount otherwise paid for that audited period, in which case AVROBIO shall pay the fees and expenses charged by the accounting firm. AVROBIO shall include in each relevant license granted by it a provision requiring any (sub)licensee to maintain records of sales of Licensed Products made pursuant to such license, and to grant access to such records by AVROBIO's independent accountant to the same extent and under the same obligations as required of AVROBIO under this Agreement. AVROBIO shall advise BioMarin in advance of each audit of any such (sub)licensee with respect to Licensed Product sales. AVROBIO will provide BioMarin with a summary of the results received from the audit and, if BioMarin so requests, a copy of the audit report, with respect to relevant Licensed Product sales.

4.7 Confidentiality. Each Party will treat all information subject to review under Section 4.6 in accordance with the provisions of Section 7 and will cause its accounting firm and the independent expert to enter into a reasonably acceptable confidentiality agreement with the audited Party obligating such entity to maintain all such financial information in confidence pursuant to such confidentiality agreement.

4.8 Payment Terms; Interest.

4.8.1 Payments under this Agreement shall be made in U.S. Dollars by wire transfer of immediately available funds to an account at a commercial bank designated by BioMarin, such designation in writing to be provided to AVROBIO at least [***] before payment is due. Any payments due under this Agreement shall be due on such date as specified in the Agreement or, in the event that such date is not a business day, the next succeeding business day. Any payments for reimbursement of patent expenses that are based on invoices shall be made within [***] from AVROBIO's receipt of such invoice.

4.8.2 If AVROBIO does not make a payment that is owed under the terms of this Agreement by the date when due, then AVROBIO shall be obligated to pay computed simple interest, the interest period commencing from such date and ending on the date that payment of the amount owed is actually made, at an interest rate per annum equal to [***] percent ([***]%), or the highest rate allowed by law, whichever is lower. The interest calculation shall be based on the Actual/360 computation method. Such interest shall be due and payable on the tender of the underlying principal payment.

4.9 Taxes. BioMarin will be responsible for any income or other taxes owed by BioMarin and required by applicable law to be withheld or deducted from any of the royalty and other payments made by or on behalf of AVROBIO to BioMarin hereunder ("**Withholding Taxes**"), and AVROBIO may deduct from any amounts that AVROBIO is required to pay hereunder to BioMarin an amount equal to any such Withholding Taxes required by AVROBIO to be withheld and paid to the proper tax authority. BioMarin will provide AVROBIO any information available to BioMarin that is necessary to determine the Withholding Taxes. Such Withholding Taxes will be paid to the proper taxing authority for BioMarin's account and evidence of such payment will be secured and sent to BioMarin within [***] of such payment. The Parties will use reasonable efforts to do such lawful acts and sign such lawful deeds and documents as either Party may reasonably request from the other Party to enable BioMarin and AVROBIO or its Affiliates or sublicensees to take advantage of any applicable legal provision or any double taxation treaties with the object of paying the sums due to BioMarin hereunder without, or to minimize the amount of, such withholding or deduction of any Withholding Taxes.

5. INTELLECTUAL PROPERTY RIGHTS

5.1 Prosecution of Licensed Patent Rights.

5.1.1 In accordance with this Section 5.1.1, unless the Parties otherwise agree in writing for a given Licensed Patent Right, BioMarin will have lead responsibility for the preparation, filing, prosecution, defense and maintenance ("**Prosecution"**) in the Territory of the Licensed Patent Rights. BioMarin shall be responsible for all costs and expenses with respect to such activities, except to the extent that any such activities are undertaken after the Effective Date at the express request of AVROBIO and in cooperation with AVROBIO as further provided in Section 5.1.2 below. BioMarin will perform such activities either itself or through patent counsel of its choice. BioMarin will provide AVROBIO with copies of all official correspondence received from patent offices with respect to any claims of Licensed Patent Rights submitted pursuant to Section 5.1.2, and with any proposed substantive responses thereto sufficiently in advance for AVROBIO to provide comments and suggestions on such proposed responses, which comments and suggestions shall be considered by BioMarin in good faith. At AVROBIO's request, BioMarin will provide AVROBIO with an update of the filing, prosecution and maintenance status for each Licensed Patent Right; provided that BioMarin shall not be obligated to provide such updates more than [***] times per year. In the event that BioMarin elects not to pursue or continue the Prosecution of any Licensed Patent Right in any country, BioMarin shall provide AVROBIO with notice of this decision at least [***] prior to any pending lapse or abandonment thereof and provide AVROBIO with an opportunity to assume responsibility for such Prosecution, at AVROBIO's sole expense. In the event that AVROBIO elects in writing to assume responsibility for such Prosecution, AVROBIO shall have the right, at AVROBIO's sole expense, to transfer the responsibility for such Prosecution of such patent applications and patents to patent counsel selected by it, and BioMarin shall cooperate with AVROBIO as reasonably requested to facilitate transfer of the control of such Prosecution to AVROBIO. For clarity, all filings with respect to Licensed Patent Rights shall at all times continue to be pursued in the name of BioMarin or its designee.

5.1.2 Promptly following the Effective Date, [***].

5.2 Enforcement.

5.2.1 **Initiation**. If either Party learns of any infringement or threatened infringement by a Third Party of any Licensed Patent Right in the Field, such Party shall promptly notify the other Party and shall provide such other Party with available evidence of such infringement. AVROBIO shall have the first right, but not the obligation, at its sole expense, to bring suit or other appropriate legal action against any actual or suspected infringement, in the Field, of any Licensed Patent Rights impacting the Development or Commercialization of Licensed Products in the Field, in the Territory. BioMarin shall have the right to participate and be represented in any such suit by its own counsel at its own expense. No settlement of any such action or defense which restricts the scope, or adversely affects the enforceability, of any such Licensed Patent Right may be entered into by AVROBIO without the prior written consent of BioMarin. If AVROBIO does not take such action within [***] after written notice from BioMarin of such infringement, then on written request by BioMarin, and with AVROBIO's prior written consent (not to be unreasonably withheld) BioMarin shall have the right but not the obligation, at its own expense, to bring suit or other appropriate legal action against such infringement. BioMarin shall have the sole right but not the obligation, at its own expense, to bring suit or other appropriate legal action against infringement of the Licensed Patents outside the Field. Notwithstanding the foregoing, with respect to the Licensed Patent Rights listed in Part 2 of Schedule A, Section 5.2.2 shall apply.

5.2.2 **Part 2 Patents.** BioMarin shall have the first right, but not the obligation, at its sole expense, to bring suit or other appropriate legal action against any actual or suspected infringement, in the Field, of any Licensed Patent Rights included in Part 2 of Schedule A impacting the Development or Commercialization of Licensed Products in the Field, in the Territory. AVROBIO shall have the right to participate and be represented in any such suit by its own counsel at its own expense. No settlement of any such action or defense which could reasonably be expected to have a material adverse effect on AVROBIO's exclusive rights under this Agreement regarding the Development or Commercialization of Licensed Products in the Field in the Territory may be entered into by BioMarin without the prior written consent of AVROBIO, which consent shall not be unreasonably withheld, conditioned or delayed. If BioMarin does not take such action within [***] after written notice from AVROBIO of such infringement, then on written request by AVROBIO, and with BioMarin's prior written consent (not to be unreasonably withheld) AVROBIO shall have the right but not the obligation, at its own expense, to bring suit or other appropriate legal action against such infringement; provided that BioMarin will have the right to participate in and control any such litigation with respect to invalidity defenses and counterclaims at AVROBIO's expense, and to otherwise participate and be represented in any such suit, using its own counsel at BioMarin's expense, provided that BioMarin shall use all reasonable efforts to control the expenses to be borne by AVROBIO.

5.2.3 **Cooperation**. Each Party shall, at the other Party's expense, execute all papers and perform such other acts as may be reasonably required to bring and/or maintain any infringement suit brought by the other Party in accordance with Section 5.2.1 or Section 5.2.2 above (including joining as a party to such actions or proceedings if required by applicable law). In the event BioMarin is joined as a party to an action initiated by AVROBIO pursuant to Section 5.2, AVROBIO shall indemnify and secure BioMarin as to any costs (including internal costs), damages and expenses to the extent incurred as a direct result of BioMarin's joinder. In addition, the Parties shall cooperate with each other in obtaining patent term restoration or supplemental protection certificates or their equivalents in any country where applicable to Licensed Products. In the event that elections with respect to obtaining such patent term restoration, supplemental protection certificates or their equivalents are to be made, the Parties shall agree upon such elections.

5.2.4 **Recovery**. Any amount recovered, whether by judgment or settlement, shall first be applied to reimburse the costs and expenses (including attorneys' fees) of the Party bringing suit, then to the costs and expenses (including attorneys' fees), if any, of the other Party. Any net amounts of recovery(remaining after payment of costs and expenses as above shall be allocated [***].

5.3 Defense of Infringement Claims. If the manufacture, sale or use of a Licensed Product pursuant to this Agreement results in, or may result in, any claim, suit, or proceeding by a Third Party alleging patent infringement by AVROBIO (or its Affiliates or sublicensees) in the Field in the Territory, AVROBIO will promptly notify BioMarin thereof in writing, and AVROBIO shall indemnify BioMarin with respect to any such claims as required in Section 9. AVROBIO or its Affiliate or sublicensee will have the exclusive right to defend and control the defense of any such claim, suit, action or proceeding at its own expense, using counsel of its own choice, and may settle any such claim, suit, action or proceeding at its sole discretion; *provided*, that if any such settlement would admit or concede that any material aspect of the Licensed

Patent Rights are invalid or unenforceable, or would shorten the life of any of the Licensed Patent Rights or narrow their scope, or require BioMarin to pay any amounts, the aspects of such settlement directly involving such admission or concession or payment shall require the prior written consent of BioMarin. AVROBIO will keep BioMarin reasonably informed of all material developments in connection with any such claim, suit, or proceeding.

5.4 Patent Marking. AVROBIO shall, and shall require its Affiliates and sublicensees to, mark Licensed Products sold by it hereunder with appropriate patent numbers or indicia to the extent permitted by applicable law and regulations, in those countries in which such markings or such notices impact recoveries of damages or equitable remedies available with respect to infringements of Patent Rights.

6. REPRESENTATION AND WARRANTIES; COVENANTS

6.1 BioMarin Warranties. BioMarin hereby warrants and represents to AVROBIO, as of the Effective Date, that: (i) BioMarin owns or otherwise Controls the Licensed Technology and has the right to grant the licenses under the Licensed Technology as set forth in this Agreement; (ii) BioMarin has not entered into any agreement, arrangement or understanding regarding the use of the Licensed Technology in the Field in the Territory that would prevent BioMarin from granting the license to AVROBIO as set forth in Section 2.1 of this Agreement; (iii) during the Term of this Agreement, BioMarin shall not grant a license under the Licensed Technology to any Third Party in the Field in the Territory; (iv) none of the Licensed Technology has been misappropriated from any Third Party; and [***].

6.2 Reciprocal Representations and Warranties. Each Party represents and warrants to the other Party that: (i) this Agreement is a legal and valid obligation binding upon its execution and enforceable against it in accordance with its terms and conditions; and (ii) the execution, delivery and performance of this Agreement by such Party has been duly authorized by all necessary corporate action, and (iii) the person executing this Agreement on behalf of such Party has been duly authorized to do so by all requisite corporate actions.

6.3 DISCLAIMER OF WARRANTY. EXCEPT FOR THE EXPRESS WARRANTIES SET FORTH HEREIN, NEITHER PARTY MAKES ANY REPRESENTATIONS NOR GRANTS ANY OTHER WARRANTIES, EXPRESS OR IMPLIED, EITHER IN FACT OR BY OPERATION OF LAW, BY STATUTE OR OTHERWISE, AND BIOMARIN AND AVROBIO EACH SPECIFICALLY DISCLAIMS ANY OTHER WARRANTIES, WHETHER WRITTEN OR ORAL, OR EXPRESS OR IMPLIED, INCLUDING ANY WARRANTY OF QUALITY OR MERCHANTABILITY, OR ANY WARRANTY AS TO THE VALIDITY OR ENFORCEABILITY OF ANY PATENTS OR THE NONINFRINGEMENT OF ANY INTELLECTUAL PROPERTY RIGHTS OF THIRD PARTIES.

7. CONFIDENTIALITY

7.1 Definition. During the Term, a Party (the "**Disclosing Party**", with respect to information disclosed by such Party) may disclose or otherwise communicate to the other Party (the "**Receiving Party**", with respect to information disclosed to such Party by the other Party)

its information in connection with this Agreement or the performance of its obligations hereunder (the "**Confidential Information**" of the disclosing Party), which may include scientific and manufacturing information and plans, marketing and business plans, and financial and personnel matters relating to a Party or its present or future products, sales, suppliers, customers, employees, investors or business. Without limiting the foregoing, "**Confidential Information**" of a Party is hereby deemed to include any information disclosed by such Party to the other Party pursuant to that certain confidentiality agreement between the Parties dated as of March 1, 2017 (the "**Prior CDA**"). For clarity, the Licensed Technology is the Confidential Information of BioMarin, subject to the exceptions set forth in Section 7.2.

7.2 Exclusions. Notwithstanding the foregoing, information disclosed by a Disclosing Party will not be deemed Confidential Information with respect to the Receiving Party for purposes of this Agreement if such information:

(a) was already known to the Receiving Party or its Affiliates, as evidenced by their written records, other than under an obligation of confidentiality or non-use, at the time of disclosure to the Receiving Party;

(b) was generally available or was otherwise part of the public domain at the time of its disclosure to the Receiving Party;

(c) became generally available or otherwise became part of the public domain after its disclosure to the Receiving Party, through no fault of or breach of its obligations under this Section 9 or the Prior CDA (as defined above) by the Receiving Party;

(d) was disclosed to the Receiving Party, other than under an obligation of confidentiality or non-use, by a Third Party who had no obligation to the Party that controls such information not to disclose such information to others and has the lawful right to disclose it; or

(e) was independently discovered or developed by the Receiving Party or its Affiliate, as evidenced by written records, without the use of Confidential Information belonging to the Disclosing Party.

7.3 Disclosure and Use Restriction. Except as expressly otherwise provided herein, each Party agrees that, during the Term and for [***] thereafter, such Party (as the Receiving Party with respect to Confidential Information of the other Party) and its Affiliates and sublicensees will keep completely confidential, and will not publish or otherwise disclose and will not use for any purpose except for the purposes expressly contemplated by this Agreement, any Confidential Information of the Disclosing Party.

7.4 Authorized Disclosure. A Receiving Party may disclose specific Confidential Information of the Disclosing Party to the extent that such disclosure is:

7.4.1 required by a valid order of a court of competent jurisdiction or other governmental or regulatory body of competent jurisdiction; *provided*, that such Receiving Party will first have given reasonable prior notice of such disclosure requirement to the Disclosing Party and given the Disclosing Party a reasonable opportunity to quash such order and/or to obtain a protective or order limiting such disclosure and/or requiring that the Confidential Information and documents that are the subject of such order be held in confidence by such court or governmental or regulatory body and/or, if disclosed, be used only for the purposes for which the order was issued; and *provided, further*, that if the disclosure requirement is not quashed, the Confidential Information disclosed in response to such court or governmental order will be limited to that information that is legally required to be disclosed in response to such court or governmental order, taking into account any protective or other similar order limiting such disclosure obligation;

7.4.2 required by law; *provided*, that the Disclosing Party will provide the Receiving Party with notice of such disclosure in advance thereof to the extent practicable and the disclosure will be limited to that information that is legally required to be disclosed in response to such court or governmental order;

7.4.3 made by the Receiving Party to Regulatory Authorities as required in connection with any regulatory filing or application made in accordance with the terms of this Agreement: *provided*, that reasonable measures will be taken to assure confidential treatment of such information;

7.4.4 made by the Receiving Party as reasonably required in connection with the performance of this Agreement, to Affiliates, employees, consultants, representatives or agents, each of whom prior to disclosure must be bound by obligations of confidentiality and non-use at least equivalent in scope to those set forth in this Section 7;

7.4.5 made by the Receiving Party to existing or potential acquirers or merger candidates; potential sublicensees or collaborators (to the extent contemplated hereunder); investment bankers; existing or potential investors, venture capital firms or other financial institutions or investors for purposes of obtaining financing; or Affiliates, each of whom prior to disclosure must be bound by obligations of confidentiality and non-use at least equivalent in scope to those set forth in this Section 7.4;

7.4.6 made by the Receiving Party with the prior written consent of the Disclosing Party.

7.5 Use of Name. Neither Party may make public use of the other Party's name except (a) in connection with the activities contemplated hereby as permitted in this Section 7, (b) as required by applicable law, subject to this Section 7, and (c) otherwise as agreed in writing by such other Party.

7.6 Terms of Agreement to be Maintained in Confidence. The Parties agree that the terms of this Agreement are confidential and will not be disclosed by either Party to any Third Party (except to a Party's professional advisor, in accordance with Section 7.4.4) without prior written permission of the other Party; *provided*, that either Party may make any filings of this Agreement required by law or regulation in any country so long as such Party uses its reasonable efforts to obtain confidential treatment for portions of this Agreement as available, consults with the other Party, and permits the other Party to participate, to the extent practicable, in seeking a protective order or other confidential treatment; and *provided further*, that a Party may publicly disclose, without regard to the preceding requirements of this Section 7.6, information that was previously disclosed in compliance with such requirements; and *provided further,* that a Party may disclose such terms in confidence as provided in Section 7.4.5.

7.7 Press Release. Neither Party shall issue any press release or other public announcement relating to the existence of this Agreement or the terms hereof without obtaining the other Party's written approval. For clarity, subject to AVROBIO's compliance with its obligations regarding Confidential Information of BioMarin hereunder and with Sections 7.5 and 7.6, and as long as specific reference to [***] is not made unless and until use of [***] by AVROBIO has been disclosed in scientific publications or presentations made by AVROBIO in the normal course of business, nothing in this Agreement shall be deemed to prohibit AVROBIO from making customary public disclosures regarding the Licensed Product development program in the Field to be conducted by AVROBIO hereunder. For further clarity, AVROBIO may make disclosures regarding this Agreement to its current and prospective investors as permitted under Section 7.4.5 and as permitted in Section 7.5.

8. TERM AND TERMINATION

8.1 Term. The term of this Agreement will commence as of the Effective Date and, will expire upon the expiration of the last Royalty Term for all Licensed Products in all countries in the Territory, or will terminate if the Agreement is earlier terminated in accordance with this Section 8 (such period, the "**Term**").

8.2 Termination for Material Breach.

8.2.1 Any material failure by a Party (the "**Breaching Party**") to comply with its material obligations contained in this Agreement (such failure a "**Material Breach**") will entitle the other Party ("**Non-Breaching Party**") to give to the Breaching Party written notice of the Material Breach, which notice shall specify in detail the nature of the breach and shall, require the Breaching Party to make good or otherwise cure such Material Breach.

8.2.2 If such Material Breach is not cured within [***] ([***] for Material Breach of any payment obligation or obligation to issue Preferred Stock) after the receipt of notice pursuant to Section 8.2.1 above, the Non-Breaching Party will be entitled to terminate this Agreement on written notice to the Breaching Party and without prejudice to any of its other rights conferred on it by this Agreement and other remedies available under applicable law.

8.3 Termination at Will.

8.3.1 AVROBIO may terminate this Agreement at will upon [***] prior written notice to BioMarin.

8.3.2 BioMarin may terminate this Agreement in its entirety upon written notice to AVROBIO in the event of (i) any challenge or opposition to the validity, patentability, enforceability, scope and/or non-infringement of any of the Licensed Patent Rights, or any actions otherwise opposing any of such Licensed Patent Rights, if brought by AVROBIO, its Affiliates or sublicensees anywhere in the Territory, or (ii) any assistance with respect to any of the foregoing actions which any of AVROBIO, its Affiliates or sublicensees knowingly provides to a Third Party anywhere in the Territory (except as required under a court order or subpoena).

8.3.3 BioMarin may terminate this Agreement at will immediately, by providing written notice to AVROBIO upon the filing or institution of bankruptcy, reorganization, liquidation or receivership proceedings, or upon an assignment of a substantial portion of the assets for the benefit of creditors, by or against AVROBIO; provided, however, that in the case of any involuntary bankruptcy proceeding such right to terminate shall only become effective if AVROBIO consents to the involuntary bankruptcy or such proceeding is not dismissed within [***] after the filing thereof.

8.4 Consequences of Expiration and Termination.

8.4.1 **Expiration**. Upon expiration of the Royalty Term in a particular country for a given Licensed Product, AVROBIO's license under Section 2.1 with respect to such Licensed Product in the Field in such country will become irrevocable, perpetual and fully-paid.

8.4.2 **Early Termination**. Upon termination of this Agreement by a Party for Material Breach pursuant to Section 8.2, or by a Party pursuant to Section 8.3, the following provisions will apply:

(a) All rights and licenses granted by BioMarin to AVROBIO under this Agreement will terminate immediately.

(b) AVROBIO and its Affiliates shall discontinue making any representations regarding its or their status as a licensee(s) of BioMarin and with respect to Licensed Products, and shall cause any sublicensees (except as set forth in clause (c) below) to do the same. AVROBIO and its Affiliates shall cease conducting any activities with respect to the Development and Commercialization of the Licensed Products, and shall cause any sublicensees to do the same.

(c) Subject to BioMarin's written consent, such consent to not be unreasonably withheld, a sublicense granted by AVROBIO or any of its Affiliates to a sublicensee shall survive termination of this Agreement, provided that such subicensee agrees in writing within [***] of termination of this Agreement to fully perform what would otherwise be AVROBIO's obligations to BioMarin under this Agreement, including without limitation an agreement to cure any then-existing breaches of this Agreement by AVROBIO.

8.4.3 Upon termination or expiration of the Agreement in whole or in part, upon the request of the Disclosing Party, the Receiving Party shall promptly return to the Disclosing Party or destroy the Disclosing Party's Confidential Information, including all copies thereof, except to the extent that retention of such Confidential Information is reasonably necessary for the Receiving Party to exploit any continuing rights it may have (including, without limitation, the right to exploit any fully paid-up license pursuant to Section 8.4.1 in the event of an expiration of the Agreement in whole or in part) and/or to fulfill its obligations contemplated herein, including its obligations of non-disclosure and non-use hereunder. The return and/or destruction of such Confidential Information as provided above shall not relieve the Receiving

Party of its obligations under the Agreement. The provisions of this section shall not apply to copies of electronically exchanged Confidential Information made as a matter of routine information technology backup and maintained in a secure manner, or to Confidential Information or copies thereof which must be stored by the Receiving Party according to provisions of applicable law; provided that such Confidential Information shall remain subject to the terms of Section 7.

8.4.4 **Survival**. Expiration or termination of this Agreement will not relieve the Parties of any obligation accruing prior to such expiration or termination. The provisions of Sections [***] will survive any termination or expiration of this Agreement.

9. INDEMNIFICATION AND INSURANCE

9.1 Indemnification by BioMarin. BioMarin will indemnify AVROBIO, its Affiliates, and their respective directors, officers, employees and agents (**"AVROBIO Indemnitees"**), and defend and hold each of them harmless, from and against any and all liabilities, expenses and/or losses (including without limitation attorneys' fees, court costs, witness fees, damages, judgments, fines and amounts paid in settlement) ("**Losses**") based on or suffered in connection with any Third Party suits, claims, actions, and demands ("**Claims"**) against any such AVROBIO Indemnitee to the extent arising from or occurring as a result of or in connection with [***].

9.2 **Indemnification by AVROBIO**. AVROBIO will indemnify BioMarin, its Affiliates, and their respective directors, officers, employees, and agents ("**BioMarin Indemnitees**"), and defend and hold each of them harmless, from and against any and all Losses based on or suffered in connection with any Claims against any such BioMarin Indemnitee to the extent arising from or occurring as a result of or in connection with: [***].

9.3 Indemnification Procedure.

9.3.1 **Notice of Claim**. Each of AVROBIO and BioMarin, as applicable (the "**Indemnitee**") will give the other Party (the "**Indemnifying Party**") prompt written notice (an "**Indemnification Claim Notice**") of any Claims or discovery of fact upon which an Indemnitee intends to base a request for indemnification under Section 9.1 or 9.2, as applicable; *provided, however,* that the failure to give such prompt written notice will not relieve the Indemnifying Party of its indemnification obligation under this Agreement except and only to the extent that the Indemnifying Party is actually prejudiced as a result of such failure. In no event will the Indemnifying Party be liable for any Losses that result from any delay in providing such notice. Each Indemnification Claim Notice must contain a description of the Claim and the nature and amount of such Loss (but only to the extent that the nature and amount of such Loss are known at such time). The Indemnitee will furnish promptly to the Indemnifying Party copies of all papers and official documents received by it or any of its fellow Indemnitees, as applicable, in respect of any Losses.

9.3.2 **Control of Defense**. Within [***] after the Indemnifying Party's receipt of an Indemnification Claim Notice pursuant to Section 9.3.1, the Indemnifying Party shall assume the defense of the Claim(s) referenced in such notice and provide written confirmation to

the other Party and any other of its fellow Indemnitees. Upon assuming the defense of a Claim, the Indemnifying Party shall appoint lead counsel in the defense of the Claim; provided that such lead counsel shall be reasonably acceptable to the other Party. Upon the Indemnifying Party's assumption of the defense of a Claim, the Indemnitees will immediately deliver to the Indemnifying Party all original notices and documents (including court papers) received by such Indemnitees in connection with the Claim. The Indemnifying Party will keep the other Party regularly informed with respect to the status of its defense of any such Claim, and will respond promptly to the other Party's questions with respect to such (including, where requested by the Indemnitee, providing copies of related court filings).

9.3.3 **Right to Participate in Defense**. Without limiting Section 9.3.2 above, any Indemnitee will be entitled to participate in, but not control, the defense of such Claim and to employ counsel of its choice for such purpose; provided, that such employment will be at the Indemnitee's own expense unless the employment thereof has been specifically authorized by the Indemnifying Party in writing.

9.3.4 **Settlement**. With respect to any Losses (a) relating solely to the payment of money damages in connection with a Claim and (b) that will not (i) result in the Indemnitee's becoming subject to injunctive or other relief, (ii) require an admission of fault by a Indemnitee, or (iii) otherwise adversely affect the business of the Indemnitee in any manner, and (c) that includes a complete release of the Indemnitee, the Indemnifying Party will have the sole right to enter into a settlement on such terms as AVROBIO, in its sole discretion, will deem appropriate. The Indemnifying Party will pay all Losses resulting from such settlement pursuant to the terms of such settlement, including any conditions set by the court adjudicating such Claim. With respect to all other Losses in connection with Claims, the Indemnifying Party will have authority to consent to the entry of any judgment, enter into any settlement or otherwise dispose of such Loss provided it obtains the prior written consent of the other Party and all relevant Indemnitees (which consent will be at the other Party's and such other Indemnitees' sole and absolute discretion).

9.3.5 **Cooperation**. Each Indemnitee will cooperate in the defense of any Claim by the Indemnifying Party under this Section 9 and will furnish such records, information and testimony, provide such witnesses and attend such conferences, discovery proceedings, hearings, trials and appeals as may be reasonably requested by the Indemnifying Party in connection with such defense. Such cooperation will include access during normal business hours afforded to counsel selected by the Indemnifying Party under Section 9.3.2 to, and reasonable retention by the Indemnitee, as required under applicable law, of records and information that are reasonably relevant to such Claim, and making a reasonably limited number of employees and agents available on a mutually convenient basis to provide additional information and explanation of any material provided hereunder. The Indemnifying Party will reimburse the Indemnitee for all its reasonable out-of-pocket expenses in connection therewith.

9.4 Expenses. Except as provided above, any costs and expenses, including fees and disbursements of counsel, incurred by an Indemnitee in connection with any Claim will be reimbursed on a [***] by the Indemnifying Party without prejudice to the Indemnifying Party's right to contest the Indemnitee's right to indemnification and subject to refund in the event the Indemnifying Party is ultimately held not to be obligated to indemnify the Indemnitee.

9.5 **Insurance**. AVROBIO shall have and maintain at its sole cost and expense, adequate liability insurance (including product liability insurance) to protect against potential liabilities and risk arising out of its activities under this Agreement and any agreement related hereto and upon such terms (including coverages, deductible limits and self-insured retentions) as are customary in the pharmaceutical industry generally for drug development activities; provided that, upon commencement of clinical trials of Licensed Product(s), such coverage will include a minimum per occurrence limit of [***] and upon commercialization of Licensed Products such coverage will include a minimum per occurrence limit of [***]. Such liability insurance shall insure against all types of liability, including personal injury, physical injury or property damage arising out of such AVROBIO's activities hereunder. Such policy shall include BioMarin as an additional insured and shall include a waiver of subrogation. At least [***] prior to initiation of any clinical trial of a Licensed Product, Provider shall provide to BioMarin certificates of insurance evidencing the above required insurance. This Section 9.5 shall not create any limitation on AVROBIO's liability under this Agreement, including with respect to its indemnification obligations under this Section 9.

10. LIMITATION OF LIABILITY

IN NO EVENT SHALL EITHER PARTY BE LIABLE FOR ANY INDIRECT, INCIDENTAL, SPECIAL, PUNITIVE, EXEMPLARY OR CONSEQUENTIAL DAMAGES, WHETHER BASED UPON A CLAIM OR ACTION OF CONTRACT, WARRANTY, NEGLIGENCE, STRICT LIABILITY OR OTHER TORT, OR OTHERWISE, ARISING OUT OF THE AGREEMENT; [***].

11. MISCELLANEOUS

11.1 Assignment. Without the prior written consent of the other Party hereto (which consent shall not be unreasonably withheld), a Party will not sell, transfer, assign, delegate, pledge or otherwise dispose of, whether voluntarily, involuntarily, by operation of law or otherwise, this Agreement or any of its rights or duties hereunder; *provided*, that a Party hereto may assign or transfer this Agreement and its rights or obligations hereunder without the consent of the other Party: (a) to any Affiliate of such Party; or (b) to any Third Party with which it merges or consolidates, or to which it transfers all or substantially all of its assets to which this Agreement relates, and provided that the foregoing consent obligation shall not limit the ability to grant sublicenses as permitted in this Agreement or to engage subcontractors to perform certain obligations hereunder. The assigning Party (except if it is not the surviving entity) will remain jointly and severally liable with the relevant Affiliate or Third Party assignee under this Agreement, and the relevant Affiliate assignee, Third Party assignee or surviving entity will assume in writing all of the assigning Party's obligations under this Agreement. Any purported assignment or transfer in violation of this Section 11.1 will be void ab initio and of no force or effect.

11.2 Severability. If any provision of this Agreement is held to be illegal, invalid or unenforceable under any present or future law, and if the rights or obligations of either Party under this Agreement will not be materially and adversely affected thereby, (a) such provision will be fully severable, (b) this Agreement will be construed and enforced as if such illegal, invalid or unenforceable provision had never comprised a part hereof, (c) the remaining

provisions of this Agreement will remain in full force and effect and will not be affected by the illegal, invalid or unenforceable provision or by its severance herefrom, and (d) in lieu of such illegal, invalid or unenforceable provision, there will be added automatically as a part of this Agreement a legal, valid and enforceable provision as similar in terms to such illegal, invalid or unenforceable provision as may be possible and reasonably acceptable to the Parties herein.

11.3 Governing Law; Dispute Resolution.

11.3.1 This Agreement, and any disputes between the Parties related to or arising out of this Agreement (including the Parties' relationship created hereby, the negotiations for and entry into this Agreement, its conclusion, binding effect, amendment, coverage, termination, or the performance or alleged non-performance of a Party of its obligations under this Agreement) (each a "**Dispute**"), will be governed by the laws of the State of Delaware without reference to any choice of law principles thereof that would cause the application of the laws of a different jurisdiction.

11.3.2 In the event of any Dispute, a Party may notify the other Party in writing of such Dispute, and such Dispute will be promptly referred to [***] ("**Senior Officers**") of each of the Parties (or their respective designees) who will use their good faith efforts to resolve the Dispute within [***] after it was referred to such Senior Officers. If such Senior Officers are unable to resolve such dispute within thirty (30) days of their first meeting for such negotiations, either Party may seek to have such dispute resolved in accordance with Section 11.3.3.

11.3.3 Any dispute arising under this Agreement, or other legal proceeding relating to this Agreement or the enforcement of any provision of this Agreement, if not resolved by the Senior Officers pursuant to Section 11.3.2, must be brought or otherwise commenced solely and exclusively in courts of competent jurisdiction located in the city of Wilmington, Delaware. Consistent with the preceding sentence, each of the Parties: (a) expressly and irrevocably consents and submits to the jurisdiction of the courts of competent jurisdiction in the city of Wilmington, Delaware in connection with any such legal proceeding; (b) expressly agrees that the courts of competent jurisdiction in the city of Wilmington, Delaware shall be deemed to be a convenient forum; and (c) expressly agrees not to assert (by way of motion, as a defense or otherwise), in any such legal proceeding commenced in the courts of competent jurisdiction in the city of Wilmington, Delaware, any claim that such Party is not subject personally to the jurisdiction of such court, that such legal proceeding has been brought in an inconvenient forum, that the venue of such proceeding is improper or that this Agreement or the subject matter of this Agreement may not be enforced in or by such court.

11.4 Notices. All notices or other communications that are required or permitted hereunder will be in writing and delivered personally, or sent by internationally-recognized overnight courier addressed as follows:

If to BioMarin. to:

BioMarin Pharmaceutical Inc.
105 Digital Drive
Novato, CA 94949
Attention: General Counsel

If to AVROBIO, to:

AVROBIO, Inc.
700 Technology Square, Suite 101
Cambridge, MA 02139
Attention: Chief Executive Officer

or to such other address as the Party to whom notice is to be given may have furnished to the other Party in writing in accordance herewith. Any such communication will be deemed to have been given (i) when delivered, if personally delivered, and (ii) on the second business day after dispatch, if sent by internationally-recognized overnight courier. It is understood and agreed that this Section 11.4 is not intended to govern the day-to-day business communications necessary between the Parties in performing their duties, in due course, under the terms of this Agreement.

11.5 Entire Agreement; Modifications. This Agreement including the Exhibits attached hereto, each of which is hereby incorporated and made part of in this Agreement by reference, sets forth and constitutes the entire agreement and understanding between the Parties with respect to the subject matter hereof and all prior agreements, understanding, promises and representations, whether written or oral, with respect thereto. Each Party confirms that it is not relying on any representations or warranties of the other Party except as specifically set forth herein. No amendment or modification of this Agreement will be binding upon the Parties unless in writing and duly executed by authorized representatives of both Parties.

11.6 Relationship of the Parties. It is expressly agreed that the Parties' relationship under this Agreement is strictly one of a pure contract relationship between BioMarin and AVROBIO, and that this Agreement does not create or constitute a partnership, joint venture, or agency. Neither Party will have the authority to make any statements, representations or commitments of any kind, or to take any action, which will be binding (or purport to be binding) on the other.

11.7 Waiver. Any term or condition of this Agreement may be waived at any time by the Party that is entitled to the benefit thereof, but no such waiver will be effective unless set forth in a written instrument duly executed by or on behalf of the Party waiving such term or condition. The waiver by either Party hereto of any right hereunder or of claims based on the failure to perform or a breach by the other Party will not be deemed a waiver of any other right hereunder or of any other breach or failure by said other Party whether of a similar nature or otherwise.

11.8 Counterparts. This Agreement may be executed in two or more counterparts, each of which will be deemed an original, but all of which together will constitute one and the same instrument.

11.9 No Benefit to Third Parties. The representations, warranties, covenants and agreements set forth in this Agreement are for the sole benefit of the Parties hereto and their successors and permitted assigns, and they will not be construed as conferring any rights on any other parties.

11.10 Further Assurance. Each Party will duly execute and deliver, or cause to be duly executed and delivered, such further instruments and do and cause to be done such further acts and things, including the filing of such assignments, agreements, documents and instruments, as may be necessary or as the other Party may reasonably request in connection with this Agreement or to carry out more effectively the provisions and purposes, or to better assure and confirm unto such other Party its rights and remedies under this Agreement.

11.11 English Language. This Agreement has been written and executed in the English language as used in the United States of America and will be interpreted in accordance with the English language as used in the United States of America. Any translation by a Party into any other language will not be an official version thereof, and in the event of any conflict in interpretation between the English version and such translation, the English version will control.

11.12 No Drafting Party. This Agreement has been submitted to the scrutiny of, and has been negotiated by, both Parties and their counsel, and will be given a fair and reasonable interpretation in accordance with its terms, without consideration or weight being given to any such terms having been drafted by any Party or its counsel. No rule of strict construction will be applied against either Party .

11.13 Construction. Except where the context otherwise requires, wherever used, the use of any gender will be applicable to all genders and the word "or" is used in the inclusive sense (and/or). The captions of this Agreement are for convenience of reference only and in no way define, describe, extend or limit the scope or intent of this Agreement or the intent of any provision contained in this Agreement. The term "including" as used herein means including, without limiting the generality of any description preceding such term. The word "any" will mean "any" unless otherwise clearly indicated by context. Unless the context requires otherwise, (a) any definition of or reference to any agreement, instrument or other document refer to such agreement, instrument or other document as from time to time amended, supplemented or otherwise modified (subject to any restrictions on such amendments, supplements or modifications set forth herein or therein), (b) any reference to any laws refer to such laws as from time to time enacted, repealed or amended, (c) the words "herein", "hereof and "hereunder", and words of similar import, refer to this Agreement in its entirety and not to any particular provision hereof, and (d) all references herein to Sections and Exhibits, unless otherwise specifically provided, refer to the Sections and Exhibits of this Agreement.

[Remainder of page intentionally left blank. Signature page follows.]

IN WITNESS WHEREOF, the Parties have executed this Agreement by their respective authorized representatives as of the date first written above.

BIOMARIN PHARMACEUTICAL INC.

By: /s/ G. Eric Davis

Name: G. Eric Davis

Title: Executive Vice President, General Counsel

AVROBIO, INC.

By: /s/ Geoff MacKay

Name: Geoff MacKay

Title: President & CEO

SCHEDULE A

LICENSED PATENT RIGHTS

[***]

[***]	[***]	[***]	[***]
[***]	[***]	[***]	[***]
[***]	[***]	[***]	[***]
[***]	[***]	[***]	[***]
[***]	[***]	[***]	[***]
[***]	[***]	[***]	[***]
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[***]

[***]	[***]	[***]	[***]
[***]	[***]	[***]	[***]
[***]	[***]	[***]	[***]
[***]	[***]	[***]	[***]
[***]	[***]	[***]	[***]
[***]	[***]	[***]	[***]
[***]	[***]	[***]	[***]

SCHEDULE B

LICENSED KNOW-HOW

[***]

[***]

[***]

[***]

[***]

[***]

[***]

[***]

[***]

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SCHEDULE C

ADDITIONAL CLAIMS FOR LICENSED PATENT RIGHTS

[***]

[***]

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[***]

[***]

[***]

[***]

[***]

[***]

[***]

Exhibit 10.7

CERTAIN CONFIDENTIAL PORTIONS OF THIS EXHIBIT WERE OMITTED AND REPLACED WITH "[***]". A COMPLETE VERSION OF THIS EXHIBIT HAS BEEN FILED SEPARATELY WITH THE SECRETARY OF THE SECURITIES AND EXCHANGE COMMISSION PURSUANT TO AN APPLICATION REQUESTING CONFIDENTIAL TREATMENT PURSUANT TO RULE 406 PROMULGATED UNDER THE SECURITIES ACT OF 1933, AS AMENDED.

Exclusive License Agreement

1. Parties

1.1 Dr Stefan Karlsson personal id.no [***] and Maria Dahl personal id.no [***] (the "**Original Rights Holders**") together with any and all postdocs or other researchers adhering to this Agreement in accordance with Section 10 (collectively referred to as the "**Rights Holders**", and each being a "**Rights Holder**").

1.2 AVROB10, Inc., a Delaware Corporation in the USA, with an address of 400 Technology Square, 10th Floor, Cambridge, MA 02139; ("**AVROBIO**")

1.3 All of the Rights Holders, on the one hand, and AVROBIO, on the other hand, are also referred to each as a "**Party**", and together as the "**Parties**".

1.4 Notwithstanding Section 1.3, an obligation or right under this Agreement (except confidentiality obligations) for a Rights Holder relating to specific Rights shall apply to a given Rights Holder only if and to the extent that the relevant Rights Holder has a legal interest in and to (in whole or in part) such Rights. Each Rights Holder is liable for his/her own obligations under this Agreement and, except to the extent expressly provided in Section 5.2 and Section 15 or otherwise mutually agreed in writing between and among the Rights Holders, no Rights Holder shall be responsible for any other Rights Holder's obligations hereunder.

2. Definitions

2.1 When used in this Agreement, terms set out below have the following meanings:

Agreement	means this exclusive license agreement.
Confidential Information	means any non-public information relating to the terms of this Agreement, the Project or the Rights, including any regulatory, scientific or other business information of a Party or its affiliates disclosed to another Party before or during the term of this Agreement.
Contract Research Agreement	means the contract research agreement entered into between LU and AVROBIO regarding the Project and dated January 17, 2017.
Effective Date	means the date when this Agreement has been duly signed by AVROBIO and each of the Original Rights Holders.
Field of Use	means any and all uses relevant to Gaucher disease.

First Commercial Sale	means the first commercial sale of a Product by AVROBIO or any of its affiliates or sublicensees to a third party in a commercial arm's length transaction.
License	has the meaning set out in Section 4.
LU	means Lund University, registration no. 202100-3211, with address P.O. Box 117, SF.-22I 00 Lund, Sweden.
Pivotal Trial	means a trial in any country conducted in accordance with ICH GCP that is designed and executed to prospectively establish statistically significant evidence of efficacy and safety of a Product as a basis for a marketing authorization or that would otherwise satisfy requirements of 21 CFR 312.21(c), or its foreign equivalent.
Product(s)	means any product (a) the manufacture, use or sale of which, but for the License granted hereunder, would infringe a valid claim of a patent right within the Rights, or (b) incorporates, practices or was developed through material use of the information, data and/or know-how in the Rights.
Project	means the fully-funded commissioned research project in Gaucher Disease, described and to be carried out under the Contract Research Agreement.
Results	means any ideas, inventions, discoveries, know-how, data, documentation, reports, materials, writings (except publications), designs, computer software, processes, principles, methods, techniques and other information, recorded in any form, that before the Effective Date have been, or after the Effective Date are, discovered, conceived, reduced to practice or otherwise generated through work performed under or otherwise resulting from the Project.
Rights	means any and all rights of the Rights Holders, whenever created and in whatever form, and regardless of as to whether patented/patent applied for or not, to gene therapy compositions and methods for use in the prevention, modulation or treatment of Gaucher disease, and to any improvements thereof, including any and all rights of the Rights Holders to the Technology, the LU Background Information (as defined in the Contract Research Agreement) and to the Results.
Technology	means the ideas, inventions, discoveries, know-how, data, documentation, reports, materials, writings (except publications), designs, computer software, processes, principles, methods, techniques and other information relating to the Gaucher Disease program al LU led by Dr. Stefan Karlsson and created, conceived or developed by the Rights Holders (or one or some of them as applicable), including all patents, know-how, materials and other intellectual property rights, and including, without limitation, those items listed in Appendix 1.

3. Background

3.1 AVROBIO has entered into the Contract Research Agreement with LU, under which AVROBIO has engaged LU for the performance of the contract research Project relating to Gaucher Disease.

3.2 The Rights Holders arc active within the Project.

3.3 AVROBIO's willingness to fund the Project has been and continues to be conditioned upon having an exclusive license agreement established, for the granting by the Rights Holders of an exclusive license to AVROBIO in respect of the Rights.

3.4 In light of the foregoing been, the Parties have entered into this Agreement.

4. License

4.1 Each of the Rights Holders hereby grants to AVROBIO an exclusive, worldwide, transferable, sub-licensable license under such Rights Holder's interest in the Rights to research, have researched, develop, have developed, make, have made, use, have used, sell, have sold, offer for sale, have offered for sale, import, have imported, export and have exported Products in the Field of Use (the "**License**").

4.2 The exclusivity for AVROBIO under the License shall apply also vis-a-vis each Rights Holders, and shall be subject to the right of LU to use the Rights for non-commercial academic research and educational purposes as granted to LU under the Contract Research Agreement, but shall be subject to no other rights of any other person.

5. Consideration[1]

5.1 As consideration for the License, within [***] days after the first achievement of each of the following milestone events, AVROBIO shall pay the following amounts (each one time only) to the Rights Holders:

i. US $[***] upon [***]; and

ii. US $[***].

5.2 Payment of each amount set out in Section 5.1 shall be made within [***] from the date when the event triggering the payment obligation occurred. Payment shall be made in immediately available funds to a bank account designated by Dr Stefan Karlsson on behalf of all of the Rights Holders in a written notice delivered lo all of the notice addresses for the Parties in accordance with Section 15. AVROBIO shall have no liability or responsibility when it comes to the allocation or forwarding of the amounts set

1 **NTD**: The Rights Holders need enter into a separate agreement describing how these amounts shall be distributed among the Rights Holders

5.3 out in Section 5.1 on or to the individual Rights Holders, and AVROBIO shall have fully fulfilled all its obligations under this Agreement with respect to the payment of such amounts when such amounts or any component thereof have been paid to the account designated by such written notice to AVROBIO. Each Rights Holder agrees that he/she shall not make any claim against AVROBIO with respect to any payment that has been made by AVROBIO to the designated account in accordance with this Section 5.2.

6. Patent Filing, Maintenance and other Protection

6.1 Patent Filing and Maintenance

(a) The Rights Holders have the right, but not the obligation, as shall be agreed among the Rights Holders in writing, using legal counsel of their choice and at their expense, to file, prosecute and maintain patents and patent applications and/or seek other protection for results or innovations within the Rights, provided that the Rights Holders shall always consult with AVROBIO and take reasonable consideration to the views of AVROBIO in connection with such activities, in each case prior to taking actions. The Rights Holders shall pay all licenses, recording, registration, renewal and other similar fees in connection with maintenance of patents and patent applications for results or innovations within the Rights.

(b) If the Rights Holders in accordance with their written agreement elect not to file, prosecute, defend or maintain any patent or patent application or other potential protection for results or innovations within the Rights in any country, then the Rights Holders shall inform AVROBIO of such election and AVROBIO will have the right, but not the obligation, at its own expense and in its own name, to tils, prosecute, defend, and maintain such patent or patent application or seek other protection.

(c) If a given Rights Holder no longer wishes to file, prosecute, defend or maintain in force a patent for results or innovations within the Rights in one or several countries, the relevant Rights Holder will notify AVROBIO and, upon written request of AVROBIO timely assign and transfer his/her rights in the relevant patent to AVROBIO against no additional remuneration or, if the relevant Rights Holder reasonably concludes that it is not entitled to so assign and transfer his/her rights in the relevant patent to AVROBIO, the Rights Holder will notify AVROBIO and instead offer AVROBIO to, at its own expense but in the name of the relevant Rights Holder, maintain the relevant patent, and AVROBIO may thereafter at its own expense file, prosecute, defend or maintain the relevant patent in such a country, and AVROBIO shall have the right to deduct from any payment under Section 5.1 (if and to the extent that such payment then remains outstanding and unpaid), costs and expenses (including reasonable attorneys' fees) incurred by AVROBIO for maintaining any such patent as stipulated in this Section 6.1(c).

6.2 Infringement by Third Parties

(a) If, during the term of this Agreement, any Party learns of any actual, alleged or threatened infringement by a third party of any Rights, such Party shall promptly notify the other Party and shall provide such other Party with available information about such alleged potential infringement.

(b) AVROBIO shall have the first right (but not the obligation), at its own expense and with legal counsel of its own choice, to bring suit (or take other appropriate legal action) against any actual, alleged or threatened infringement of the Rights relevant to the Field of Use. The Rights Holders shall have the right, at their own expense, to be represented in any such action by one set of counsel of the Rights Holders' joint choice. If AVROBIO does not file any action or proceeding against such alleged infringer(s) or take other reasonable actions to resolve such infringement within a reasonable period of time not to exceed [***] after AVROBIO's receipt of a written notice from the Rights Holders requesting AVROBIO to take action with respect to such infringement and that is issued after delivery of the relevant notices pursuant to Section 6.2(a) with respect to such infringement, and provided that the relevant infringement adversely affects the rights of the Rights Holders hereunder, then the Rights Holders shall have the right (but not the obligation), at their own expense and as mutually agreed by all relevant Rights Holders, to bring suit (or take other appropriate legal action) against such actual, alleged or threatened infringement, with legal counsel of the Rights Holders' own choice. No Party shall be permitted to settle any such suit without the prior consent of the other Parry, such consent not to be unreasonably withheld, conditioned or delayed. If the Rights Holders lake any such action as permitted above, AVROBIO shall have the right, at its own expense, to be represented in any such action by counsel of its own choice. Any damages, monetary awards or other amounts recovered, whether by judgment or settlement, pursuant to any suit, proceeding or other legal action taken under this Section 6.2, shall be applied as follows:

i. First, to reimburse the Parties for their respective costs and expenses (including reasonable attorneys' fees and costs) incurred in prosecuting such enforcement action in accordance with this Section 6.2;

ii. Second, to [***] in reimbursement for [***]; and

iii. Third, any amounts remaining shall be allocated [***] percent to the Party bringing the action and [***]% to the other Party.

(c) If a Party brings any such action or proceeding hereunder, the other Party (including each Rights Holder as relevant) agrees to be joined as party plaintiff if necessary to prosecute such action or proceeding, and to give the Party bringing such action or proceeding reasonable assistance and authority to file and prosecute the suit.

6.3 Patent Infringement Claims Each Party shall notify the other Party promptly in writing of any claim of, or action for, infringement of any patents of, or misappropriation of trade secret rights of, any third party which is threatened, made or brought against either Party by reason of the use of the Rights or the development, manufacture, use or sale of Products by AVROBIO, and following such notification the Parties will confer on how to respond.

7. Intellectual Property Rights

7.1 Each Rights Holder retains title to his/her interest in the Rights, including any and all intellectual property rights and know-how related thereto, save if and to the extent this Agreement expressly provides otherwise. For clarity, AVROBIO shall have and retain title and interest in and to any and all rights, results and/or know-how that is obtained or developed by A VROBIO through practice of the License or otherwise as a result of its research on and development, manufacture, sale and marketing of Products in the Field of Use. In the event that any Rights are jointly invented by AVROBIO and any Rights Holder, such Rights shall be jointly owned by the relevant Rights Holder(s) and AVROBIO and, notwithstanding Section 6.1, AVROBIO shall have the first right to file, prosecute, defend or maintain any patent or patent application claiming the relevant Rights in accordance with the principles of Section 6.1, mutatis mutandis.

8. Representations and Warranties

8.1 Each one of the Rights Holders represents and warrants to AVROBIO as follows:

i. he/she has good title to and ownership of his/her interest in the Rights, and such Rights Holder has full right and qualification to grant the licenses and rights regarding such Rights in accordance with this Agreement;

ii. he/she knows of no other person or entity other than another Rights Holder having any claim of ownership in and to the Rights;

iii. his/her interest in the Rights is not encumbered with any lien, right of pledge, license, option right or any similar right;

iv. such Rights Holder has the right to enter into this Agreement and grant the License hereunder;

v. the execution, delivery and performance of this Agreement does not and will not result in a breach of or constitute a default under any material agreement, mortgage, lease, license, permit or other instrument or obligation to which he/she is a party or by which he/she or his/her properties may be bound or affected.

8.2 AVROBIO represents and warrants to the Rights Holders as follows:

i. the execution, delivery and performance of this Agreement have been duly authorized by all necessary corporate action and do not and will not result in a breach of or constitute a default under any material agreement, mortgage, lease, license, permit or other instrument or obligation to which it is a party or by which it or its properties may be bound or affected.

9. Indemnification

9.1 Each Rights Holder will indemnify, defend and hold harmless AVROBIO, its affiliates, and its and their respective officers, directors, employees and agents (collectively, the "**AVROBIO Indemnitees**") against any third party claims, including reasonable attorneys' fees for defending those claims, to the extent such claims arise out of or relate to (a) such Rights Holder's negligence or willful misconduct; or (b) such Rights Holder's breach of this Agreement including any representation or warranty hereunder.

9.2 AVROBIO will indemnify, defend and hold harmless the Rights Holders, their heirs, successors and permitted assigns (collectively, the "**Rights Holder Indemnitees**") against any third party claims, including reasonable attorneys' fees for defending those claims, to the extent such claims arise out of or relate to (a) the practice of the License by AVROBIO or its affiliates (except to the extent such claims result from any Rights Holder's breach of this Agreement, including any representation or warranty hereunder, or a Rights Holder Indemnitee's negligence or willful misconduct); (b) AVROBIO's negligence or willful misconduct; or (c) AVROBIO's breach of this Agreement.

9.3 Each Party must notify the other Party within [***] after receipt of any claims made for which the other Party might be liable under Section 9.1 or 9.2, as applicable. The indemnifying Party will have the sole right to defend, negotiate, and settle such claims. The indemnified Party will be entitled to participate in the defense of such matter and to employ counsel at its expense to assist in such defense; provided, however, that the indemnifying Party will have final decision-making authority regarding all aspects of the defense of the claim. The indemnified Party will provide the indemnifying Party with such information and assistance as the indemnifying Party may reasonably request, at the expense of the indemnifying Party. Neither Party will be responsible or bound by any settlement of any claim or suit made without its prior written consent; provided, however, that the indemnified Party will not unreasonably withhold or delay such consent.

10. Status of the Parties; New Project Participants

10.1 In performing obligations under this Agreement, each Rights Holder shall at all times act as an independent contractor to AVROBIO. This Agreement shall not create any relationship whereby any Rights Holder shall be an agent or legal representative of AVROBIO for any purpose whatsoever and creates no relationship of employment, principal and agent, partnership or joint venture. No Rights Holder shall have any authority to bind AVROBIO or to create any express or implied obligation for AVROBIO, and shall not hold himself or herself out as having such authority. The Rights Holders shall have full responsibility for payment of, and shall pay, all compensation, social security, unemployment, withholding and other taxes and charges (including, but not limited to any value-added tax or other fees that may be imposed on the amounts payable to them by AVROBIO under this Agreement), as and when the same become due and payable, and AVROBIO shall have no obligation to pay or make available any employee benefit to any Right Holder. The Rights Holders shall indemnify AVROBIO and hold AVROBIO harmless to the extent of any obligation described in the preceding sentence imposed on AVROBIO to pay any such amounts in connection with this Agreement.

10.2 The Rights Holders agree that before introducing or involving any new person in the Project other than the current Rights Holders, and as a condition for such introduction or involvement, such person shall agree to be bound by this Agreement in writing and thereby agree that any results or innovations generated by such person in the course of performance of the Project will be covered by the License under the terms of this Agreement, and a copy of each such Right's Holders agreement shall promptly be provided to AVROBIO.

11. Term

11.1 This Agreement shall enter into force on the Effective Date and shall remain in force until the later of;

i. the twentieth (20th) anniversary of the Project end date;

ii. the expiration of the term of any patent filed on Rights and containing one or more claims that would be infringed by the manufacture, sale or use of any Product in any part of the world;

iii. if the manufacture, use or sale of a Product is covered by a marketing exclusivity right in any part of the world, the term of such marketing exclusivity right; or

iv. if AVROBIO or any of its sublicensees, partners or contractors at any such point in time described above still commercializes a Product, for so long as AVROBIO or any of its sublicensees, partners or contractors continues to commercialize a Product.

11.2 Either AVROBIO on the one hand, or all Rights Holders by unanimous mutual agreement on the other hand, may terminate the Agreement immediately by giving written notice to the other Party in the following circumstances:

i. if AVROBIO on the one hand, or any Rights Holder on the other hand should commit a material breach of the Agreement without fully rectifying such breach within [***] after having been given written notice thereof pursuant to Section 15 including a request for such rectification, including written notice that the Agreement may otherwise be terminated; or

ii. if the other Party should enter into liquidation, become insolvent or enter into composition or statutory reorganization proceedings.

11.3 Provisions regarding indemnification, intellectual property, confidentiality, governing law and disputes shall survive the termination of the Agreement. The same shall apply to any other provision of the Agreement, which by its nature is intended to survive the termination hereof.

12. Confidentiality

12.1 Each Party (including each Rights Holder) agrees not to disclose Confidential Information of the other Party received in connection with this Agreement to any third party. Each Party (including each Rights Holder) agrees not to use any such Confidential Information of the other Party for any purpose other than as set out in this Agreement without the prior written consent of the other Party in each specific case. Each Party reserves all rights in its Confidential Information, or any other information disclosed hereunder, and no rights or obligations other than those explicitly stated herein are granted or to be implied from this Agreement.

12.2 Nothing in this Section 12 shall prevent AVROBIO from using or disclosing Confidential Information of the Rights Holders as reasonably required in connection with the exercise of rights granted to it hereunder or from disclosing such Confidential Information to its affiliates and to its or its affiliates' directors, employees, consultants, advisors and Board members and to its or its affiliates' potential and future collaborators, licensees, sublicensees, permitted acquirers and assignees, investment bankers, investors and lenders; provided, however, that such recipients shall be bound by confidentiality provisions that are customary and reasonable in light of the circumstances of such disclosure, meaning, in no event, less than a reasonable standard of care and a confidentiality undertaking which will remain in force for at least [***] from disclosure.

12.3 The obligations of confidentiality set forth herein do not apply to information that:

i. was in the public domain at the time of disclosure or that has come into the public domain thereafter otherwise than through a breach of this Agreement or the Contract Research Agreement by the receiving Party (including by any receiving Rights Holder) or by LU;

ii. the receiving Party can show was already known to that Party at the time of disclosure from a source other than the disclosing Party;

iii. is developed by the receiving Party without use or reference to the Confidential Information of the disclosing Party; and/or

iv. has been legitimately disclosed to the receiving Party on a non-confidential basis by a third party, and independently of, the disclosing Party.

12.4 Notwithstanding any other provision hereof, it shall not be a violation of this Agreement for the receiving Party to disclose Confidential Information of the disclosing Party to the extent such disclosure is required to comply with applicable laws or governmental regulations, provided that the receiving Party provides prior written notice of such required disclosure to the disclosing Party and takes reasonable and lawful actions to avoid and/or minimize the extent of such disclosure.

12.5 The Parties note that certain publication rights have been granted to LU under the Contract Research Agreement and (he Parties acknowledge and agree that such publication rights will apply in accordance with the terms of the Contract Research Agreement, irrespective of the terms of this Agreement.

13. Assignment

No Party (including any individual Rights Holder) may wholly or partly assign or pledge its rights and/or obligations under this Agreement to any third party without the prior written consent of the other Party which, for the Rights Holders with respect to any assignment by AVROBIO, may be provided by Dr. Stefan Karlsson, such consent to not be unreasonably withheld. Notwithstanding the foregoing, AVROBIO may, without such consent, but with notice to the Rights Holders, assign this Agreement, in whole or in part, (a) in connection with the transfer or sale of all or substantially all of its assets or the line of business to which this Agreement relates, (b) to a successor entity or acquirer in the event of a merger, consolidation or change of control, or (c) to any affiliate. Any purported assignment in violation of the preceding sentences will be void. Any permitted assignee will assume the rights and obligations of its assignor under this Agreement.

14. Amendments

14.1 Any amendments to this Agreement shall be made in writing and signed by AVROBIO and all Rights Holders.

14.2 For the avoidance of any doubt, this Agreement shall not be deemed to modify the terms of any agreement that is solely between any two of the Parties hereto or of the Contract Research Agreement, including any confidentiality obligations under the Contract Research Agreement that may be applicable to the Rights Holders.

15. Notices

15.1 Any notice required or permitted to be given under this Agreement shall be in writing and shall be (a) delivered personally, (b) sent by registered mail, return receipt requested, postage prepaid, or (c) sent by a nationally-recognized courier service guaranteeing next-day or second day delivery, charges prepaid, to the notice address(es) of the other Party set forth below, or at such other address(es) as may from time to time be furnished by similar notice by the relevant Party. The effective date of any notice under this Agreement shall be the date of confirmed receipt by the receiving Party.

If to AVROBIO:

AVROBIO, Inc.
400 Technology Square, 10th Floor
Cambridge, MA 02139, USA
Attn: Chief Executive Officer

If to the Rights Holders:

Maria Dahl
Stefan Karlsson
BMC A12, Molecular Medicine and Gene Therapy
Lund University
Lund 22184 Sweden

15.2 For clarity, each Rights Holder agrees that any notice to the Rights Holders given in accordance with this Section 15 shall be deemed sufficient and effective, and the Rights Holders shall be responsible for determining by separate written agreement among themselves how each individual Rights Holder is to become informed of any notice given by AVROBIO hereunder.

16. Governing Law and Disputes

16.1 This Agreement shall be governed by and construed in accordance with the laws of Sweden, without reference to its conflict-of-laws rules.

16.2 Any dispute, controversy or claim arising out of or in connection with this Agreement, or the breach, termination or invalidity thereof, shall first be referred to mediation in accordance with the Mediation Rules of the Arbitration Institute of the Stockholm Chamber of Commerce, unless AVROBIO or all of the Rights Holders acting unanimously objects.

16.3 If AVROBIO or all of the Rights Holders acting unanimously objects lo mediation or if the mediation is terminated, the dispute shall be finally resolved by arbitration in accordance with the Rules for Expedited Arbitrations of the Arbitration Institute of the Stockholm Chamber of Commerce. The seat of arbitration will be London, England.

16.4 The language to be used in the arbitral proceedings shall be English.

16.5 Each Party undertakes and agrees that all information disclosed in the course of arbitral proceedings conducted with reference to this arbitration clause, as well as any decision or award that is made or declared during the proceedings, will be kept strictly confidential. This notwithstanding, a Party shall not be prevented from disclosing such information in order to safeguard in the best possible way his rights vis-a-vis the other Party in connection with the dispute, or if such information must be disclosed pursuant to law, statute, regulation, a decision by an authority, a stock exchange contract or similar.

Signature page follows

Place: Cambridge, MA

Date: Jan. 30th, 2017

AVROBIO INC.

Signature: /s/ Geoff MacKay
Name: Geoff MacKay

Place: Lund, Sweden

Date: January 26, 2017

MARIA DAHL

Signature: /s/ Maria Dahl
Name: Maria Dahl

Place: Lund

Date: January 27, 2017

DR. STEFAN KARLSSON

Signature: /s/ Stefan Karlsson
Name: Stefan Karlsson

Appendix I

TECHNOLOGY

[***]

Exhibit 10.8

CERTAIN CONFIDENTIAL PORTIONS OF THIS EXHIBIT WERE OMITTED AND REPLACED WITH "[***]". A COMPLETE VERSION OF THIS EXHIBIT HAS BEEN FILED SEPARATELY WITH THE SECRETARY OF THE SECURITIES AND EXCHANGE COMMISSION PURSUANT TO AN APPLICATION REQUESTING CONFIDENTIAL TREATMENT PURSUANT TO RULE 406 PROMULGATED UNDER THE SECURITIES ACT OF 1933, AS AMENDED.

Execution Copy
CONFIDENTIAL

LICENSE AGREEMENT

This License Agreement (the "**Agreement**") is made and entered into effective as of October 2, 2017 (the "**Effective Date**"), by and between

GenStem Therapeutics, Inc., a Delaware corporation having an address of [***], Cardiff by the Sea, CA 92007 ("**GenStem**"),

and

AVROBIO, Inc., a Delaware corporation having a place of business at 700 Technology Square, Suite 101, Cambridge, MA 02139 ("**AVROBIO**").

GenStem and AVROBIO each may be referred to herein individually as a "**Party**," or collectively as the "**Parties**."

RECITALS

A. GenStem owns and/or controls certain patents and other intellectual property pertaining to genetic modification of stem cells and gene therapy, and is developing products using such intellectual property.

B. AVROBIO desires to obtain an exclusive license under GenStem's intellectual property rights for the purpose of developing, manufacturing and commercializing Licensed Products in the Field (each as defined below), and GenStem desires to grant AVROBIO such a license on the terms and conditions set forth in this Agreement.

In consideration of the foregoing premises, the mutual promises and covenants set forth in this Agreement, and other good and valuable consideration, the receipt and sufficiency of which are hereby acknowledged, GenStem and AVROBIO hereby agree as follows:

AGREEMENT

1. DEFINITIONS

When used in this Agreement, the following capitalized terms will have the meanings as defined below. Unless the context indicates otherwise, the singular will include the plural and the plural will include the singular.

1.1 "**Affiliate**" means, with respect to a Party, any corporation, firm, partnership or other entity that directly or indirectly controls or is controlled by or is under common control with such Party, but only for so long as such control exists. As used in this definition, "control" means (with correlative meanings for the terms "controlled by" and "under common control with") that the applicable entity has the actual ability to direct and manage the business affairs of

the Party, whether through ownership, directly or indirectly, of fifty percent (50%) or more of the shares of stock entitled to vote for the election of directors of the Party, in the case of a corporation, or fifty percent (50%) or more of the equity interests in the case of any other type of legal entity, status as a general partner in any partnership, or by contract or any other arrangement whereby such entity controls or has the right to control the business affairs of the Party.

1.2 "**BLA**" means a Biologies License Application, as defined in **21 C.F.R. Part 600-680,** required to be filed with the FDA for approval to commence commercial sale or marketing of a biologies product in the U.S. or a similar filing in a country outside the United States.

1.3 "**Commercialization**" means all activities relating to the manufacture, marketing, obtaining pricing and reimbursement approvals, promotion, advertising, importing, selling, distribution and customer support of a Licensed Product in a country. The term "**Commercialize**" has a correlative meaning.

1.4 "**Commercially Reasonable Efforts**" means, with respect to Developing or Commercializing a Licensed Product, that AVROBIO will use the efforts [***] but the level of effort will be no less than: (a) marketing Licensed Products in quantities calculated to address anticipated market demand once marketing has begun and (b) seeking needed governmental approvals for marketing Licensed Products with diligence in supplying indicated information to, and replying to, appropriate governmental offices in the process. Commercially Reasonable Efforts shall in no case involve a shelving of the development, marketing or sale of Licensed Products or a suspension of the diligent pursuit of needed governmental approval for Licensed Products.

1.5 "Control" means, with respect to any Know-How, Patent Right, or other intellectual property right, that the applicable Party owns or has a license under such Know-How, Patent Right, or other intellectual property right and has the ability to assign to the other Party, or grant to the other Party a license, sublicense or other right to or under, such Know-How, Patent Right or right as provided for herein without violating the terms of any agreement or other arrangements with any Third Party.

1.6 "**Development**" means non-clinical and clinical drug discovery, research and/or development activities reasonably related to or leading to the development and submission of information to a Regulatory Authority, including chemical synthesis, sequencing, toxicology, pharmacology and other discovery and pre-clinical efforts, test method development and stability testing, manufacturing process development, formulation development, delivery system development, quality assurance and quality control development, manufacturing, statistical analysis, and clinical studies. When used as a verb, "**Develop**" means to engage in Development.

1.7 "**FDA**" means the United States Food and Drug Administration, or any successor agency thereto.

1.8 "**Field**" means any and all uses of Licensed Product.

1.9 "**First Commercial Sale**" means, with respect to a given Licensed Product in a particular country, the first sale to a Third Party of such Licensed Product in such country, after obtaining all required Regulatory Approvals in such country. "First Commercial Sale" shall not include the supply of any Licensed Product for use in clinical trials or for compassionate use.

1.10 "**IND**" means an Investigational New Drug application filed with the FDA and sufficient to satisfy the requirements of 21 CFR 312.20.

1.11 "**Know-How**" means any non-public, documented or otherwise recorded or memorialized knowledge, experience, know-how, technology, technical information, results, trade secrets, data and all other information, including formulas and formulations, processes, techniques, unpatented inventions, discoveries, ideas, and developments, test procedures, and results, together with all documents and files embodying the foregoing, and including relevant proprietary materials.

1.12 "**Licensed Know-How**" means Know-How Controlled by GenStem or its Affiliates as of the Effective Date or during the Term that is necessary to research, Develop, manufacture and/or Commercialize Licensed Products in the Field. Licensed Know How to be shared with AVROBIO will include, without limitation, the items set forth on Schedule B attached hereto.

1.13 "**Licensed Patent Rights**" means: (a) any of the Patent Rights listed in Schedule A, and (b) any division, continuation and/or any foreign patent application and/or Letters Patent, and/or the equivalent thereof issuing on any of the foregoing, and/or any reissue, reexamination and/or extension thereof. Any continuation-in-part application or other patent application or patent that is directed specifically to subject matter specifically described in, at least one of the patents or patent applications described above and that has claims relevant to the Field, or that would otherwise be infringed by AVROBIO's Development and Commercialization of Licensed Products under the terms of this Agreement shall also be included in Licensed Patent Rights to the extent such patent or patent application is Controlled by GenStem.

1.14 "**Licensed Product**" means any product that utilizes, includes or incorporates a gene encoding cystinosin, or the protein produced by such gene, in each case (i) the manufacture, use or sale of which would, but for the licenses granted herein, infringe a Valid Claim of the Licensed Patent Rights, (ii) that is the product described in the IND to be filed in accordance with Section 2.2.1, or (iii) that is any derivative, modification or improvement to such product described in such IND and that is to be used for the treatment of Cystinosis.

1.15 "**Licensed Technology**" means the Licensed Patent Rights and the Licensed Know-How.

1.16 "**Major Country**" means [***].

1.17 "**Net Sales**" means the amount invoiced or received by AVROBIO, its Affiliates or sublicensees for sales of a Licensed Product less the following deductions, to the extent included in and not already deducted from the gross amounts invoiced or otherwise charged, and to the extent applicable solely to such sales of the Licensed Product:

(1) normal and customary charges for packaging, transportation, freight and insurance actually incurred and not charged to the purchaser separately for the shipping delivery of the Licensed Product;

(2) sales, value added and excise taxes or customs duties or any other governmental charges imposed upon the sale of the Licensed Product and paid by the selling party, other than franchise tax or income tax of any kind;

(3) reasonable and customary rebates, quantity discounts, charge-backs, allowances and premiums granted or allowed in connection with the sale of the Licensed Product;

(4) credits or allowances given or made for rejection of or return of, and for uncollectible amounts on, previously sold Licensed Products or for retroactive price reductions; and

(5) credits and allowances to customers on account of governmental or managed care requirements on the Licensed Product.

Net Sales shall be determined in accordance with GAAP. In the case of a sale of a Licensed Product between or among AVROBIO or any Affiliate or sublicensee thereof for resale by such transferee, Net Sales shall be based on [***]. Any deductions listed above which involve a payment by AVROBIO (or its Affiliate or sublicensee) shall be [***]. [***].

1.18 "**Patent Rights**" means (a) all patents and patent applications in any country or supranational jurisdiction; (b) any divisional, continuation, or continuation-in-part, reissue, reexamination, substitution, renewal and/or extension of any such patents and patent applications; and (c) any foreign counterpart patent or patent application of any of the foregoing.

1.19 "**Pivotal Trial**" means a clinical trial that is designed to: (a) establish that a Licensed Product is safe and efficacious for its intended use; (b) define warnings, precautions and adverse reactions that are associated with the Licensed Product in the dosage range to be prescribed; and (c) support Regulatory Approval of such Licensed Product; and that is generally consistent with 21 CFR § 312.21(c), or a similar clinical study prescribed by the Regulatory Authorities in a country other than the United States.

1.20 "**Product Label**" means the United States prescribing information/package insert (USPI) for an approved pharmaceutical product as accepted but the FDA, or the equivalent thereof approved by any other Regulatory Authority.

1.21 "**Regulatory Approvals**" means, with respect to a Licensed Product, the approvals, registrations, licenses and permits of any Regulatory Authority in a country, including pricing and/or reimbursement approvals, that are necessary to be obtained in order to market and sell commercially such Licensed Product in that country.

1.22 "**Regulatory Authority**" means any federal, state or local regulatory agency, department, bureau or other government entity, including the FDA, which has responsibility for granting any licenses or approvals or granting pricing and/or reimbursement approvals necessary for the marketing and sale of a Licensed Product in any country.

1.23 "**Royalty Term**" has the meaning assigned to it in Section 4.3.3.

1.24 "**Series B Financing**" means AVROBIO's first issuance and sale of shares of a newly authorized series of preferred stock (e.g., Series B preferred stock) after the Effective Date of this Agreement to venture capital funds and/or other institutional investors in a bona fide equity financing.

1.25 "**Sublicense Income**" means license issue fees, milestone payments, maintenance fees, upfront fees, technology access fees, and any similar payments made by a Third Party sublicensee to AVROBIO or an Affiliate of AVROBIO as consideration for a sublicense granted to such Third Party under the rights to Licensed Technology granted to AVROBIO under this Agreement. Excluded from Sublicense Income are: (a) royalties received on the sale or distribution of Licensed Products; (b) payments related to equity investments in AVROBIO or its Affiliates to the extent equal to the fair market value of the equity, with any excess being part of Sublicense Income, (c) bona fide research or development funding from Third Parties for any work related to the research or development of Licensed Products that AVROBIO or any AVROBIO Affiliate is required to perform or have performed under such sublicense agreement, and (d) payments based on the cost of goods for product manufactured and supplied by AVROBIO for a Third Party under the relevant sublicense agreement.

1.26 "**Term**" has the meaning assigned to it in Section 8.1.

1.27 "**Territory**" means all countries of the world

1.28 "**Third Party**" means any party other than GenStem, AVROBIO, or their respective Affiliates.

1.29 "**UCSD**" means The Regents of the University of California, a California public corporation having its statewide administrative offices at 1111 Franklin Street, Oakland, California 94607-5200, represented by its San Diego campus.

1.30 "**Valid Claim**" means either (a) a claim of an issued and unexpired patent or a supplementary protection certificate, which has not been held permanently revoked, unenforceable or invalid by a decision of a court, patent office or other forum of competent jurisdiction, unappealable or unappealed within the time allowed for appeal and that is not admitted to be invalid or unenforceable through reissue, disclaimer or otherwise (i.e., only to the extent the subject matter is disclaimed or is sought to be deleted or amended through reissue), or (b) a claim of a pending patent application that has not been abandoned, finally rejected or expired without the possibility of appeal or refiling, *provided*, *however*, that Valid Claim shall exclude any such claim in such a pending application that has not been granted within the earlier of (i) ten (10) years following the earliest priority filing date for such claim and (ii) five (5) years from the date of issuance of the first substantive patent office action considering the patentability of such claim by the applicable patent office in such country, in each case unless and until such claim is granted in such country (at which time such claim will become a Valid Claim again).

2. LICENSES

2.1 License Grant. Subject to the terms and conditions of this Agreement, GenStem hereby grants to AVROBIO an exclusive, royalty-bearing license under GenStem's rights in the Licensed Patent Rights to research, have researched, develop, have developed, make, have made, use, have used, sell, have sold, offer for sale, have offered for sale, import, have imported, export and have exported Licensed Products in the Field in the Territory, including the right to grant sublicenses (the "**License**"). In addition, AVROBIO shall have the exclusive right in the Field to use and have used the Licensed Know-How provided to it by GenStem hereunder as reasonably required in the exercise of the rights granted above. With regards to any Licensed Patent Rights that are not owned by GenStem, notwithstanding the foregoing license grant or any other section of this Agreement, but subject to Sections 2.2.2 and 6.1, the scope of the rights granted to AVROBIO with respect to Licensed Patent Rights under the License shall be limited to the rights that GenStem has in such Licensed Patent Rights, including under the License Agreement between GenStem and UCSD effective as of June 14, 2017 (the "**UCSD Agreement**"). AVROBIO hereby agrees to comply with all obligations under the UCSD Agreement as it exists on the Effective Date that are applicable to Sublicensees (as defined in the UCSD License).

2.2 Reservation of Rights; Covenants.

2.2.1 Notwithstanding the exclusive rights granted to AVROBIO in Section 2.1, GenStem shall have the right and obligation to complete the planned Phase 1/2 Trial in Cystinosis titled: "A Phase 1/2 Study to determine the safety and efficacy of transplantation with autologous CD34+ HSCs from mobilized PBSCs of patients with nephropathic cystinosis modified by ex vivo transduction using lentiviral vector", at GenStem's expense, provided that the Parties shall reasonably consult, cooperate and communicate regarding such efforts. For clarity, such clinical trial shall be conducted in accordance with the protocol as previously provided to AVROBIO and any amendments thereto shall require the prior written consent of AVROBIO, not to be unreasonably withheld, conditioned or delayed. GenStem will use commercially reasonable best efforts to conduct and complete the planned Phase 1/2 Trial in Cystinosis in a timely manner, with US IND filing anticipated by [***], obtainment of first patient consent anticipated by [***] and obtainment of third patient consent anticipated by [***] (each of the foregoing, the "**Trial Dates**"). GenStem will prepare and deliver to AVROBIO a final Study Report for the planned Phase 1/2 Trial as soon as practicable after trial completion. Upon written request of GenStem, AVROBIO agrees to negotiate in good faith a reasonable extension of any relevant Trial Date in order to account for unforeseen circumstances or requirements, in either case beyond the reasonable control of GenStem, including any requirements imposed by a Governmental Authority, provided that any such adjusted Trial Dates shall only be effective if mutually agreed in writing by the Parties.

2.2.2 GenStem shall use all commercially reasonable efforts to maintain its rights under the UCSD Agreement with respect to Licensed Technology as in force on the Effective Date and shall promptly notify AVROBIO if it receives written notice from UCSD of any claimed breach of the UCSD Agreement. Upon termination of the UCSD Agreement for any reason, GenStem shall provide prompt written notice to AVROBIO, and upon request of AVROBIO will assign to UCSD its rights under this Agreement, provided that a) AVROBIO is not in material breach of this Agreement at such time; and b) AVROBIO is not involved in

litigation as an adverse party to UCSD at such time. In no case, however, will UCSD be bound by duties and obligations contained in this Agreement that extend beyond the duties and obligations of UCSD set forth in the UCSD Agreement. Upon any such assignment, AVROBIO will promptly agree in writing to be bound to UCSD by the terms of this Agreement, including but not limited to the payment obligations hereunder.

2.2.3 No implied licenses are granted under this Agreement, and each Party reserves all rights to all of its technology except for the rights expressly granted to AVROBIO under this Section 2.

2.3 Right to Sublicense. AVROBIO may grant sublicenses under the license set forth in Section 2.1 and any other rights granted to it under this Agreement to its Affiliates and Third Parties, subject to the terms and conditions set forth in this Section 2.3. An existing sublicensee in good standing may grant further sublicenses, also subject to such terms and conditions.

2.3.1 Each sublicense agreement shall be consistent with and subject to the terms and conditions of this Agreement. AVROBIO shall remain responsible for the performance of all sublicensees under any such sublicense as if such performance were carried out by AVROBIO itself, including, without limitation, the payment of any royalties or other payments provided for hereunder.

2.3.2 AVROBIO will provide GenStem with a copy of each sublicense agreement within [***] of execution of such agreement, which copy may be reasonably redacted except for matters relevant to a determination of AVROBIO's compliance with its obligations and/or GenStem's rights under this Agreement.

2.4 Technology Transfer. GenStem will provide to AVROBIO, at no additional expense: (a) copies of the Licensed Know-How set forth in Schedule B. which information shall be provided to AVROBIO promptly after the Effective Date, and (b) other Licensed Technology and related program information available to GenStem (including without limitation data and other reports generated by or on behalf of GenStem regarding the Phase 1/2 Trial referenced above) as reasonably requested by AVROBIO, which information shall be provided to AVROBIO promptly after any such reasonable request.

2.5 Regulatory Cooperation. GenStem shall keep AVROBIO reasonably informed of its regulatory activities and timelines therefor. GenStem shall provide AVROBIO with timely notice of any material meetings or other communications with any Regulatory Authority relevant to Licensed Products, and AVROBIO shall, if permitted by law, have the right to attend all such meetings, provided that, GenStem will not be obligated to change or delay any such scheduled meetings in order to comply with AVROBIO's availability. GenStem shall also timely provide AVROBIO with a copy of all relevant regulatory submissions reasonably in advance of submission to the FDA or other Regulatory Authority to allow AVROBIO an opportunity for review and comment. In addition, upon reasonable request of AVROBIO, GenStem shall prepare, pursue and participate in, as applicable, additional submissions to or meetings with relevant Regulatory Authorities, provided that AVROBIO shall lead, assist and/or cooperate, at GenStem's request and at AVROBIO's expense, in the preparation of such submissions and conduct of such meetings.

3. DEVELOPMENT AND COMMERCIALIZATION OF LICENSED PRODUCTS

3.1 Responsibilities. Subject to the terms and conditions of this Agreement (including without limitation Section 2.2.1 and this Section 3), AVROBIO (and/or its Affiliates and sublicensees) will be solely responsible, at AVROBIO's expense, for the Development and Commercialization of Licensed Products in the Field in the Territory, using Commercially Reasonable Efforts. AVROBIO will conduct, and will cause its Affiliates and sublicensees to conduct, such activities in a good scientific manner and in compliance in all material respects with all applicable laws.

3.2 Communication. Each Party will appoint one of its employees to serve as a technical liaison and relationship manager hereunder ("**Relationship Manager**") with responsibility for overseeing communications between the Parties relevant to this Agreement, including without limitation communications regarding: (a) the conduct of the Phase 1/2 Trial referenced above, (b) the transfer of the Licensed Technology to AVROBIO as contemplated in Section 2.4 above, and (c) patent matters. The initial Relationship Manager for AVROBIO shall be Dr. Nerissa Kreher and for GenStem shall be Dr. Stephanie Cherqui. Each Party may replace its Relationship Manager at any time by notice in writing to the other Party. Notwithstanding the foregoing, all information regarding the Licensed Patent Rights that is to be provided to AVROBIO pursuant to Section 6.1 shall be directed to Dr. Chris Mason at AVROBIO [***].

3.3 Diligence. AVROBIO will use Commercially Reasonable Efforts to Develop, and Commercialize one or more Licensed Products in the United States and in at least one Major Country. All efforts of AVROBIO's Affiliates, Third Party contractors and sublicensees will be considered efforts of AVROBIO for the purpose of determining AVROBIO's compliance with its obligations under this Section 3.3.

3.4 Progress Reports. Within [***] after the end of each calendar year, AVROBIO shall furnish GenStem with a written report on the progress of its efforts during the immediately preceding year to Develop and Commercialize Licensed Products under this Agreement, and of intended efforts for the Licensed Products for the year in which the report is submitted.

3.5 Access Requirements. In addition to the obligations set forth above, to the extent required by applicable law, unless a- waiver is obtained from the appropriate agency, AVROBIO shall submit an access plan to California Institute for Regenerative Medicine ("**CIRM**") within [***] following final approval of any Licensed Product by the FDA. The plan must afford access to Licensed Products to Californians who have no other means to purchase the Licensed Product in a manner consistent with CIRM regulations (see Title 17, California Code of Regulations, Section 100607). Further, to the extent required by applicable law, unless a waiver is obtained from the appropriate agency, AVROBIO acknowledges that CIRM may request that AVROBIO enter into a license agreement with respect to Licensed Product in any field of use or territory with a responsible applicant or applicants, upon terms that are reasonable under the circumstances in accordance with CIRM regulations (see Title 17, California Code of Regulations, Section 100610).

4. FINANCIAL TERMS

4.1 License Fees.

4.1.1 As initial consideration for the grant of rights set forth herein, AVROBIO will pay to GenStem a non-creditable, non-refundable initial license fee of One Million U.S Dollars (US$1,000,000), payable within [***] of the Effective Date.

4.1.2 As an additional license fee, AVROBIO will pay to GenStem a non-creditable, non-refundable additional license fee of [***] within [***] of receiving written notice from GenStem of treatment of the first patient with Licensed Product in the Phase 1/2 Trial to be conducted by GenStem pursuant to Section 2.2.1, provided that, if such milestone is achieved prior to the closing of AVROBIO's Series B Financing, AVROBIO shall have the right to delay payment until the earlier of the closing of such Series B Financing and April 1, 2018.

4.2 Milestone Payments.

4.2.1 **Development Milestones**. AVROBIO will pay to GenStem the following non-creditable, non-refundable milestone payments within [***] following the first achievement of the corresponding events described in the table below by the first Licensed Product being Developed, either directly or indirectly, by or on behalf of AVROBIO, its Affiliates or sublicensees to achieve such event. For clarity, each Development Milestone payment below shall be made only once, upon the first attainment of the applicable milestone event by any such Licensed Product.

MILESTONE EVENT	MILESTONE PAYMENT
1. [***]	$[***]
2. [***]	$[***]
3. [***]	$[***]
4. [***]	$[***]

Notwithstanding the foregoing, the [***] and [***] milestone payments specified above shall be reduced by [***]% if at the time of achievement [***]. In addition, notwithstanding the foregoing, in the event that [***] (a) [***] and Milestone Payment 1 above has not been paid at such time, then such amount shall instead be payable within [***] irrespective of whether or not [***], and (b) [***] and Milestone Payment 2 above has not been paid at such time, then such amount shall instead be payable within [***] irrespective of whether or not [***].

4.3 Royalties.

4.3.1 **Royalty Rates**. With respect to all Licensed Products in the aggregate that are Commercialized by AVROBIO, its Affiliates and sublicensees in the Territory during the Term of this Agreement and subject to Sections 4.3.2 and 4.3.3, AVROBIO shall pay to GenStem tiered royalties based annual Net Sales of such Licensed Products in the Territory in any given calendar year. The royalty rates will be as follows:

Net Sales in Calendar Year between	Royalty Rate
$[***] - $[***]	[***]%
>[***] and £ $[***]	[***]%
> $[***]	[***]%

4.3.2 **Royalty Reduction/ Offset**. The royalty due on Licensed Products as specified above in Section 4.3.1 shall be reduced by [***] ([***]%) (i) for sales in a given country where (a) the approved Product Label for the Licensed Product in such country at the time of sale specifically excludes females or does not include human clinical safety and efficacy data from females, or (b) the manufacture, use or sale of the Licensed Product would not infringe a Valid Claim of the Licensed Patent Rights in such country, or (ii) if GenStem has not achieved any relevant event specified in Section 2.2.1 as of the relevant Trial Date, as such Trial Date may be adjusted in accordance with Section 2.2.1. Further, AVROBIO shall have the right to offset [***] ([***]%) of any royalties or other license fees paid to Third Parties for sales of Licensed Product in a particular country in order to commercialize Licensed Products against royalties due hereunder for such country, up to a maximum of [***] ([***]%) of the amounts otherwise due to GenStem under Section 4.3.1. Notwithstanding anything in this Agreement, in no event shall the royalty payable to GenStem under this Agreement be reduced pursuant to any provision of this Section 4.3.2 or any other section of this Agreement to less than [***] of the relevant amount provided in Section 4.3.1. For clarity, if human clinical safety and efficacy data from females becomes available at any time during the Term, AVROBIO shall use Commercially Reasonable Efforts to obtain access to such data and to file it with the appropriate Regulatory Authorities in order to expand the approved Product Label for the Licensed Product.

4.3.3 **Royalty Term**. Running royalties as specified above shall be payable on Net Sales on a Licensed Product-by-Licensed Product and country-by-country basis until the later of (i) the eleventh (11th) anniversary of the First Commercial Sale of such Licensed Product in such country, and (ii) expiration of the last Valid Claim under the Licensed Patent Rights covering such Licensed Product in such country (the "**Royalty Term**" for such Licensed Product in such country).

4.4 Royalty Reports; Payment. Following the First Commercial Sale of any Licensed Product for which royalties are due pursuant to Section 4.3, and continuing for so long as royalties are due hereunder, within [***] after the end of [***], AVROBIO shall provide a royalty report showing, on a Licensed Product-by-Licensed Product and country-by-country basis:

(a) the Net Sales of each Licensed Product sold by AVROBIO, its Affiliates and sublicensees during such calendar quarter reporting period;

(b) the royalties payable in United States dollars which shall have accrued hereunder with respect to such Net Sales;

(c) withholding taxes, if any, required by applicable law to be deducted with respect to such royalties; and

(d) the rate of exchange with supporting calculations, determined in accordance with Section 4.5, used by AVROBIO in determining the amount of United States dollars payable hereunder.

Such reports shall also include, following written request of GenStem, any other reasonable data and information reasonably requested by GenStem, including any additional data and information required under the UCSD License.

AVROBIO shall pay to GenStem the royalties for [***] at the time of submission of AVROBIO's royalty report. If no royalty is due for any royalty period hereunder following commencement of the reporting obligation, AVROBIO shall so report.

4.5 Sublicense Income. AVROBIO will pay to GenStem [***] of Sublicense Income received from Third Party sublicensees if the applicable sublicense agreement is entered into by the relevant parties prior to the [***] anniversary of the Effective Date and [***] of Sublicense Income received from Third Party sublicensees if the applicable sublicense agreement is entered into by the relevant parties on or after the [***] anniversary of the Effective Date and prior to the [***] anniversary of the Effective Date. For the avoidance of doubt, no portion of Sublicense Income shall be payable to GenStem with respect to any sublicense agreement entered into by the relevant parties on or after the [***] anniversary of the Effective Date. AVROBIO will make such payment to GenStem within [***] of receipt of the relevant Sublicense Income. Any such payments with respect to the Sublicense Income shall be non-creditable against any other payment obligations of AVROBIO under this Agreement; provided, however, that AVROBIO shall not be required to make any payments to GenStem which would amount to "double-dipping" for the same milestone event. Accordingly, if AVROBIO receives Sublicense Income as a result of a sublicensee's achievement of a milestone event for which a milestone payment is due to GenStem as provided in Section 4.2 above, amounts paid by AVROBIO to GenStem on account of the relevant Sublicense Income shall be fully creditable against any amounts payable by AVROBIO to GenStem for such milestone event under Section 4.2. For example, if a sublicense agreement is entered into prior to the [***] anniversary of the Effective Date and the sublicensee pays to AVROBIO the sum of $[***] upon the achievement of milestone event 1, GenStem shall receive the $[***] due pursuant to Section 4.2, and an additional [***]% of the excess milestone payment of $[***] – $[***] under this Section 4.5.

4.6 Currency Exchange. In the case of Net Sales outside the United States, the rate of exchange to be used in computing the amount of currency equivalent in United States dollars shall be the rate of exchange used by AVROBIO or its Affiliate or sublicensee, as relevant, for its own financial reporting purposes in connection with its other products or accounts, which shall be consistent with GAAP. Upon request by GenStem, AVROBIO shall provide GenStem with a copy of AVROBIO's (or its Affiliate's or sublicensee's, as relevant) then-current currency exchange policy.

4.7 Records; Audit, Records and Audits. AVROBIO shall keep, and shall require its Affiliates and (sub)licensees to keep (all in accordance with generally accepted accounting principles, consistently applied), complete and accurate records in sufficient detail to properly reflect Net Sales and to enable any milestones payable hereunder to be determined. Upon the written request of GenStem and not more than once in each calendar year, AVROBIO and its Affiliates shall permit an independent certified public accounting firm of nationally recognized standing selected by GenStem and reasonably acceptable to AVROBIO, at GenStem's expense, to have access during normal business hours to such records of AVROBIO and/or its Affiliates as may be reasonably necessary to verify the accuracy of the payments hereunder for any calendar year ending not more than [***] prior to the date of such request. These rights with respect to any calendar year shall terminate [***] after the end of any such calendar year. GenStem shall provide AVROBIO with a copy of the accounting firm's written report within [***] of completion of such report. If such accounting firm correctly concludes that an underpayment was made, then AVROBIO shall pay the amount due within [***] of the date GenStem delivers to AVROBIO such accounting firm's written report so correctly concluding. GenStem shall bear the full cost of such audit unless such audit correctly discloses that the additional payment payable by AVROBIO for the audited period is more than [***] of the amount otherwise paid for that audited period, in which case AVROBIO shall pay the reasonable fees and expenses charged by the accounting firm. GenStem shall treat all financial information, subject to review under this Section in accordance with the confidentiality provisions of this Agreement, and shall cause its accounting firm to enter into a confidentiality agreement with AVROBIO obligating it to treat all such financial information in confidence pursuant to such confidentiality provisions. AVROBIO and its Affiliates shall include in each relevant license granted by it a provision requiring any (sub)licensee to maintain records of sales of Licensed Products made pursuant to such license, and to grant access to such records by AVROBIO's independent accountant to the same extent and under the same obligations as required of AVROBIO under this Agreement. AVROBIO shall advise GenStem in advance of each audit of any such (sub)licensee with respect to Licensed Product sales. AVROBIO will provide GenStem with a summary of the results received from the audit and, if GenStem so requests, a copy of the audit report, with respect to relevant Licensed Product sales.

4.8 Confidentiality. Each Party will treat all information subject to review under Section 4.6 in accordance with the provisions of Section 7 and will cause its accounting firm and the independent expert to enter into a reasonably acceptable confidentiality agreement with the audited Party obligating such entity to maintain all such financial information in confidence pursuant to such confidentiality agreement.

4.9 Payment Terms; Interest.

4.9.1 Payments under this Agreement shall be made in U.S. Dollars by wire transfer of immediately available funds to an account at a commercial bank designated by GenStem, such designation in writing to be provided to AVROBIO at least [***] before payment is due. Any payments due under this Agreement shall be due on such date as specified in the Agreement or, in the event that such date is not a business day, the next succeeding business day. Any payments based on invoices shall be made within [***] from AVROBIO's receipt of such invoice.

4.9.2 If AVROBIO does not make a payment that is owed under the terms of this Agreement by the date when due, then AVROBIO shall be obligated to pay computed simple interest, the interest period commencing from such date and ending on the date that payment of the amount owed is actually made, at an interest rate per annum equal to the [***], or the highest rate allowed by law, whichever is lower. The interest calculation shall be based on the act/360 computation method. Such interest shall be due and payable on the tender of the underlying principal payment.

4.10 Taxes. GenStem will be responsible for any income or other taxes owed by GenStem and required by applicable law to be withheld or deducted from any of the royalty and other payments made by or on behalf of AVROBIO to GenStem hereunder ("**Withholding Taxes**"). AVROBIO may deduct from any amounts that AVROBIO is required to pay hereunder to GenStem an amount equal to any such Withholding Taxes required by AVROBIO to be withheld and paid to the proper tax authority. Upon request, GenStem will provide AVROBIO any information available to GenStem that is necessary to allow any such Withholding Taxes to be determined. Such Withholding Taxes will be paid to the proper taxing authority for GenStem's account and evidence of such payment will be secured and sent to GenStem within [***] of such payment. The Parties will use reasonable efforts to do such lawful acts and sign such lawful deeds and documents as either Party may reasonably request from the other Party to enable GenStem and AVROBIO or its Affiliates or sublicensees to take advantage of any applicable legal provision or any double taxation treaties with the object of paying the sums due to GenStem hereunder without, or to minimize the amount of, such withholding or deduction of any Withholding Taxes.

5. INTELLECTUAL PROPERTY RIGHTS

5.1 Prosecution of Licensed Patent Rights.

5.1.1 In accordance with this Section 5.1.1, unless the Parties otherwise agree in writing for a given Licensed Patent Right, as between the Parties, GenStem will have lead responsibility for the preparation, filing, prosecution, defense and maintenance ("**Prosecution**") in the Territory of the Licensed Patent Rights, provided that AVROBIO acknowledges that UCSD may be performing such activities for GenStem. GenStem shall be responsible for all costs and expenses with respect to such activities. GenStem will perform or have performed such activities through patent counsel of its choice. GenStem will provide AVROBIO with copies of all official correspondence received from patent offices with respect to any Licensed Patent Rights, and with any proposed substantive responses thereto sufficiently in advance for AVROBIO to provide comments and suggestions on such proposed responses, which comments and suggestions shall be considered by GenStem in good faith, and GenStem shall use all reasonable efforts to have them taken into consideration by UCSD. GenStem will provide AVROBIO with an update of the filing, prosecution and maintenance status for each Licensed Patent Right on a periodic basis. In the event that GenStem elects not to pursue or continue the Prosecution of any Licensed Patent Right in any country, GenStem shall provide AVROBIO with notice of this decision at least [***] prior to any pending lapse or abandonment thereof and provide AVROBIO with an opportunity to request that GenStem continue such Prosecution at AVROBIO's expense.

5.2 Enforcement.

5.2.1 **Initiation**. If either Party learns of any infringement or threatened infringement by a Third Party of any Licensed Patent Right, such Party shall promptly notify the other Party and shall provide such other Party with available evidence of such infringement (the "**Infringement Notice**"). Neither AVROBIO nor GenStem will notify a Third Party (including the infringer) of infringement or put such Third Party on notice of the existence of any Licensed Patent Rights without first obtaining consent of the other, such consent not to be unreasonably withheld, conditioned or delayed. AVROBIO and GenStem agree to discuss and determine how best to proceed. AVROBIO and GenStem agree to use diligent efforts to cooperate with each other to terminate such infringement without litigation. If such infringement has not ended within [***] of the effective date of the Infringement Notice, then AVROBIO shall have the first right, but not the obligation, at its sole expense, to bring suit or other appropriate legal action against any actual or suspected infringement of any Licensed Patent Rights relating to the Development or Commercialization of Licensed Products in the Field in the Territory. If AVROBIO does not take such action within [***] after the Infringement Notice, then GenStem shall have the right but not the obligation, at its own expense, to bring suit or other appropriate legal action against such infringement.

5.2.2 **Cooperation**. Each Party shall, at the other Party's expense, execute all papers and perform such other acts as may be reasonably required to bring and/or maintain any infringement suit brought by the other Party in accordance with Section 5.2.1 above (including joining as a party to such actions or proceedings if reasonably requested by the other Party or required by applicable law), and at its option and expense, may be represented in such suit by counsel of its choice. GenStem shall use all reasonable efforts to obtain UCSD's similar cooperation with respect to any such actions or proceedings as relevant. In addition, the Parties shall cooperate with each other in obtaining patent term restoration or supplemental protection certificates or their equivalents in any country where applicable to Licensed Patent Rights. In the event that elections with respect to obtaining such patent term restoration, supplemental protection certificates or their equivalents are to be made, the Parties shall agree upon such elections.

5.2.3 **Recovery**. Any amount recovered, whether by judgment or settlement, shall first be applied to reimburse the costs and expenses (including attorneys' fees) of the Party bringing suit, then to the costs and expenses (including attorneys' fees), if any, of the other Party. With regards to net amounts of recovery (remaining after payment of costs and expenses as above), such shall be allocated [***].

5.3 Defense of Infringement Claims. If the manufacture, sale or use of a Licensed Product pursuant to this Agreement results in, or may result in, any claim, suit, or proceeding by a Third Party alleging patent infringement by AVROBIO (or its Affiliates or sublicensees) in the Field in the Territory, AVROBIO will promptly notify GenStem thereof in writing. AVROBIO or its Affiliate or sublicensee will have the exclusive right to defend and control the defense of any such claim, suit, action or proceeding at its own expense, using counsel of its own choice, and may settle any such claim, suit, action or proceeding at its sole discretion; *provided*, that if any such settlement would admit or concede that any material aspect of the Licensed Patent Rights are invalid or unenforceable, or require GenStem to pay any amounts, the aspects of such settlement directly involving such admission or concession or payment shall require the prior written consent of GenStem. AVROBIO will keep GenStem reasonably informed of all material developments in connection with any such claim, suit, or proceeding.

5.4 Patent Marking. AVROBIO shall mark all Licensed Products made, used, sold, offered for sale, or imported under the terms of this Agreement, or their containers, in accordance with the applicable patent marking laws.

5.5 Preference for United States Industry. If AVROBIO sells a Licensed Product in the U.S., AVROBIO shall manufacture said Licensed Product substantially in the U.S. unless a written waiver of such obligation is obtained.

6. REPRESENTATION AND WARRANTIES; COVENANTS

6.1 GenStem Warranties. GenStem hereby warrants and represents to AVROBIO as of the Effective Date that: (i) GenStem owns or Controls the entire right, title and interest in and to the Licensed Technology and no Third Party other than UCSD has any ownership rights thereto; (ii) GenStem has the right to grant the licenses under the Licensed Technology as set forth in this Agreement; (iii) GenStem has not entered into any agreement, arrangement or understanding regarding any of the Licensed Technology that conflicts with the terms of this Agreement; (iv) to its knowledge no Third Party has any license rights, options or other rights in, under or to the Licensed Technology that conflict with the terms of this Agreement and during the Term of this Agreement GenStem and its Affiliates shall not grant any such rights to any Third Party; (v) GenStem is not aware of (a) any Patent Rights owned by a Third Party that would be infringed by the use or practice of the Licensed Technology in the Field in the Territory under the license granted in Section 2.1, (b) any Patent Rights owned or licensed by GenStem or its Affiliates that are not Licensed Patent Rights and that would likely be infringed by the use or practice the Licensed Technology in the Field in the Territory under the license granted in Section 2.1, or (c) any prior art or other facts or circumstances that would reasonably lead GenStem or its Affiliates to believe that any of the Licensed Patent Rights are likely invalid or unenforceable; and (vi) none of the Licensed Technology has been misappropriated from any Third Party.

6.2 Reciprocal Representations and Warranties. Each Party represents and warrants to the other Party that: (i) this Agreement is a legal and valid obligation binding upon its execution and enforceable against it in accordance with its terms and conditions; and (ii) the execution, delivery and performance of this Agreement by such Party has been duly authorized by all necessary corporate action, and (iii) the person executing this Agreement on behalf of such Party has been duly authorized to do so by all requisite corporate actions.

6.3 DISCLAIMER OF WARRANTY. EXCEPT FOR THE EXPRESS WARRANTIES SET FORTH IN SECTIONS 6.1 AND 6.2, NEITHER PARTY MAKES ANY REPRESENTATIONS NOR GRANTS ANY OTHER WARRANTIES, EXPRESS OR IMPLIED, EITHER IN FACT OR BY OPERATION OF LAW, BY STATUTE OR OTHERWISE, AND GENSTEM AND AVROBIO EACH SPECIFICALLY DISCLAIMS ANY OTHER WARRANTIES, WHETHER WRITTEN OR ORAL, OR EXPRESS OR IMPLIED, INCLUDING ANY WARRANTY OF QUALITY OR MERCHANTABILITY, OR ANY WARRANTY AS TO THE VALIDITY OR ENFORCEABILITY OF ANY PATENTS OR THE NON-INFRINGEMENT OF ANY INTELLECTUAL PROPERTY RIGHTS OF THIRD PARTIES.

7. CONFIDENTIALITY

7.1 Definition. During the Term, a Party (the "**Disclosing Party**", with respect to information disclosed by such Party) may disclose or otherwise communicate to the other Party (the "**Receiving Party**", with respect to information disclosed to such Party by the other Party) its information in connection with this Agreement or the performance of its obligations hereunder (the "**Confidential Information**" of the disclosing Party), which may include scientific and manufacturing information and plans, marketing and business plans, and financial and personnel matters relating to a Party or its present or future products, sales, suppliers, customers, employees, investors or business. Without limiting the foregoing, "Confidential Information" of a Party is hereby deemed to include any information disclosed by such Party to the other Party pursuant to that certain confidentiality agreement between the Parties dated as of February 9, 2017 (the "**Prior CDA**").

7.2 Exclusions. Notwithstanding the foregoing, information disclosed by a Disclosing Party will not be deemed Confidential Information with respect to the Receiving Party for purposes of this Agreement if such information:

(a) was already known to the Receiving Party or its Affiliates, as evidenced by their written records, other than under an obligation of confidentiality or non-use, at the time of disclosure to the Receiving Party;

(b) was generally available or was otherwise part of the public domain at the time of its disclosure to the Receiving Party;

(c) became generally available or otherwise became part of the public domain after its disclosure to the Receiving Party, through no fault of or breach of its obligations under this Section 9 or the Prior CDA (as defined above) by the Receiving Party;

(d) was disclosed to the Receiving Party, other than under an obligation of confidentiality or non-use, by a Third Party who had no obligation to the Party that controls such information and know-how not to disclose such information or know-how to others and has the lawful right to disclose it; or

(e) was independently discovered or developed by the Receiving Party or its Affiliate, as evidenced by written records, without the use of Confidential Information belonging to the Disclosing Party.

7.3 Disclosure and Use Restriction. Except as expressly otherwise provided herein, each Party agrees that, during the Term and for [***] thereafter, such Party (as the Receiving Party with respect to Confidential Information of the other Party) and its Affiliates and sublicensees will keep completely confidential, and will not publish or otherwise disclose and will not use for any purpose except for the purposes expressly contemplated by this Agreement, any Confidential Information of the Disclosing Party.

7.4 Authorized Disclosure. A Receiving Party may disclose specific Confidential Information of the Disclosing Party to the extent that such disclosure is:

7.4.1 required by a valid order of a court of competent jurisdiction or other governmental or regulatory body of competent jurisdiction; *provided*, that such Receiving Party will first have given reasonable prior notice of such disclosure requirement to the Disclosing Party and given the Disclosing Party a reasonable opportunity to quash such order and/or to obtain a protective or order limiting such disclosure and/or requiring that the Confidential Information and documents that are the subject of such order be held in confidence by such court or governmental or regulatory body and/or, if disclosed, be used only for the purposes for which the order was issued; and *provided*, *further*, that if the disclosure requirement is not quashed, the Confidential Information disclosed in response to such court or governmental order will be limited to that information that is legally required to be disclosed in response to such court or governmental order, taking into account any protective or other similar order limiting such disclosure obligation;

7.4.2 required by law; *provided*, that the Disclosing Party will provide the Receiving Party with notice of such disclosure in advance thereof to the extent practicable and the disclosure will be limited to that information that is legally required to be disclosed in response to such court or governmental order;

7.4.3 made by the Receiving Party to regulatory authorities as required in connection with any regulatory filing or application made in accordance with the terms of this Agreement; *provided*, that reasonable measures will be taken to assure confidential treatment of such information;

7.4.4 made by the Receiving Party as reasonably required in connection with the performance of this Agreement, to Affiliates, employees, consultants, representatives or agents, each of whom prior to disclosure must be bound by obligations of confidentiality and non-use at least equivalent in scope to those set forth in this Section 7.4;

7.4.5 made by the Receiving Party to existing or potential acquirers or merger candidates; potential sublicensees or collaborators (to the extent contemplated hereunder); investment bankers; existing or potential investors, venture capital firms or other financial institutions or investors for purposes of obtaining financing; or Affiliates, each of whom prior to disclosure must be bound by obligations of confidentiality and non-use at least equivalent in scope to those set forth in this Section 7.4;

7.4.6 made by the Receiving Party with the prior written consent of the Disclosing Party.

7.5 Use of Name. Neither Party may make public use of the other Party's name except (a) in connection with the activities contemplated hereby as permitted in this Section 7, (b) as required by applicable law, and (c) otherwise as agreed in writing by such other Party.

7.6 Terms of Agreement to be Maintained in Confidence. The Parties agree that the terms of this Agreement are confidential and will not be disclosed by either Party to any Third Party (except to a Party's professional advisor) without prior written permission of the other Party; *provided*, that either Party may make any filings of this Agreement required by law or regulation in any country so long as such Party uses its reasonable efforts to obtain confidential treatment for portions of this Agreement as available, consults with the other Party, and permits the other Party to participate, to the extent practicable, in seeking a protective order or other confidential treatment; and *provided further*, that a Party may publicly disclose, without regard to the preceding requirements of this Section 7.6, information that was previously disclosed in compliance with such requirements; and *provided further*, that a Party may disclose such terms in confidence as provided in Section 7.4.5.

8. TERM AND TERMINATION

8.1 Term. The term of this Agreement will commence as of the Effective Date and, will expire upon the expiration of the last Royalty Term for all Licensed Products in all countries in the Territory, or will terminate if the Agreement is earlier terminated in accordance with this Section 8 (such period, the "**Term**").

8.2 Termination for Material Breach.

8.2.1 Any material failure by a Party (the "**Breaching Party**") to comply with its material obligations contained in this Agreement (such failure a "**Material Breach**") will entitle the other Party ("**Non-Breaching Party**") to give to the Breaching Party written notice of the Material Breach, which notice shall specify in detail the nature of the breach and shall, require the Breaching Party to make good or otherwise cure such Material Breach.

8.2.2 If such Material Breach is not cured within [***] ([***] for Material Breach of any payment obligation) after the receipt of notice pursuant to Section 8.2.1 above, the Non-Breaching Party will be entitled to terminate this Agreement on written notice to the Breaching Party and without prejudice to any of its other rights conferred on it by this Agreement and other remedies available under applicable law.

8.3 Termination at Will. AVROBIO may terminate this Agreement at will upon [***] prior written notice to GenStem.

8.4 Consequences of Expiration and Termination.

8.4.1 **Expiration**. Upon expiration of the Royalty Term in a particular country for a given Licensed Product, AVROBIO's license under Section 2.1 with respect to such Licensed Product in the Field in such country will become irrevocable, perpetual and fully-paid.

8.4.2 **Early Termination or Material Breach by AVROBIO**. Upon termination of this Agreement pursuant to Section 8.3, or a termination by GenStem for Material Breach by AVROBIO pursuant to Section 8.2, the following provisions will apply:

(a) All rights and licenses granted by GenStem to AVROBIO under this Agreement will terminate immediately.

(b) Any sublicense granted by AVROBIO or any of its Affiliates to a subicensee shall survive termination of this Agreement, *provided* that such subicensee

agrees in writing within [***] of termination of this Agreement to fully perform what would otherwise be AVROBIO's obligations to GenStem under this Agreement, including without limitation an agreement to cure any then-existing breaches of this Agreement by AVROBIO.

8.4.3 Upon termination or expiration of the Agreement in whole or in part, upon the request of the Disclosing Party, the Receiving Party shall promptly return to the Disclosing Party or destroy the Disclosing Party's Confidential Information, including all copies thereof, except to the extent that retention of such Confidential Information is reasonably necessary for the Receiving Party to exploit any continuing rights it may have (including, without limitation, the right to exploit any fully paid-up license pursuant to Section 8.4.1 in the event of an expiration of the Agreement in whole or in part) and/or to fulfill its obligations contemplated herein, including its obligations of non-disclosure and non-use hereunder. The return and/or destruction of such Confidential Information as provided above shall not relieve the Receiving Party of its obligations under the Agreement. The provisions of this section shall not apply to copies of electronically exchanged Confidential Information made as a matter of routine information technology backup and maintained in a secure manner, or to Confidential Information or copies thereof which must be stored by the Receiving Party according to provisions of applicable law.

8.4.4 **Survival**. Expiration or termination of this Agreement will not relieve the Parties of any obligation accruing prior to such expiration or termination. The provisions of Sections **1**, **2.2.3**, **4.4**, **4.5**, **4.6**, **4.7**, **4.8**, **4.9**, **4.10**, **5.3**, **6.3**, **7**, **8.4**, **9.1**, **9.2**, **9.3**, **9.4**, **10** and **11** will survive any termination or expiration of this Agreement.[1]

9. INDEMNIFICATION AND INSURANCE

9.1 Indemnification by GenStem. GenStem will indemnify AVROBIO, its Affiliates, its sublicensees, and their respective directors, officers, employees and agents, and defend and hold each of them harmless, from and against any losses, damages, liabilities, costs and expenses (including reasonable attorneys' fees and expenses) (collectively, **"Losses")** based on or suffered in connection with any liability suits, investigations, allegations, actions, claims or demands by Third Parties ("**Third Party Claims**") to the extent arising from or occurring as a result of or in connection with (i) any breach by GenStem of its representations, warranties or other obligations under this Agreement, or (ii) the gross negligence or willful misconduct of GenStem or its Affiliate; except to the extent that such Losses or Third Party Claims arise out of or result from the gross negligence or willful misconduct of a party seeking indemnification hereunder, or a breach by AVROBIO of any provision of this Agreement.

9.2 Indemnification by AVROBIO. AVROBIO will indemnify GenStem, its Affiliates, UCSD and their respective directors, officers, employees and agents, and defend and save each of them harmless, from and against any Losses based on or suffered in connection with any Third Party Claims against any such indemnified party arising from or occurring as a result of or in connection with: (i) any theory of product liability (including actions in the form of tort, warranty or strict liability) concerning a Licensed Product that is Developed or Commercialized

1 To be updated upon finalization of the Agreement.

by AVROBIO, its Affiliates or sublicensees, (ii) any breach by AVROBIO of its representations, warranties or obligations under this Agreement, or (iii) the gross negligence or willful misconduct of AVROBIO, its Affiliates or sublicensees; except to the extent that such Losses or Third Party Claims arise out of or result from the gross negligence or willful misconduct of a party seeking indemnification hereunder, or a breach by GenStem of any provision of this Agreement.

9.3 Indemnification Procedure.

9.3.1 **Notice of Claim**. The indemnified Party will give the indemnifying Party (the "**Indemnifying Party**") prompt written notice (an "**Indemnification Claim Notice**") of any Losses or discovery of fact upon which such Indemnified Party intends to base a request for indemnification under Section 9.1 or Section 9.2; *provided*, *however*, that the failure to give such prompt written notice will not relieve Indemnifying Party of its indemnification obligation under this Agreement except and only to the extent that the Indemnifying Party is actually prejudiced as a result of such failure. In no event will the Indemnifying Party be liable for any Losses that result from any delay in providing such notice. Each Indemnification Claim Notice must contain a description of the claim and the nature and amount of such Loss (to the extent that the nature and amount of such Loss are known at such time). The indemnified Party will furnish promptly to the indemnifying Party copies of all papers and official documents received in respect of any Losses. All indemnification claims in respect of a Party, its Affiliates or their respective directors, officers, employees and agents (collectively, the "**Indemnitees**" and each an "**Indemnitee**") will be made solely by such Party to this Agreement (the "**Indemnified Party**").

9.3.2 **Control of Defense**. At its option, the Indemnifying Party may assume the defense of any Third Party Claim by giving written notice to the Indemnified Party within [***] after the Indemnifying Party's receipt of an Indemnification Claim Notice. Upon assuming the defense of a Third Party Claim, the Indemnifying Party may appoint as lead counsel in the defense of the Third Party Claim any legal counsel selected by the Indemnifying Party. In the event the Indemnifying Party assumes the defense of a Third Party Claim, the Indemnified Party will immediately deliver to the Indemnifying Party all original notices and documents (including court papers) received by any Indemnitee in connection with the Third Party Claim. Should the Indemnifying Party assume the defense of a Third Party Claim, the Indemnifying Party will not be liable to the Indemnified Party or any other Indemnitee for any legal expenses subsequently incurred by such Indemnified Party or other Indemnitee in connection with the analysis, defense or settlement of the Third Party Claim.

9.3.3 **Right to Participate in Defense**. Without limiting Section 9.3.2 above, any Indemnitee will be entitled to participate in, but not control, the defense of such Third Party Claim and to employ counsel of its choice for such purpose; *provided*, that such employment will be at the Indemnitee's own expense unless (i) the employment thereof has been specifically authorized by the Indemnifying Party in writing, or (ii) the Indemnifying Party has failed to assume the defense and employ counsel in accordance with Section 9.3.2 (in which case the Indemnified Party will control the defense).

9.3.4 **Settlement**. With respect to any Losses relating solely to the payment of money damages in connection with a Third Party Claim and that will not result in the Indemnitee's becoming subject to injunctive or other relief or otherwise adversely affect the business of the Indemnitee in any manner, and as to which the Indemnifying Party will have acknowledged in writing the obligation to indemnify the Indemnitee hereunder, the Indemnifying Party will have the sole right to consent to the entry of any judgment, enter into any settlement or otherwise dispose of such Loss, on such terms as the Indemnifying Party, in its sole discretion, will deem appropriate, and will transfer to the Indemnified Party all amounts which said Indemnified Party will be liable to pay prior to the time prior to the entry of judgment. With respect to all other Losses in connection with Third Party Claims, where the Indemnifying Party has assumed the defense of the Third Party Claim in accordance with Section 9.3.2, the Indemnifying Party will have authority to consent to the entry of any judgment, enter into any settlement or otherwise dispose of such Loss provided it obtains the prior written consent of the Indemnified Party (which consent will be at the Indemnified Party's sole and absolute discretion). The Indemnifying Party will not be liable for any settlement or other disposition of a Loss by an Indemnitee that is reached without the written consent of the Indemnifying Party. Regardless of whether the Indemnifying Party chooses to defend or prosecute any Third Party Claim, no Indemnitee will admit any liability with respect to, or settle, compromise or discharge, any Third Party Claim without the prior written consent of the Indemnifying Party.

9.3.5 **Cooperation**. The Indemnified Party will, and will cause each other Indemnitee to, cooperate in the defense or prosecution thereof and will furnish such records, information and testimony, provide such witnesses and attend such conferences, discovery proceedings, hearings, trials and appeals as may be reasonably requested in connection with the defense or prosecution of any Third Party Claim. Such cooperation will include access during normal business hours afforded to the Indemnifying Party to, and reasonable retention by the Indemnified Party of, records and information that are reasonably relevant to such Third Party Claim, and making Indemnitees and other employees and agents available on a mutually convenient basis to provide additional information and explanation of any material provided hereunder, and the Indemnifying Party will reimburse the Indemnified Party for all its reasonable out-of-pocket expenses in connection therewith.

9.4 Expenses. Except as provided above, the reasonable and verifiable costs and expenses, including fees and disbursements of counsel, incurred by the Indemnified Party in connection with any claim will be reimbursed on a [***] basis by the Indemnifying Party, without prejudice to the Indemnifying Party's right to contest the Indemnified Party's right to indemnification and subject to refund in the event the Indemnifying Party is ultimately held not to be obligated to indemnify the Indemnified Party.

9.5 Insurance. Each Party will have and maintain such types and amounts of liability insurance as is normal and customary in the industry generally for parties similarly situated, and will upon request provide the other Party with a copy of its policies of insurance in that regard, along with any amendments and revisions thereto. Without limiting the foregoing, AVROBIO shall have and maintain at its sole cost and expense, adequate liability insurance (including product liability insurance) to protect against potential liabilities and risk arising out of its activities under this Agreement and any agreement related hereto and upon such terms (including coverages, deductible limits and self-insured retentions) as are customary in the pharmaceutical industry generally for drug development activities; provided that, prior to commencement of clinical trials of Licensed Product, such coverage will include a minimum per occurrence limit of

[***]. Such liability insurance shall insure against all types of liability, including personal injury, physical injury or property damage arising out of such AVROBIO's activities hereunder. Such policy shall include GenStem as an additional insured and shall include a waiver of subrogation. Within [***] of written request, AVROBIO shall provide to GenStem certificates of insurance evidencing the above required insurance. This Section 9.5 shall not create any limitation on AVROBIO's liability under this Agreement, including with respect to its indemnification obligations under this Article 9.

10. LIMITATION OF LIABILITY

IN NO EVENT WILL EITHER PARTY BE LIABLE TO THE OTHER PARTY FOR LOST PROFITS, LOSS OF DATA, OR FOR ANY SPECIAL, INDIRECT, INCIDENTAL, CONSEQUENTIAL OR PUNITIVE DAMAGES, HOWEVER CAUSED, ON ANY THEORY OF LIABILITY AND WHETHER OR NOT SUCH PARTY HAS BEEN ADVISED OF THE POSSIBILITY OF SUCH DAMAGES, ARISING UNDER ANY CAUSE OF ACTION AND ARISING IN ANY WAY OUT OF THIS AGREEMENT. THE FOREGOING LIMITATIONS WILL NOT APPLY TO AN AWARD OF ENHANCED DAMAGES AVAILABLE UNDER THE PATENT LAWS FOR WILLFUL PATENT INFRINGEMENT AND WILL NOT LIMIT EITHER PARTY'S OBLIGATIONS TO THE OTHER PARTY UNDER SECTIONS 7 OR 9 OF THIS AGREEMENT.

11. MISCELLANEOUS

11.1 Assignment. Without the prior written consent of the other Party hereto (which consent shall not be unreasonably withheld), a Party will not sell, transfer, assign, delegate, pledge or otherwise dispose of, whether voluntarily, involuntarily, by operation of law or otherwise, this Agreement or any of its rights or duties hereunder; *provided*, that a Party hereto may assign or transfer this Agreement and its rights or obligations hereunder without the consent of the other Party: (a) to any Affiliate of such Party; or (b) to any Third Party with which it merges or consolidates, or to which it transfers all or substantially all of its assets to which this Agreement relates, and provided that the foregoing consent obligation shall not limit the ability to grant sublicenses as permitted in this Agreement or to engage subcontractors to perform certain obligations hereunder. The assigning Party (except if it is not the surviving entity) will remain jointly and severally liable with the relevant Affiliate or Third Party assignee under this Agreement, and the relevant Affiliate assignee, Third Party assignee or surviving entity will assume in writing all of the assigning Party's obligations under this Agreement. Any purported assignment or transfer in violation of this Section 11.1 will be void *ab initio* and of no force or effect.

11.2 Severability. If any provision of this Agreement is held to be illegal, invalid or unenforceable under any present or future law, and if the rights or obligations of either Party under this Agreement will not be materially and adversely affected thereby, (a) such provision will be fully severable, (b) this Agreement will be construed and enforced as if such illegal, invalid or unenforceable provision had never comprised a part hereof, (c) the remaining provisions of this Agreement will remain in full force and effect and will not be affected by the illegal, invalid or unenforceable provision or by its severance herefrom, and (d) in lieu of such illegal, invalid or unenforceable provision, there will be added automatically as a part of this

Agreement a legal, valid and enforceable provision as similar in terms to such illegal, invalid or unenforceable provision as may be possible and reasonably acceptable to the Parties herein. To the fullest extent permitted by applicable law, each Party hereby waives any provision of law that would render any provision prohibited or unenforceable in any respect.

11.3 Governing Law; Dispute Resolution.

11.3.1 This Agreement, and any disputes between the Parties related to or arising out of this Agreement (including the Parties' relationship created hereby, the negotiations for and entry into this Agreement, its conclusion, binding effect, amendment, coverage, termination, or the performance or alleged non-performance of a Party of its obligations under this Agreement) (each a "**Dispute**"), will be governed by the laws of the State of Delaware without reference to any choice of law principles thereof that would cause the application of the laws of a different jurisdiction.

11.3.2 In the event of any Dispute, a Party may notify the other Party in writing of such Dispute, and such Dispute will be promptly referred to the Chief Executive Officers of each of the Parties (or their respective designees) who will use their good faith efforts to resolve the Dispute within [***] after it was referred to the Chief Executive Officers.

11.3.3 In the event that any Dispute is not resolved as provided in Section 11.3.2 within the relevant time period, then such Dispute will be finally settled by arbitration in accordance with this Section 11.3. The arbitration will be conducted in accordance with the Commercial Arbitration Rules of the American Arbitration Association (or its successor organization) ("**AAA**") and as further provided below, and judgment on the arbitration award may be entered in any court having jurisdiction thereof.

11.3.4 The arbitration shall be conducted by a panel of three (3) persons experienced in the pharmaceutical business: within [***] after initiation of arbitration, each Party shall select one person to act as arbitrator and the two Party-selected arbitrators shall select a third arbitrator within [***] of their appointment. If the arbitrators selected by the Parties are unable or fail to agree upon the third arbitrator, the third arbitrator shall be appointed by the AAA. The arbitrators shall have scientific and legal experience relevant to the subject matter of the dispute. In any case the arbitrator shall not be an Affiliate, employee, consultant, officer, director or stockholder of either Party, or otherwise have any current or previous relationship with either Party or their respective Affiliates. The place of arbitration shall be New York, New York, and all proceedings and communications shall be in English. Within [***] after the designation of the arbitrators, the arbitrators and the Parties shall meet, and each Party shall provide to the arbitrator a written summary of all disputed issues, such Party's position on such disputed issues and such Party's proposed ruling on the merits of each such issue.

11.3.5 The arbitrator shall set a date for a hearing, which shall be no later than [***] after the submission of written proposals pursuant to Section 11.3.4, for the presentation of evidence and legal argument concerning each of the issues identified by the Parties. The Parties shall have the right to be represented by counsel.

11.3.6 The arbitrators shall use best efforts to rule on each disputed issue within [***] after completion of the hearing described in Section 11.3.5 The determination of the arbitrators as to the resolution of any dispute shall be binding and conclusive upon all Parties. All rulings of the arbitrators shall be in writing and shall be delivered to the Parties except to the extent that the Commercial Arbitration Rules of the AAA provide otherwise. Nothing contained herein shall be construed to permit the arbitrator to award punitive, exemplary or any similar damages. The arbitrator shall render a "reasoned decision" within the meaning of the Commercial Arbitration Rules, which shall include findings of fact and conclusions of law.

11.3.7 Either Party may apply to the arbitrators for interim injunctive relief until the arbitration award is rendered or the controversy is otherwise resolved. Either Party also may, without waiving any remedy under this Agreement or violating this Section 11.3, seek from any court having jurisdiction any injunctive or provisional relief necessary to protect the rights or property of that Party. The arbitrators shall have no authority to award punitive or any other type of damages excluded under Section 10. Each Party shall bear its own costs and expenses and attorneys' fees and an equal share of the arbitrators' fees and any administrative fees of arbitration.

11.3.8 Except to the extent necessary to confirm an award or as may be required by applicable laws, neither a Party nor an arbitrator may disclose the existence, content, or results of an arbitration without the prior written consent of both Parties. In no event shall an arbitration be initiated after the date when commencement of a legal or equitable proceeding based on the dispute, controversy or claim would be barred by the applicable statute of limitations.

11.3.9 The Parties agree that any payments made pursuant to this Agreement pending resolution of any dispute hereunder shall be promptly refunded if an arbitrator or court determines that such payments are not due.

11.4 Notices. All notices or other communications that are required or permitted hereunder will be in writing and delivered personally, sent by facsimile (and promptly confirmed by personal delivery or overnight courier as provided herein), or sent by internationally-recognized overnight courier addressed as follows:

If to GenStem, to:

GenStem Therapeutics, Inc.
[***]
Cardiff by the Sea, CA 92007
Attention: Chief Executive Officer

If to AVROBIO, to:

AVROBIO, Inc.
700 Technology Square, Suite 101
Cambridge, MA 02139
Attention: Chief Executive Officer

or to such other address as the Party to whom notice is to be given may have furnished to the other Party in writing in accordance herewith. Any such communication will be deemed to have been given (i) when delivered, if personally delivered, and (ii) on the second business day after dispatch, if sent by internationally-recognized overnight courier. It is understood and agreed that this Section 11.4 is not intended to govern the day-to-day business communications necessary between the Parties in performing their duties, in due course, under the terms of this Agreement.

11.5 Entire Agreement; Modifications. This Agreement including the Exhibits attached hereto, each of which is hereby incorporated and made part of in this Agreement by reference, sets forth and constitutes the entire agreement and understanding between the Parties with respect to the subject matter hereof and all prior agreements, understanding, promises and representations, whether written or oral, with respect thereto. Each Party confirms that it is not relying on any representations or warranties of the other Party except as specifically set forth herein. No amendment or modification of this Agreement will be binding upon the Parties unless in writing and duly executed by authorized representatives of both Parties.

11.6 Relationship of the Parties. It is expressly agreed that the Parties' relationship under this Agreement is strictly one of a pure contract relationship between GenStem and AVROBIO, and that this Agreement does not create or constitute a partnership, joint venture, or agency. Neither Party will have the authority to make any statements, representations or commitments of any kind, or to take any action, which will be binding (or purport to be binding) on the other.

11.7 Waiver. Any term or condition of this Agreement may be waived at any time by the Party that is entitled to the benefit thereof, but no such waiver will be effective unless set forth in a written instrument duly executed by or on behalf of the Party waiving such term or condition. The waiver by either Party hereto of any right hereunder or of claims based on the failure to perform or a breach by the other Party will not be deemed a waiver of any other right hereunder or of any other breach or failure by said other Party whether of a similar nature or otherwise.

11.8 Counterparts. This Agreement may be executed in two or more counterparts, each of which will be deemed an original, but all of which together will constitute one and the same instrument.

11.9 No Benefit to Third Parties. The representations, warranties, covenants and agreements set forth in this Agreement are for the sole benefit of the Parties hereto and their successors and permitted assigns, and they will not be construed as conferring any rights on any other parties.

11.10 Further Assurance. Each Party will duly execute and deliver, or cause to be duly executed and delivered, such further instruments and do and cause to be done such further acts and things, including the filing of such assignments, agreements, documents and instruments, as may be necessary or as the other Party may reasonably request in connection with this Agreement or to carry out more effectively the provisions and purposes, or to better assure and confirm unto such other Party its rights and remedies under this Agreement.

11.11 English Language. This Agreement has been written and executed in the English language as used in the United States of America and will be interpreted in accordance with the English language as used in the United States of America. Any translation by a Party into any other language will not be an official version thereof, and in the event of any conflict in interpretation between the English version and such translation, the English version will control.

11.12 No Drafting Party. This Agreement has been submitted to the scrutiny of, and has been negotiated by, both Parties and their counsel, and will be given a fair and reasonable interpretation in accordance with its terms, without consideration or weight being given to any such terms having been drafted by any Party or its counsel. No rule of strict construction will be applied against either Party.

11.13 Construction. Except where the context otherwise requires, wherever used, the use of any gender will be applicable to all genders and the word "or" is used in the inclusive sense (and/or). The captions of this Agreement are for convenience of reference only and in no way define, describe, extend or limit the scope or intent of this Agreement or the intent of any provision contained in this Agreement. The term "including" as used herein means including, without limiting the generality of any description preceding such term. The word "any" will mean "any" unless otherwise clearly indicated by context. Unless the context requires otherwise, (a) any definition of or reference to any agreement, instrument or other document refer to such agreement, instrument or other document as from time to time amended, supplemented or otherwise modified (subject to any restrictions on such amendments, supplements or modifications set forth herein or therein), (b) any reference to any laws refer to such laws as from time to time enacted, repealed or amended, (c) the words "herein", "hereof and "hereunder", and words of similar import, refer to this Agreement in its entirety and not to any particular provision hereof, and (d) all references herein to Sections and Exhibits, unless otherwise specifically provided, refer to the Sections and Exhibits of this Agreement.

[**Remainder of page intentionally left blank. Signature page follows**.]

IN WITNESS WHEREOF, the Parties have executed this Agreement by their respective authorized representatives as of the date first written above.

GENSTEM THERAPEUTICS, INC.

By: /s/ Jeffrey M. Ostrove, Ph.D.
Name: Jeffrey M. Ostrove, Ph.D.
Title: Chief Executive Officer

AVROBIO, INC.

By: /s/ Geoff MacKay
Name: Geoff MacKay
Title: President & CEO

SCHEDULE A

LICENSED PATENT RIGHTS

Application No.	Filing Date	UCSD Attorney Docket No.	Summary of Claimed Subject Matter
[***]	[***]	[***]	[***]
[***]	[***]	[***]	[***]

SCHEDULE B

LICENSED KNOW-HOW

GenStem Know-How List
[***]

[***]

Exhibit 10.12

LEASE AGREEMENT

THIS LEASE AGREEMENT (this "**Lease**") is made as of this 12th day of January, 2018, between **ARE-MA REGION NO. 59, LLC**, a Delaware limited liability company ("**Landlord**"), and **AVROBIO, INC.**, a Delaware corporation ("**Tenant**").

BASIC LEASE PROVISIONS

Address of Building: 300 One Kendall Square, Cambridge, MA 02139

Premises: That portion of the second floor of the Building in the Project (each as defined below) containing approximately 11,218 rentable square feet, consisting of (i) approximately 4,580 rentable square feet of space (the "**Initial Premises**"), and (ii) approximately 6,638 rentable square feet of space (the "**Subsequent Premises**"), all as shown on **Exhibit A**.

Building: The building in the Project currently known and numbered as 300 One Kendall Square, Cambridge, Massachusetts, and located on the real property owned by Landlord and described on **Exhibit B** (the "**Property**").

Project: The project commonly known as One Kendall Square, located on the Property and property owned by affiliates of Landlord and operated as single mixed-use complex.

Base Rent: $56.00 per rentable square foot of the Premises per year, subject to adjustment as provided in Section 4 below.

Rentable Area of Premises: 11,218 rentable square feet

Rentable Area of Project: 644,771 rentable square feet

Rentable Area of Building: 65,527 rentable square feet

Building's Share of Project: 10.12%

Tenant's Share: 17.11% (6.98% attributable to the Initial Premises and 10.13% attributable to the Subsequent Premises)

Security Deposit: $209,402.67

Target Commencement Date: February 1, 2018

Rent Adjustment Percentage: 3%

Base Term: Beginning on the Commencement Date and ending 60 months from the first day of the first full month of the Term (as defined in Section 2) hereof. For clarity, if the Commencement Date occurs on the first day of a month, the expiration of the Base Term shall be measured from that date. If the Commencement Date occurs on a day other than the first day of a month, the expiration of the Base Term shall be measured from the first day of the following month.

Permitted Use: Office and related uses consistent with the character of the Project and otherwise in compliance with the provisions of Section 7 hereof.

Address for Rent Payment:
ARE-MA Region No. 59, LLC
P.O. Box 944193
Cleveland, OH 44194-4193

Landlord's Notice Address:
385 East Colorado Boulevard, Suite 299
Pasadena, CA 91101
Attention: Corporate Secretary

Tenant's Notice Address:
300 One Kendall Square, Suite 3-201
Cambridge, MA 02139
Attention: Lease Administrator

The following Exhibits and Addenda are attached hereto and incorporated herein by this reference:

[X] **EXHIBIT A** - PREMISES DESCRIPTION
[X] **EXHIBIT B** - DESCRIPTION OF PROPERTY
[X] **EXHIBIT C** - WORK LETTER
[X] **EXHIBIT D** - COMMENCEMENT DATE
[X] **EXHIBIT E** - RULES AND REGULATIONS
[X] **EXHIBIT F** - TENANT'S PERSONAL PROPERTY
[X] **EXHIBIT G** - NOTIFICATION OF PRESENCE OF ASBESTOS CONTAINING MATERIALS

1. **Lease of Premises**. Upon and subject to all of the terms and conditions of this Lease, Landlord hereby leases the Premises to Tenant and Tenant hereby leases the Premises from Landlord. The portions of the Project which are for the non-exclusive use of tenants of the Building are collectively referred to herein as the "**Common Areas**." Subject to the terms and conditions of this Lease, Tenant shall have the appurtenant right to use the Common Areas for their intended uses. The Common Areas shall include, without limitation, the common loading areas located in and serving the Building, pedestrian sidewalks and landscaped areas serving the Project, as well as the common elevators, lobbies, hallways, corridors and stairwells and, if applicable, restrooms, within the Building and serving the Premises or necessary for access to and use of the Premises. In addition to other rights reserved herein or by law, Landlord reserves the right from time to time, without material interruption of Tenant's use and access to the Premises (except in emergency): (i) to make additions to or reconstructions of the Building, Property and Project and to install, use, maintain, repair, replace and relocate for service to the Premises or other parts of the Building, Property and/or Project, pipes, ducts, conduits, wires and appurtenant fixtures, wherever located in the Premises, the Building, the Property or elsewhere in the Project, including without limitation, the installation of such facilities in the plenums of the ceilings of the Premises (or, if there is no drop ceiling, within the space above 10 feet of any floor of the Premises), and coring therefor between the ceiling or top surface of any portion of the Premises, and the space above the Premises in the plenum or below the top of the Premises as aforesaid; and (ii) to alter or relocate any Common Area or facility. From and after the Commencement Date through the expiration of the Term, Tenant shall have access to the Building and the Premises 24 hours a day, 7 days a week, except in the case of emergencies, as the result of Legal Requirements, the performance by Landlord of any installation, maintenance or repairs, or any other temporary interruptions, and otherwise subject to the terms of this Lease.

2. **Delivery; Acceptance of Premises; Commencement Date**.

(a) **Initial Premises**. Landlord shall deliver to Tenant ("**Delivery**" or "**Deliver**") the Initial Premises on or before the Target Commencement Date with Landlord's Work in the Initial Premises Substantially Completed. If Landlord fails to timely Deliver the Initial Premises, Landlord shall not be liable to Tenant for any loss or damage resulting therefrom, and this Lease shall not be void or voidable except as provided herein. Notwithstanding anything to the contrary contained herein, if Landlord fails to Deliver the Initial Premises to Tenant on or before the date that is 90 days after the Target Commencement Date (as such date may be extended for Force Majeure delays and Tenant Delays) ("**Initial Premises Abatement Date**"), Base Rent payable with respect to the Initial Premises shall be abated 1 day for each day after the Initial Premises Abatement Date (as such date may be extended for Force Majeure delays and Tenant Delays) that Landlord fails to Deliver the Initial Premises to Tenant. As used herein, the terms "**Landlord's Work**" and "**Substantially Completed**" shall have the meanings set forth for such terms in the Work Letter.

The "**Commencement Date**" shall be the earliest of: (i) the date Landlord Delivers the Initial Premises to Tenant with Landlord's Work in the Initial Premises Substantially Completed; (ii) the date Landlord could have Delivered the Initial Premises but for Tenant Delays; or (iii) the date Tenant conducts any business in the Initial Premises or any part thereof.

Except as otherwise set forth in this Lease: (i) Tenant shall accept the Initial Premises in their condition as of the Commencement Date; (ii) Landlord shall have no obligation for any defects in the Initial Premises; and (iii) Tenant's taking possession of the Initial Premises shall be conclusive evidence that Tenant accepts the Initial Premises. Any occupancy of the Initial Premises by Tenant before the Commencement Date shall be subject to all of the terms and conditions of this Lease, including the obligation to pay Base Rent and Operating Expenses.

(b) **Subsequent Premises**. Landlord shall use reasonable efforts to deliver the Subsequent Premises to Tenant with Landlord's Work in the Subsequent Premises Substantially Completed on or before June 8, 2018 (the "**Subsequent Premises Target Commencement Date**"). If Landlord fails to timely Deliver the Subsequent Premises, Landlord shall not be liable to Tenant for any loss or damage resulting therefrom, and this Lease shall not be void or voidable except as provided herein. Notwithstanding anything to the contrary contained herein, if Landlord fails to Deliver the Subsequent Premises to Tenant on or before the date that is 60 days after the Subsequent Premises Target Commencement Date (as such date may be extended for Force Majeure delays and Tenant Delays) ("**Subsequent Premises Abatement Date**"), Base Rent payable with respect to the Subsequent Premises shall be abated 1 day for each day after the Subsequent Premises Abatement Date (as such date may be extended for Force Majeure delays and Tenant Delays) that Landlord fails to Deliver the Subsequent Premises to Tenant.

The "**Subsequent Premises Commencement Date**" shall be the earliest of: (i) the date Landlord Delivers the Subsequent Premises to Tenant with Landlord's Work in the Subsequent Premises Substantially Completed; (ii) the date Landlord could have Delivered the Subsequent Premises but for Tenant Delays; or (iii) the date Tenant conducts any business in the Subsequent Premises or any part thereof.

Except as set forth in the Work Letter: (i) Tenant shall accept the Subsequent Premises in their condition as of the Subsequent Premises Commencement Date; (ii) Landlord shall have no obligation for any defects in the Subsequent Premises; and (iii) Tenant's taking possession of the Subsequent Premises shall be conclusive evidence that Tenant accepts the Subsequent Premises. Any occupancy of the Subsequent Premises by Tenant before the Subsequent Premises Commencement Date shall be subject to all of the terms and conditions of this Lease, including the obligation to pay Base Rent and Operating Expenses.

(c) **General**. Upon request of Landlord, Tenant shall execute and deliver a written acknowledgment of the Commencement Date, the Subsequent Premises Commencement Date and the expiration date of the Term when such are established in the form of the "Acknowledgement of Commencement Date" attached to this Lease as **Exhibit D**; provided, however, Tenant's failure to execute and deliver such acknowledgment shall not affect Landlord's rights hereunder. The "**Term**" of this Lease shall be the Base Term, as defined above in the Basic Lease Provisions.

Tenant agrees and acknowledges that neither Landlord nor any agent of Landlord has made any representation or warranty with respect to the condition of all or any portion of the Premises or the Project, and/or the suitability of the Premises or the Project for the conduct of Tenant's business, and Tenant waives any implied warranty that the Premises or the Project are suitable for the Permitted Use. This Lease constitutes the complete agreement of Landlord and Tenant with respect to the subject matter hereof and supersedes any and all prior representations, inducements, promises, agreements, understandings and negotiations which are not contained herein. Landlord in executing this Lease does so in reliance upon Tenant's representations, warranties, acknowledgments and agreements contained herein.

3. **Rent**.

(a) **Base Rent**. The first full month's Base Rent payable with respect to the Initial Premises shall be due and payable on the Commencement Date and the first full month's Base Rent payable with respect to the Subsequent Premises and the Security Deposit shall be due and payable on February 1, 2018. Tenant shall pay to Landlord in advance, without demand, abatement, deduction or set-off, equal monthly installments of Base Rent on or before the first day of each calendar month during the Term hereof, in lawful money of the United States of America, at the office of Landlord for payment of Rent set forth above, or to such other person or at such other place as Landlord may from time to time designate in writing. Payments of Base Rent for any fractional calendar month shall be prorated. The obligation of Tenant to pay Base Rent, Additional Rent and any other sums to Landlord and the obligations of Landlord under this Lease are independent obligations. Tenant shall have no right at any time to abate, reduce, or set-off any Rent (as defined in Section 5) due hereunder except for any abatement as may be expressly provided in this Lease.

(b) **Additional Rent**. In addition to Base Rent, Tenant agrees to pay to Landlord as additional rent ("**Additional Rent**"): (i) commencing on the Commencement Date with respect to the Initial Premises and commencing on the Subsequent Premises Commencement Date with respect to the Subsequent Premises, Tenant's Share of Operating Expenses (as defined in Section 5), and (ii) any and all other amounts Tenant assumes or agrees to pay under the provisions of this Lease, including, without limitation, any and all other sums that may become due by reason of any default of Tenant or failure to comply with the agreements, terms, covenants and conditions of this Lease to be performed by Tenant, after any applicable notice and cure period.

4. **Base Rent Adjustments**. Base Rent shall be increased on each annual anniversary of the first day of the first full month during the Term of this Lease (each an "**Adjustment Date**") by multiplying the Base Rent payable immediately before such Adjustment Date by the Rent Adjustment Percentage and adding the resulting amount to the Base Rent payable immediately before such Adjustment Date. Base Rent, as so adjusted, shall thereafter be due as provided herein. Base Rent adjustments for any fractional calendar month shall be prorated.

5. **Operating Expense Payments**. Landlord shall deliver to Tenant a written estimate of Operating Expenses for each calendar year during the Term (the "**Annual Estimate**"), which may be revised by Landlord from time to time during such calendar year. Commencing on the Commencement Date with respect to the Initial Premises and commencing on the Subsequent Premises Commencement Date with respect to the Subsequent Premises, and continuing thereafter on the first day of each month during the Term, Tenant shall pay Landlord an amount equal to 1/12th of Tenant's Share of the Annual Estimate. Payments for any fractional calendar month shall be prorated.

The term "**Operating Expenses**" means all costs and expenses of any kind or description whatsoever incurred or accrued each calendar year by Landlord in accordance with Landlord's regular accounting practices with respect to the Building and Property (including, without duplication, the Building's Share of Project with respect to all costs and expenses of any kind or description incurred or accrued by Landlord with respect to the Project which are not specific to the Building or Property or any other building or property located in the Project) including, without duplication or limitation, (w) Taxes (as defined in Section 9), (x) capital repairs, replacements and improvements amortized over the lesser of 10 years or the useful life of such capital items (except for capital repairs, replacements and improvements to the roof, which shall be amortized over 15 years), adjusted to reflect Building operations 24 hours per day, 7 days per week and 365 days per year (provided that those Operating Expenses incurred or accrued by Landlord with respect to any capital repairs, replacements or improvements which are for the intended purpose of promoting sustainability (for example, without limitation, by reducing energy usage at the Project) (a "**Capital Sustainability Expenditure**") may be amortized over a shorter period, at Landlord's discretion, to the extent the cost of a Capital Sustainability Expenditure is offset by a reduction in Operating Expenses), (y) transportation services, and (z) the costs of Landlord's third party property manager (not to exceed 3% of Base Rent) or, if there is no third party property manager, administration rent in the amount of 3% of Base Rent, excluding only:

(a) the original construction costs of the Project and renovation prior to the date of the Lease and costs of correcting defects in such original construction or renovation;

(b) capital expenditures for expansion of the Project;

(c) interest, principal payments of Mortgage (as defined in Section 27) debts of Landlord, financing costs and amortization of funds borrowed by Landlord, whether secured or unsecured and all payments of base rent (but not taxes or operating expenses) under any ground lease or other underlying lease of all or any portion of the Project;

(d) depreciation of the Project (except for capital improvements, the cost of which is includable in Operating Expenses);

(e) advertising, legal and space planning expenses and leasing commissions and other costs and expenses incurred in procuring and leasing space to tenants for the Project, including any leasing office maintained in the Project, free rent and construction allowances for tenants;

(f) legal and other expenses incurred in the negotiation or enforcement of leases;

(g) completing, fixturing, improving, renovating, painting, redecorating or other work, which Landlord pays for or performs for other tenants within their premises, and costs of correcting defects in such work;

(h) costs of utilities outside normal business hours sold to tenants of the Project;

(i) costs to be reimbursed by other tenants of the Project or Taxes to be paid directly by Tenant or other tenants of the Project, whether or not actually paid;

(j) salaries, wages, benefits and other compensation paid to (i) personnel of Landlord or its agents or contractors above the position of the person, regardless of title, who has day-to-day management responsibility for the Project or (ii) officers and employees of Landlord or its affiliates who are not assigned in whole or in part to the operation, management, maintenance or repair of the Project; provided, however, that with respect to any such person who does not devote substantially all of his or her employed time to the Project, the salaries, wages, benefits and other compensation of such person shall be prorated to reflect time spent on matters related to operating, managing, maintaining or repairing the Project in comparison to the time spent on matters unrelated to operating, managing, maintaining or repairing the Project;

(k) general organizational, administrative and overhead costs relating to maintaining Landlord's existence, either as a corporation, partnership, or other entity, including general corporate, legal and accounting expenses;

(l) costs (including attorneys' fees and costs of settlement, judgments and payments in lieu thereof) incurred in connection with disputes with tenants, other occupants, or prospective tenants, and costs and expenses, including legal fees, incurred in connection with negotiations or disputes with employees, consultants, management agents, leasing agents, purchasers or mortgagees of the Building or Property;

(m) costs incurred by Landlord due to the violation by Landlord, its employees, agents or contractors or any tenant of the terms and conditions of any lease of space in the Project or any Legal Requirement (as defined in Section 7);

(n) penalties, fines or interest incurred as a result of Landlord's inability or failure to make payment of Taxes and/or to file any tax or informational returns when due, or from Landlord's failure to make any payment of Taxes required to be made by Landlord hereunder before delinquency;

(o) overhead and profit increment paid to Landlord or to subsidiaries or affiliates of Landlord for goods and/or services in or to the Project to the extent the same exceeds the costs of such goods and/or services rendered by unaffiliated third parties on a competitive basis;

(p) costs of Landlord's charitable or political contributions, or of fine art maintained at the Project;

(q) costs in connection with services (including electricity), items or other benefits of a type which are not standard for the Project and which are not available to Tenant without specific charges therefor, but which are provided to another tenant or occupant of the Project, whether or not such other tenant or occupant is specifically charged therefor by Landlord;

(r) costs incurred in the sale or refinancing of the Property or Project;

(s) net income taxes of Landlord or the owner of any interest in the Property or Project, franchise, capital stock, gift, estate or inheritance taxes or any federal, state or local documentary taxes imposed against the Property or Project or any portion thereof or interest therein;

(t) any costs incurred to remove, study, test or remediate Hazardous Materials in or about the Premises, the Building or the Project for which Tenant is not responsible under Section 30 hereof; and

(u) any expenses otherwise includable within Operating Expenses to the extent actually reimbursed by persons other than tenants of the Project under leases for space in the Project.

Within 90 days after the end of each calendar year (or such longer period as may be reasonably required), Landlord shall furnish to Tenant a statement (an "**Annual Statement**") showing in reasonable detail: (a) the total and Tenant's Share of actual Operating Expenses for the previous calendar year, and (b) the total of Tenant's payments in respect of Operating Expenses for such year. If Tenant's Share of actual Operating Expenses for such year exceeds Tenant's payments of Operating Expenses for such year, the excess shall be due and payable by Tenant as Rent within 30 days after delivery of such Annual Statement to Tenant. If Tenant's payments of Operating Expenses for such year exceed Tenant's Share of actual Operating Expenses for such year Landlord shall pay the excess to Tenant within 30 days after delivery of such Annual Statement, except that after the expiration, or earlier termination of the Term or if Tenant is delinquent in its obligation to pay Rent, Landlord shall pay the excess to Tenant after deducting all other amounts due Landlord.

The Annual Statement shall be final and binding upon Tenant unless Tenant, within 90 days after Tenant's receipt thereof, shall contest any item therein by giving written notice to Landlord, specifying each item contested and the reason therefor. If, during such 90 day period, Tenant reasonably and in good faith questions or contests the accuracy of Landlord's statement of Tenant's Share of Operating Expenses, Landlord will provide Tenant with access to Landlord's books and records relating to the operation of the Project and such information as Landlord reasonably determines to be responsive to Tenant's questions (the "**Expense Information**"). If after Tenant's review of such Expense Information, Landlord and Tenant cannot agree upon the amount of Tenant's Share of Operating Expenses, then Tenant shall have the right to have an independent public accounting firm selected by Tenant from among the 5 largest in the United States, working pursuant to a fee arrangement other than a contingent fee (at Tenant's sole cost and expense) and approved by Landlord (which approval shall not be unreasonably withheld or delayed), audit and/or review the Expense Information for the year in question (the "**Independent Review**"). The results of any such Independent Review shall be binding on Landlord and Tenant. If the Independent Review shows that the payments actually made by Tenant with respect to

Operating Expenses for the calendar year in question exceeded Tenant's Share of Operating Expenses for such calendar year, Landlord shall at Landlord's option either (i) credit the excess amount to the next succeeding installments of estimated Operating Expenses or (ii) pay the excess to Tenant within 30 days after delivery of such statement, except that after the expiration or earlier termination of this Lease or if Tenant is delinquent in its obligation to pay Rent, Landlord shall pay the excess to Tenant after deducting all other amounts due Landlord. If the Independent Review shows that Tenant's payments with respect to Operating Expenses for such calendar year were less than Tenant's Share of Operating Expenses for the calendar year, Tenant shall pay the deficiency to Landlord within 30 days after delivery of such statement. If the Independent Review shows that Tenant has overpaid with respect to Operating Expenses by more than 5% then Landlord shall reimburse Tenant for all costs incurred by Tenant for the Independent Review. Operating Expenses for the calendar years in which Tenant's obligation to share therein begins and ends shall be prorated. Notwithstanding anything set forth herein to the contrary, if the Building is not at least 95% occupied on average during any year of the Term, Tenant's Share of Operating Expenses for such year shall be computed as though the Building had been 95% occupied on average during such year.

"**Tenant's Share**" shall be the percentage set forth in the Basic Lease Provisions as Tenant's Share, and "**Building's Share of Project**" shall be the percentage set forth in the Basic Lease Provisions as the Building's Share of Project, each as may be reasonably adjusted by Landlord for changes in the physical size of the Premises, Building, Property or Project occurring thereafter. Landlord may equitably increase Tenant's Share for any item of expense or cost reimbursable by Tenant that relates to a repair, replacement, or service that benefits only the Premises or only a portion of the Building, Property or Project that includes the Premises or that varies with occupancy or use. Landlord may equitably increase the Building's Share of Project for any item of expense or cost reimbursable by Tenant that relates to a repair, replacement, or service that benefits only the Building or only a portion of the Property or Project that includes the Building or that varies with occupancy or use of the Building. Base Rent, Tenant's Share of Operating Expenses and all other amounts payable by Tenant to Landlord hereunder are collectively referred to herein as "**Rent**."

6. **Security Deposit**. Tenant shall deposit with Landlord, on or before February 1, 2018, a security deposit (the "**Security Deposit**") for the performance of all of Tenant's obligations hereunder in the amount set forth in the Basic Lease Provisions, which Security Deposit shall be in the form of an unconditional and irrevocable letter of credit (the "**Letter of Credit**"): (i) in form and substance reasonably satisfactory to Landlord, (ii) naming Landlord as beneficiary, (iii) expressly allowing Landlord to draw upon it at any time from time to time by delivering to the issuer notice that Landlord is entitled to draw thereunder, (iv) issued by an FDIC-insured financial institution satisfactory to Landlord, and (v) redeemable by presentation of a sight draft in the Commonwealth of Massachusetts. If Tenant does not provide Landlord with a substitute Letter of Credit complying with all of the requirements hereof at least 10 days before the stated expiration date of any then current Letter of Credit, Landlord shall have the right to draw the full amount of the current Letter of Credit and hold the funds drawn in cash without obligation for interest thereon as the Security Deposit. The Security Deposit shall be held by Landlord as security for the performance of Tenant's obligations under this Lease. The Security Deposit is not an advance rental deposit or a measure of Landlord's damages in case of Tenant's default. Upon each occurrence of a Default (as defined in Section 20), Landlord may use all or any part of the Security Deposit to pay delinquent payments due under this Lease, and the cost of any damage, injury, expense or liability caused by such Default, without prejudice to any other remedy provided herein or provided by law. Upon any such use of all or any portion of the Security Deposit, Tenant shall pay Landlord on demand the amount that will restore the Security Deposit to the amount set forth in the Basic Lease Provisions. Tenant hereby waives the provisions of any law, now or hereafter in force, which provide that Landlord may claim from a security deposit only those sums reasonably necessary to remedy defaults in the payment of Rent, to repair damage caused by Tenant or to clean the Premises, it being agreed that Landlord may, in addition, claim those sums reasonably necessary to compensate Landlord for any other loss or damage, foreseeable or unforeseeable, caused by the act or omission of Tenant or any officer, employee, agent or invitee of Tenant. Upon bankruptcy or other debtor-creditor proceedings against Tenant, the Security Deposit shall be deemed to be applied first to the payment of Rent and other

charges due Landlord for periods prior to the filing of such proceedings. Upon any such use of all or any portion of the Security Deposit, Tenant shall, within 5 days after demand from Landlord, restore the Security Deposit to its original amount. If Tenant shall fully perform every provision of this Lease to be performed by Tenant, the Security Deposit, or any balance thereof (i.e., after deducting therefrom all amounts to which Landlord is entitled under the provisions of this Lease), shall be returned to Tenant (or, at Landlord's option, to the last assignee of Tenant's interest hereunder) within 60 days after the expiration or earlier termination of this Lease.

If Landlord transfers its interest in the Project or this Lease, Landlord shall either (a) transfer any Security Deposit then held by Landlord to a person or entity assuming Landlord's obligations under this Section 6, or (b) return to Tenant any Security Deposit then held by Landlord and remaining after the deductions permitted herein. Upon such transfer to such transferee or the return of the Security Deposit to Tenant, Landlord shall have no further obligation with respect to the Security Deposit, and Tenant's right to the return of the Security Deposit shall apply solely against Landlord's transferee. The Security Deposit is not an advance rental deposit or a measure of Landlord's damages in case of Tenant's default. Landlord's obligation respecting the Security Deposit is that of a debtor, not a trustee, and no interest shall accrue thereon.

7. **Use**.

(a) **Tenant's Use**. The Premises shall be used solely for the Permitted Use set forth in the Basic Lease Provisions, and in compliance with all laws, orders, judgments, ordinances, regulations, codes, directives, permits, licenses, covenants and restrictions now or hereafter applicable to the Premises, and to the use and occupancy thereof, including, without limitation, the Americans With Disabilities Act, 42 U.S.C. § 12101, et seq. (together with the regulations promulgated pursuant thereto, "**ADA**") (collectively, "**Legal Requirements**" and each, a "**Legal Requirement**"). Tenant shall, upon 5 days' written notice from Landlord, discontinue any use of the Premises which is declared by any Governmental Authority (as defined in Section 9) having jurisdiction to be a violation of a Legal Requirement. Tenant will not use or permit the Premises to be used for any purpose or in any manner that would void Tenant's or Landlord's insurance, increase the insurance risk, or cause the disallowance of any sprinkler or other credits. Tenant shall not permit any part of the Premises to be used as a "place of public accommodation", as defined in the ADA or any similar legal requirement. Tenant shall reimburse Landlord promptly upon demand for any additional premium charged for any such insurance policy by reason of Tenant's failure to comply with the provisions of this Section or otherwise caused by Tenant's use and/or occupancy of the Premises. Tenant will use the Premises in a careful, safe and proper manner and will not commit or permit waste, overload the floor or structure of the Premises, subject the Premises to use that would damage the Premises or obstruct or interfere with the rights of Landlord or other tenants or occupants of the Project, including conducting or giving notice of any auction, liquidation, or going out of business sale on the Premises, or using or allowing the Premises to be used for any unlawful purpose. Tenant shall cause any equipment or machinery to be installed in the Premises so as to reasonably prevent sounds or vibrations from the Premises from extending into Common Areas, or other space in the Project. Tenant shall not place any machinery or equipment weighing 500 pounds or more in or upon the Premises or transport or move such items through the Common Areas of the Building or in the Building elevators without the prior written consent of Landlord. Except as may be provided under the Work Letter, Tenant shall not, without the prior written consent of Landlord, use the Premises in any manner which will require ventilation, air exchange, heating, gas, steam, electricity or water beyond the existing capacity of the Building as proportionately allocated to the Premises based upon Tenant's Share as usually furnished for the Permitted Use.

Landlord shall be responsible for the compliance of the Common Areas of the Project with Legal Requirements as of the Commencement Date. Following the Commencement Date, Landlord shall, as an Operating Expense (to the extent such Legal Requirement is generally applicable to similar buildings in the area in which the Project is located) or at Tenant's expense (to the extent such Legal Requirement is applicable solely by reason of Tenant's, as compared to other tenants of the Project, particular use of the Premises or Tenant's Alterations) make any alterations or modifications to the Common Areas or the

exterior of the Building that are required by Legal Requirements, including the ADA. Tenant, at its sole expense, shall make any alterations or modifications to the interior of the Premises that are required by Legal Requirements (including, without limitation, compliance of the Premises with the ADA. Notwithstanding any other provision herein to the contrary, Tenant shall be responsible for any and all demands, claims, liabilities, losses, costs, expenses, actions, causes of action, damages or judgments, and all reasonable expenses incurred in investigating or resisting the same (including, without limitation, reasonable attorneys' fees, charges and disbursements and costs of suit) (collectively, "**Claims**") arising out of or in connection with Legal Requirements, and Tenant shall indemnify, defend, hold and save Landlord harmless from and against any and all Claims arising out of or in connection with any failure of the Premises to comply with any Legal Requirement.

(b) **Energy Use Reporting**. Tenant agrees to provide, within 10 business days of request by Landlord, such information and documentation as may be needed for compliance with the City of Cambridge Building Energy Use Disclosure Ordinance, Section 8.67.010 et seq. of the Municipal Code of the City of Cambridge (as the same may be amended, the "**Cambridge Building Energy Use Disclosure Ordinance**"), and other such energy or sustainability requirements as may be adopted from time to time by the City of Cambridge or any other governmental authority with jurisdiction over the Building, which information shall include without limitation usage at or by the Premises of electricity, natural gas, steam, hot or chilled water or other energy. Landlord shall report to the applicable governmental authority such energy usage for the Building and other Building information as required by the Cambridge Building Energy Use Disclosure Ordinance.

8. **Holding Over**. If, with Landlord's express written consent, Tenant retains possession of the Premises after the termination of the Term, (i) unless otherwise agreed in such written consent, such possession shall be subject to immediate termination by Landlord at any time, (ii) all of the other terms and provisions of this Lease (including, without limitation, the adjustment of Base Rent pursuant to Section 4 hereof) shall remain in full force and effect (excluding any expansion or renewal option or other similar right or option) during such holdover period, (iii) Tenant shall continue to pay Base Rent in the amount payable upon the date of the expiration or earlier termination of this Lease or such other amount as Landlord may indicate, in Landlord's sole and absolute discretion, in such written consent, and (iv) all other payments shall continue under the terms of this Lease. If Tenant remains in possession of the Premises after the expiration or earlier termination of the Term without the express written consent of Landlord, (A) Tenant shall become a tenant at sufferance upon the terms of this Lease except that the monthly rental shall be equal to 150% of Rent in effect during the last 30 days of the Term, and (B) Tenant shall be responsible for all damages suffered by Landlord resulting from or occasioned by Tenant's holding over, including consequential damages. No holding over by Tenant, whether with or without consent of Landlord, shall operate to extend this Lease except as otherwise expressly provided, and this Section 8 shall not be construed as consent for Tenant to retain possession of the Premises. Acceptance by Landlord of Rent after the expiration of the Term or earlier termination of this Lease shall not result in a renewal or reinstatement of this Lease.

9. **Taxes**. Landlord shall pay, as part of Operating Expenses, all taxes, levies, fees, assessments and governmental charges of any kind, existing as of the Commencement Date or thereafter enacted with respect to the Project (collectively referred to as "**Taxes**"), imposed by any federal, state, regional, municipal, local or other governmental authority or agency, including, without limitation, quasi-public agencies (collectively, "**Governmental Authority**") during the Term, including, without limitation, all Taxes: (i) imposed on or measured by or based, in whole or in part, on rent payable to (or gross receipts received by) Landlord under this Lease and/or from the rental by Landlord of the Building, Property or Project or any portion thereof, or (ii) based on the square footage, assessed value or other measure or evaluation of any kind of the Premises, Building, Property or Project or portion thereof, or (iii) assessed or imposed by or on the operation or maintenance of any portion of the Premises, Building, Property or Project, including parking, or (iv) assessed or imposed by, or at the direction of, or resulting from Legal Requirements, or interpretations thereof, promulgated by, any Governmental Authority, or (v) imposed as a license or other fee, charge, tax or assessment on Landlord's business or occupation of leasing space in the Building, Property or Project or portion thereof. Landlord may contest

by appropriate legal proceedings the amount, validity, or application of any Taxes or liens securing Taxes. Taxes shall not include any net income taxes, franchise, capital stock, gift, estate or inheritance taxes, or any federal, state or local document taxes imposed on the Project or any portion thereof or interest therein, or on Landlord, except to the extent such net income taxes are in substitution for any Taxes payable hereunder. If any such Tax is levied or assessed directly against Tenant, then Tenant shall be responsible for and shall pay the same at such times and in such manner as the taxing authority shall require. Operating Expenses hereunder shall also include the cost of tax monitoring services provided to Landlord with respect to the Building, Property or Project. Tenant shall pay, prior to delinquency, any and all Taxes levied or assessed against any personal property or trade fixtures placed by Tenant in the Premises, whether levied or assessed against Landlord or Tenant. If any Taxes on Tenant's personal property or trade fixtures are levied against Landlord or Landlord's property, or if the assessed valuation of the Building, Property or Project is increased by a value attributed by the taxing authority to improvements in or alterations to the Premises, whether owned by Landlord or Tenant and whether or not affixed to the real property so as to become a part thereof, higher than the base valuation on which Landlord from time-to-time allocates Taxes to all tenants in the Building, Property or Project, or portion thereof of which the Premises are a part, Landlord shall have the right, but not the obligation, to pay such Taxes. Landlord's determination of any excess assessed valuation shall be binding and conclusive, absent manifest error. The amount of any such payment by Landlord shall constitute Additional Rent due from Tenant to Landlord within 30 days of written demand therefor from Landlord.

10. **Parking and PTDM**.

(a) **Parking and Monthly Parking Charge**. Subject to all matters of record, Force Majeure, a Taking (as defined in Section 19 below), the exercise by Landlord of its rights hereunder and upon payment of the Monthly Parking Charge (as defined below) for each parking space commencing on the Commencement Date, Tenant shall have the right, in common with other tenants of the Project to use 0.9 vehicle parking spaces per 1,000 rentable square feet of the Premises ("**Tenant's Parking Allocation**") in the parking facility located at the One Kendall Square Garage located on Binney Street (the "**OKS Garage**") in those areas designated for non-reserved parking, subject in each case to Landlord's rules and regulations; provided, however, Landlord may relocate any or all of Tenant's Parking Allocation from the OKS Garage to the parking garage located at 800 Technology Square. Landlord may allocate parking spaces among Tenant and other tenants in the Project pro rata as described above if Landlord determines that such parking facilities are becoming crowded. Landlord shall not be responsible for enforcing Tenant's parking rights against any third parties, including other tenants of the Project. If Tenant delivers written notice to Landlord during the Term requesting additional parking spaces and Landlord determines that the additional parking spaces desired by Tenant are available for use by Tenant, Landlord shall notify Tenant in writing and Tenant shall immediately commence leasing and paying for such additional parking spaces. The "**Monthly Parking Charge**" shall mean the market rate monthly charge therefor designated by Landlord, adjusted reasonably and no more frequently than once in any 12-month period, based upon the rates charged by comparable parking facilities in the vicinity of the Project. As of the date of this Lease, the Monthly Parking Charge is equal to $310.00 per parking space per month.

(b) **Parking and Transportation Demand Management**. Tenant shall, at Tenant's sole expense, for so long as a parking and traffic demand management plan approved by the City of Cambridge (as amended from time to time, the "**PTDM**"), is applicable to the Project, comply with the PTDM as applicable to the Project, including without limitation, as applicable (i) offer to subsidize mass transit monthly passes for all of its employees who work in the Premises in accordance with the terms set forth in the PTDM; (ii) implement a Commuter Choice Program and the MBTA's Corporate Pass Plan; (iii) discourage single-occupant vehicle ("**SOV**") use by its employees; (iv) promote alternative modes of transportation and use of alternative work hours; (v) at Landlord's request, meet with Landlord and/or its representatives no more frequently than quarterly to discuss transportation programs and initiatives; (vi) participate in annual surveys, monitoring transportation programs and initiatives at the Campus, and, without limitation, achieve a sixty (60%) percent response rate for patron surveys; (vii) cooperate with Landlord in connection with transportation programs and initiatives promulgated pursuant to the PTDM;

(viii) provide alternative work programs (such as telecommuting, flex-time and compressed work weeks) to its employees in order to reduce traffic impacts in Cambridge during peak commuter hours; (ix) offer an emergency ride home ("**ERH**") through the Charles River Transportation Management Association ("**CRTMA**"), or have its own ERH program, for all employees who commute by non-SOV mode at least 3 days a week and who are eligible to park in the parking spaces in the parking facility described above; (x) cooperate with the Cambridge Office of Workforce Development to expand employment opportunities for Cambridge residents; (xi) become a member of the CRTMA and cause the EZ Ride shuttle service to service the Building; (xii) in the event that the single occupancy vehicle and traffic generation modal split limits of the PTDM are exceeded, charge each user of a parking space the market rate for parking in Kendall Square/East Cambridge therefor; (xiii) comply with the requirements of any other parking and traffic demand management plan to which Tenant may be a party from time to time; (xiii) designate an employee transportation coordinator for the Building; and (xiv) otherwise cooperate with Landlord in encouraging employees to seek alternate modes of transportation.

11. **Utilities, Services**. Landlord shall provide, subject to the terms of this Section 11, water, electricity, HVAC, light, power, sewer, and other utilities (including gas and fire sprinklers to the extent the Building is plumbed for such services), refuse and trash collection and janitorial services (collectively, "**Utilities**"). Landlord shall pay, as Operating Expenses or subject to Tenant's reimbursement obligation below, for all Utilities used on the Premises, all maintenance charges for Utilities, and any storm sewer charges or other similar charges for Utilities imposed by any Governmental Authority or Utility provider, and any taxes, penalties, surcharges or similar charges thereon. The Premises shall be separately metered at landlord's sole cost and expense to measure Tenant's usage of electricity for lights and plugs. Landlord may cause, at Tenant's expense, any other Utilities to be separately metered or charged directly to Tenant by the provider. Tenant shall pay directly to the Utility provider, prior to delinquency, any separately metered Utilities and services which may be furnished to Tenant or the Premises during the Term. Tenant shall pay, as part of Operating Expenses, its share of all charges for jointly metered Utilities based upon consumption, as reasonably determined by Landlord. No interruption or failure of Utilities, from any cause whatsoever, shall result in eviction or constructive eviction of Tenant, termination of this Lease or the abatement of Rent. Tenant agrees to limit use of water and sewer to normal restroom use.

Notwithstanding anything to the contrary set forth herein, if (i) a stoppage of an Essential Service (as defined below) to the Premises shall occur and such stoppage is due solely to the gross negligence or willful misconduct of Landlord and not due in any part to any act or omission on the part of Tenant or any Tenant Party or any matter beyond Landlord's reasonable control (any such stoppage of an Essential Service being hereinafter referred to as a "**Service Interruption**"), and (ii) such Service Interruption continues for more than 5 consecutive business days after Landlord shall have received written notice thereof from Tenant, and (iii) as a result of such Service Interruption, the conduct of Tenant's normal operations in the Premises are materially and adversely affected, then there shall be an abatement of one day's Base Rent for each day during which such Service Interruption continues after such 5 business day period; provided, however, that if any part of the Premises is reasonably useable for Tenant's normal business operations or if Tenant conducts all or any part of its operations in any portion of the Premises notwithstanding such Service Interruption, then the amount of each daily abatement of Base Rent shall only be proportionate to the nature and extent of the interruption of Tenant's normal operations or ability to use the Premises. The rights granted to Tenant under this paragraph shall be Tenant's sole and exclusive remedy resulting from a failure of Landlord to provide services, and Landlord shall not otherwise be liable for any loss or damage suffered or sustained by Tenant resulting from any failure or cessation of services. For purposes hereof, the term "**Essential Services**" shall mean the following services: HVAC service, water, sewer and electricity, but in each case only to the extent that Landlord has an obligation to provide same to Tenant under this Lease. The provisions of this paragraph shall only apply as long as the original Tenant is the tenant occupying the Premises under this Lease and shall not apply to any assignee or sublessee.

12. **Alterations and Tenant's Property**. Any alterations, additions, or improvements made to the Premises by or on behalf of Tenant, including additional locks or bolts of any kind or nature upon any doors or windows in the Premises, but excluding installation, removal or realignment of furniture systems (other than removal of furniture systems owned or paid for by Landlord) not involving any modifications to the structure or connections (other than by ordinary plugs or jacks) to Building Systems (as defined in Section 13) ("**Alterations**") shall be subject to Landlord's prior written consent, which may be given or withheld in Landlord's sole discretion if any such Alteration affects the structure or Building Systems, but which shall otherwise not be unreasonably withheld or delayed. Tenant may construct cosmetic, nonstructural Alterations in the Premises without Landlord's prior approval if the aggregate cost of all such work in any 12 month period does not exceed $30,000 (a "**Notice-Only Alteration**"), provided Tenant notifies Landlord in writing of such intended Notice-Only Alteration, and such notice shall be accompanied by plans, specifications, work contracts and such other information concerning the nature and cost of the Notice-Only Alteration as may be reasonably requested by Landlord, which notice and accompanying materials shall be delivered to Landlord not less than 15 business days in advance of any proposed construction. If Landlord approves any Alterations, Landlord may impose such conditions on Tenant in connection with the commencement, performance and completion of such Alterations as Landlord may deem appropriate in Landlord's reasonable discretion. Any request for approval shall be in writing, delivered not less than 15 business days in advance of any proposed construction, and accompanied by plans, specifications, bid proposals, work contracts and such other information concerning the nature and cost of the alterations as may be reasonably requested by Landlord, including the identities and mailing addresses of all persons performing work or supplying materials. Landlord's right to review plans and specifications and to monitor construction shall be solely for its own benefit, and Landlord shall have no duty to ensure that such plans and specifications or construction comply with applicable Legal Requirements. Tenant shall cause, at its sole cost and expense, all Alterations to comply with insurance requirements and with Legal Requirements and shall implement at its sole cost and expense any alteration or modification required by Legal Requirements as a result of any Alterations. Tenant shall pay to Landlord, as Additional Rent, within 30 days of Landlord's written demand an amount equal to Landlord's reasonable out-of-pocket expenses incurred for third party plan review, coordination, scheduling and supervision incurred in connection with any Alteration. Before Tenant begins any Alteration, Landlord may post on and about the Premises notices of non-responsibility pursuant to applicable law. Tenant shall reimburse Landlord for, and indemnify and hold Landlord harmless from, any expense incurred by Landlord by reason of faulty work done by Tenant or its contractors, delays caused by such work, or inadequate cleanup.

Tenant shall furnish security or make other arrangements satisfactory to Landlord to assure payment for the completion of all Alterations work free and clear of liens, and shall provide (and cause each contractor or subcontractor to provide) certificates of insurance for workers' compensation and other coverage in amounts and from an insurance company satisfactory to Landlord protecting Landlord against liability for personal injury or property damage during construction. Upon completion of any Alterations, Tenant shall deliver to Landlord: (i) sworn statements setting forth the names of all contractors and subcontractors who did the work and final lien waivers from all such contractors and subcontractors; and (ii) "as built" plans for any such Alteration.

Other than (i) the items, if any, listed on **Exhibit F** attached hereto, (ii) any items agreed by Landlord in writing to be included on **Exhibit F** in the future, and (iii) any trade fixtures, machinery, equipment and other personal property not paid for by Landlord which may be removed without material damage to the Premises, which damage shall be repaired (including capping or terminating utility hook-ups behind walls) by Tenant during the Term (collectively, "**Tenant's Property**"), all property of any kind paid for by Landlord, all Alterations, real property fixtures, built-in machinery and equipment, built-in casework and cabinets and other similar additions and improvements built into the Premises so as to become an integral part of the Premises (collectively, "**Installations**") shall be and shall remain the property of Landlord during the Term and following the expiration or earlier termination of the Term, shall not be removed by Tenant at any time during the Term and shall remain upon and be surrendered with the Premises as a part thereof in accordance with Section 28 following the expiration or earlier termination of this Lease; provided, however, that Landlord shall, at the time its approval of such Installation is requested, or at the time it receives notice of a Notice-Only Alteration, notify Tenant if it has elected to cause Tenant to remove such Installation upon the expiration or earlier termination of this

Lease. If Landlord so elects, Tenant shall remove such Installation upon the expiration or earlier termination of this Lease and restore any damage caused by or occasioned as a result of such removal, including, when removing any of Tenant's Property which was plumbed, wired or otherwise connected to any of the Building Systems, capping off all such connections behind the walls of the Premises and repairing any holes. During any such restoration period beyond the expiration or earlier termination of the Term, Tenant shall pay Rent to Landlord as provided herein as if said space were otherwise occupied by Tenant.

13. **Landlord's Repairs**. Landlord, as an Operating Expense, shall maintain all of the structural, exterior, parking and other Common Areas of the Building and Property, including HVAC, plumbing, fire sprinklers, elevators and all other building systems serving the Premises and other portions of the Building ("**Building Systems**"), in good repair, reasonable wear and tear and uninsured losses and damages caused by Tenant, or by any of Tenant's agents, servants, employees, invitees and contractors (collectively, "**Tenant Parties**") excluded. Losses and damages caused by Tenant or any Tenant Party shall be repaired by Landlord, to the extent not covered by insurance, at Tenant's sole cost and expense. Landlord reserves the right to stop Building Systems services when necessary (i) by reason of accident or emergency, or (ii) for planned repairs, alterations or improvements, which are, in the judgment of Landlord, desirable or necessary to be made, until said repairs, alterations or improvements shall have been completed. Landlord shall have no responsibility or liability for failure to supply Building Systems services during any such period of interruption; provided, however, that Landlord shall, except in case of emergency, make a commercially reasonable effort to give Tenant 48 hours advance notice of any planned stoppage of Building Systems services for routine maintenance, repairs, alterations or improvements. Tenant shall promptly give Landlord written notice of any repair required by Landlord pursuant to this Section, after which Landlord shall have a reasonable opportunity to effect such repair within a reasonable time period. Landlord shall use reasonable efforts to minimize interference with Tenant's operations in the Premises during such planned stoppages of Building Systems. Landlord shall not be liable for any failure to make any repairs or to perform any maintenance unless such failure shall persist for an unreasonable time after Tenant's written notice of the need for such repairs or maintenance. Tenant waives its rights under any state or local law to terminate this Lease or to make such repairs at Landlord's expense and agrees that the parties' respective rights with respect to such matters shall be solely as set forth herein. Repairs required as the result of fire, earthquake, flood, vandalism, war, or similar cause of damage or destruction shall be controlled by Section 18.

14. **Tenant's Repairs**. Subject to Section 13 hereof, Tenant, at its expense, shall repair, replace and maintain in good condition all non-structural portions of the Premises, including, without limitation, entries, doors, ceilings, interior windows, interior walls, and the interior side of demising walls, reasonable wear and tear and damage by casualty excepted. Should Tenant fail to make any such repair or replacement or fail to maintain the Premises, Landlord shall give Tenant notice of such failure. If Tenant fails to commence cure of such failure within 30 days of Landlord's notice, and thereafter diligently prosecute such cure to completion, Landlord may perform such work and shall be reimbursed by Tenant within 10 days after demand therefor; provided, however, that if such failure by Tenant creates or could reasonably be expected to create an emergency, Landlord may immediately commence cure of such failure and shall thereafter be entitled to recover the costs of such cure from Tenant. Subject to Sections 17 and 18, Tenant shall bear the full uninsured cost of any repair or replacement to any part of the Project that results from damage caused by Tenant or any Tenant Party.

15. **Mechanic's Liens**. Tenant shall discharge, by bond or otherwise, any mechanic's lien filed against the Premises or against the Building, Property or Project for work claimed to have been done for, or materials claimed to have been furnished to, Tenant within 15 days after Tenant receives written notice of the filing thereof, at Tenant's sole cost and shall otherwise keep the Premises and the Building, Property and Project free from any liens arising out of work performed, materials furnished or obligations incurred by Tenant. Should Tenant fail to discharge any lien described herein, Landlord shall have the right, but not the obligation, to pay such claim or post a bond or otherwise provide security to eliminate the lien as a claim against title to the Building, Property or Project and the cost thereof shall be immediately due from Tenant as Additional Rent. If Tenant shall lease or finance the acquisition of office

equipment, furnishings, or other personal property of a removable nature utilized by Tenant in the operation of Tenant's business, Tenant warrants that any Uniform Commercial Code Financing Statement filed as a matter of public record by any lessor or creditor of Tenant will upon its face or by exhibit thereto indicate that such Financing Statement is applicable only to removable personal property of Tenant located within the Premises. In no event shall the address of the Building or Project be furnished on the statement without qualifying language as to applicability of the lien only to removable personal property, located in an identified suite held by Tenant.

16. **Indemnification**. Subject to the penultimate paragraph of Section 17, Tenant hereby indemnifies and agrees to defend, save and hold Landlord, its officers, directors, employees, managers, agents, sub-agents, constituent entities and lease signators (collectively, "**Landlord Indemnified Parties**") and Holders of Mortgages (each as defined in Section 27 below) as to which Tenant has been given notice harmless from and against any and all Claims for injury or death to persons or damage to property occurring within or about the Premises, arising directly or indirectly out use or occupancy of the Premises by Tenant or any Tenant Party (including, without limitation, any act, omission or neglect by Tenant or any Tenant Parties in or about the Premises) or a breach or default by Tenant in the performance of any of its obligations hereunder, except to the extent caused by the willful misconduct or negligence of Landlord Indemnified Parties. Landlord Indemnified Parties shall not be liable to Tenant for, and Tenant assumes all risk of damage to, personal property (including, without limitation, loss of records kept within the Premises). Tenant further hereby irrevocably waives any and all Claims for injury to Tenant's business or loss of income relating to any such damage or destruction of personal property (including, without limitation, any loss of records). Landlord Indemnified Parties shall not be liable for any damages arising from any act, omission or neglect of any tenant in the Project or of any other third party.

17. **Insurance**. Landlord shall maintain all risk property and, if applicable, sprinkler damage insurance covering the full replacement cost of the Building. Landlord shall further procure and maintain commercial general liability insurance with a single loss limit of not less than $2,000,000 for bodily injury and property damage with respect to the Project. Landlord may, but is not obligated to, maintain such other insurance and additional coverages as it may deem necessary, including, but not limited to, flood, environmental hazard and earthquake, loss or failure of building equipment, errors and omissions, rental loss during the period of repair or rebuilding, workers' compensation insurance and fidelity bonds for employees employed to perform services and insurance for any improvements installed by Tenant or which are in addition to the standard improvements customarily furnished by Landlord without regard to whether or not such are made a part of the Project. All such insurance shall be included as part of the Operating Expenses. The Building and Property may be included in a blanket policy (in which case the cost of such insurance allocable to the Building and Property will be determined by Landlord based upon the insurer's cost calculations).

Tenant, at its sole cost and expense, shall maintain during the Term: all risk property insurance with business interruption and extra expense coverage, covering the full replacement cost of all property and improvements installed or placed in the Premises by Tenant at Tenant's expense; workers' compensation insurance with no less than the minimum limits required by law; employer's liability insurance with such limits as required by law; and commercial general liability insurance, with a minimum limit of not less than $2,000,000 per occurrence for bodily injury and property damage with respect to the Premises. The commercial general liability insurance policy shall name Alexandria Real Estate Equities, Inc., and Landlord, its officers, directors, employees, managers, agents, sub-agents, constituent entities and lease signators (collectively, "**Landlord Insured Parties**"), as additional insureds; insure on an occurrence and not a claims-made basis; be issued by insurance companies which have a rating of not less than policyholder rating of A and financial category rating of at least Class X in "Best's Insurance Guide"; shall not be cancelable for nonpayment of premium unless 30 days prior written notice shall have been given to Landlord from the insurer; not contain a hostile fire exclusion; contain a contractual liability endorsement; and provide primary coverage to Landlord Insured Parties (any policy issued to Landlord Insured Parties providing duplicate or similar coverage shall be deemed excess over Tenant's policies, regardless of limits). Copies of such policies (if requested by Landlord), or certificates of insurance showing the limits of coverage required hereunder and showing Landlord as an additional insured, along

with reasonable evidence of the payment of premiums for the applicable period, shall be delivered to Landlord by Tenant upon commencement of the Term and upon each renewal of said insurance. Tenant's policy may be a "blanket policy" with an aggregate per location endorsement which specifically provides that the amount of insurance shall not be prejudiced by other losses covered by the policy. Tenant shall, at least 5 days prior to the expiration of such policies, furnish Landlord with renewal certificates.

In each instance where insurance is to name Landlord as an additional insured, Tenant shall upon written request of Landlord also designate and furnish certificates so evidencing Landlord as additional insured to: (i) any lender of Landlord holding a security interest in the Building, Property or Project or any portion thereof and any servicer in connection therewith, (ii) the landlord under any lease wherein Landlord is tenant of the real property on which the Building, Property or Project is located, if the interest of Landlord is or shall become that of a tenant under a ground or other underlying lease rather than that of a fee owner, and/or (iii) any management company retained by Landlord to manage the Project.

The property insurance obtained by Landlord and Tenant shall include a waiver of subrogation by the insurers and all rights based upon an assignment from its insured, against Landlord or Tenant, and their respective officers, directors, employees, managers, agents, invitees and contractors ("**Related Parties**"), in connection with any loss or damage thereby insured against. Neither party nor its respective Related Parties shall be liable to the other for loss or damage caused by any risk insured against under property insurance required to be maintained hereunder, and each party waives any claims against the other party, and its respective Related Parties, for such loss or damage. The failure of a party to insure its property shall not void this waiver. Landlord and its respective Related Parties shall not be liable for, and Tenant hereby waives all claims against such parties for, business interruption and losses occasioned thereby sustained by Tenant or any person claiming through Tenant resulting from any accident or occurrence in or upon the Premises, Building, Property or Project from any cause whatsoever. If the foregoing waivers shall contravene any law with respect to exculpatory agreements, the liability of Landlord or Tenant shall be deemed not released but shall be secondary to the other's insurer.

Landlord may require insurance policy limits to be raised to conform with requirements of Landlord's lender and/or to bring coverage limits to levels then being generally required of new tenants within the Project.

18. **Restoration**. If, at any time during the Term, the Building or the Premises are damaged or destroyed by a fire or other insured casualty, Landlord shall notify Tenant within 60 days after discovery of such damage as to the amount of time Landlord reasonably estimates it will take to restore the Building or the Premises, as applicable (the "**Restoration Period**"). If the Restoration Period is estimated to exceed 9 months (the "**Maximum Restoration Period**"), Landlord may, in such notice, elect to terminate this Lease as of the date that is 75 days after the date of discovery of such damage or destruction. Unless Landlord so elects to terminate this Lease, Landlord shall, subject to receipt of sufficient insurance proceeds (with any deductible to be treated as a current Operating Expense), promptly restore the Premises (excluding the improvements installed by Tenant or by Landlord and paid for by Tenant), subject to delays arising from the collection of insurance proceeds, or from Force Majeure events; provided, however, that if repair or restoration of the Premises is not substantially complete as of the end of the Maximum Restoration Period or, if longer, the Restoration Period, Landlord may, in its sole and absolute discretion, elect not to proceed with such repair and restoration, in which event Landlord shall be relieved of its obligation to make such repairs or restoration and this Lease shall terminate as of the date that is 75 days after the discovery of such damage or destruction.

Tenant, at its expense, shall promptly perform, subject to delays arising from the collection of insurance proceeds or from Force Majeure events, all repairs or restoration not required to be done by Landlord and shall promptly re-enter the Premises and commence doing business in accordance with this Lease. Notwithstanding the foregoing, Landlord may terminate this Lease if the Premises are damaged during the last 1 year of the Term and Landlord reasonably estimates that it will take more than 2 months

to repair such damage, or if insurance proceeds are not available for such restoration. Rent shall be abated from the date of discovery of the damage or destruction until the Premises are repaired and restored, in the proportion which the area of the Premises, if any, which is not usable by Tenant bears to the total area of the Premises, unless Landlord provides Tenant with other space during the period of repair that is suitable for the temporary conduct of Tenant's business. Such abatement shall be the sole remedy of Tenant, and except as provided in this Section 18, Tenant waives any right to terminate the Lease by reason of damage or casualty loss.

The provisions of this Lease, including this Section 18, constitute an express agreement between Landlord and Tenant with respect to any and all damage to, or destruction of, all or any part of the Premises, or any other portion of the Building, Property or Project, and any statute or regulation which is now or may hereafter be in effect shall have no application to this Lease or any damage or destruction to all or any part of the Premises or any other portion of the Building, Property or Project, the parties hereto expressly agreeing that this Section 18 sets forth their entire understanding and agreement with respect to such matters.

19. **Condemnation**. If the whole or any material part of the Premises, Building or Property is taken for any public or quasi-public use under governmental law, ordinance, or regulation, or by right of eminent domain, or by private purchase in lieu thereof (a "**Taking**" or "**Taken**"), and the Taking would in Landlord's reasonable judgment either prevent or materially interfere with Tenant's use of the Premises or materially interfere with or impair Landlord's ownership or operation of the Building or Property, then upon written notice by Landlord this Lease shall terminate and Rent shall be apportioned as of said date. If part of the Premises shall be Taken, and this Lease is not terminated as provided above, Landlord shall promptly restore the Premises and the Building and Property as nearly as is commercially reasonable under the circumstances to their condition prior to such partial Taking and the rentable square footage of the Building, the rentable square footage of the Premises, Tenant's Share of Operating Expenses, the Building's Share of Project and the Rent payable hereunder during the unexpired Term shall be reduced to such extent as may be fair and reasonable under the circumstances. Upon any such Taking, Landlord shall be entitled to receive the entire price or award from any such Taking without any payment to Tenant, and Tenant hereby assigns to Landlord Tenant's interest, if any, in such award. Tenant shall have the right, to the extent that same shall not diminish Landlord's award, to make a separate claim against the condemning authority (but not Landlord) for such compensation as may be separately awarded or recoverable by Tenant for moving expenses and damage to Tenant's trade fixtures, if a separate award for such items is made to Tenant. Tenant hereby waives any and all rights it might otherwise have pursuant to any provision of state law to terminate this Lease upon a partial Taking of the Premises, Building, Property or Project.

20. **Events of Default**. Each of the following events shall be a substantial default ("**Default**") by Tenant under this Lease:

(a) **Payment Defaults**. Tenant shall fail to pay any installment of Rent or any other payment hereunder when due; provided, however, that Landlord will give Tenant notice and an opportunity to cure any failure to pay Rent within 5 days of any such notice not more than twice in any 12 month period and Tenant agrees that such notice shall be in lieu of and not in addition to, or shall be deemed to be, any notice required by law.

(b) **Insurance**. Any insurance required to be maintained by Tenant pursuant to this Lease shall be canceled or terminated or shall expire or shall be reduced or materially changed, or Landlord shall receive a notice of nonrenewal of any such insurance and Tenant shall fail to obtain replacement insurance at least 20 days before the expiration of the current coverage.

(c) **Abandonment**. Tenant shall abandon the Premises. Tenant shall not be deemed to have abandoned the Premises if (i) Tenant provides Landlord with reasonable advance notice prior to vacating, (ii) Tenant has made reasonable arrangements with Landlord for the security of the Premises for the balance of the Term, and (iii) Tenant continues during the balance of the Term to satisfy all of its obligations under the Lease as they come due.

(d) **Improper Transfer**. Tenant shall assign, sublease or otherwise transfer all or any portion of Tenant's interest in this Lease or the Premises in violation of the provisions of this Lease, or Tenant's interest in this Lease shall be attached, executed upon, or otherwise judicially seized and such action is not released within 90 days of the action.

(e) **Liens**. Tenant shall fail to discharge or otherwise obtain the release of any lien placed upon the Premises in violation of this Lease within 15 days after Tenant receives written notice that any such lien is filed against the Premises.

(f) **Insolvency Events**. Tenant or any guarantor or surety of Tenant's obligations hereunder shall: (A) make a general assignment for the benefit of creditors; (B) commence any case, proceeding or other action seeking to have an order for relief entered on its behalf as a debtor or to adjudicate it a bankrupt or insolvent, or seeking reorganization, arrangement, adjustment, liquidation, dissolution or composition of it or its debts or seeking appointment of a receiver, trustee, custodian or other similar official for it or for all or of any substantial part of its property (collectively a "**Proceeding for Relief**"); (C) become the subject of any Proceeding for Relief which is not dismissed within 90 days of its filing or entry; or (D) die or suffer a legal disability (if Tenant, guarantor, or surety is an individual) or be dissolved or otherwise fail to maintain its legal existence (if Tenant, guarantor or surety is a corporation, partnership or other entity).

(g) **Estoppel Certificate or Subordination Agreement**. Tenant fails to execute any document required from Tenant under Sections 23 or 27 within 5 days after a second notice requesting such document.

(h) **Other Defaults**. Tenant shall fail to comply with any provision of this Lease other than those specifically referred to in this Section 20, and, except as otherwise expressly provided herein, such failure shall continue for a period of 30 days after written notice thereof from Landlord to Tenant.

Any notice given under Section 20(h) hereof shall: (i) specify the alleged default, (ii) demand that Tenant cure such default, (iii) be in lieu of, and not in addition to, or shall be deemed to be, any notice required under any provision of applicable law, and (iv) not be deemed a forfeiture or a termination of this Lease unless Landlord elects otherwise in such notice; provided that if the nature of Tenant's default pursuant to Section 20(h) is such that it cannot be cured by the payment of money and reasonably requires more than 30 days to cure, then Tenant shall not be deemed to be in default if Tenant commences such cure within said 30 day period and thereafter diligently prosecutes the same to completion; provided, however, that such cure shall be completed no later than 60 days from the date of Landlord's notice.

21. **Landlord's Remedies**.

(a) **Payment By Landlord; Interest**. Upon a Default by Tenant hereunder, Landlord may, without waiving or releasing any obligation of Tenant hereunder, make such payment or perform such act to the extent necessary to cure the Default. All sums so paid or incurred by Landlord, together with interest thereon, from the date such sums were paid or incurred, at the annual rate equal to 12% per annum or the highest rate permitted by law (the "Default Rate"), whichever is less, shall be payable to Landlord on demand as additional Rent. Nothing herein shall be construed to create or impose a duty on Landlord to mitigate any damages resulting from Tenant's Default hereunder.

(b) **Late Payment Rent**. Late payment by Tenant to Landlord of Rent and other sums due will cause Landlord to incur costs not contemplated by this Lease, the exact amount of which will be extremely difficult and impracticable to ascertain. Such costs include, but are not limited to, processing and accounting charges and late charges which may be imposed on Landlord under any

Mortgage covering the Premises. Therefore, if any installment of Rent due from Tenant is not received by Landlord within 5 days after the date such payment is due, Tenant shall pay to Landlord an additional sum of 6% of the overdue Rent as a late charge. Notwithstanding the foregoing, before assessing a late charge the first time in any calendar year, Landlord shall provide Tenant written notice of the delinquency and will waive the right if Tenant pays such delinquency within 5 days thereafter. The parties agree that this late charge represents a fair and reasonable estimate of the costs Landlord will incur by reason of late payment by Tenant. In addition to the late charge, Rent not paid when due shall bear interest at the Default Rate from the 5th day after the date due until paid.

(c) **Remedies**. Upon the occurrence of a Default, Landlord, at its option, without further notice or demand to Tenant, shall have in addition to all other rights and remedies provided in this Lease, at law or in equity, the option to pursue any one or more of the following remedies, each and all of which shall be cumulative and nonexclusive, without any notice or demand whatsoever (except as otherwise expressly provided in Section 21(c)(v) with respect to Landlord's Lump Sum Election). No cure in whole or in part of such Default by Tenant after Landlord has taken any action beyond giving Tenant notice of such Default to pursue any remedy provided for herein (including retaining counsel to file an action or otherwise pursue any remedies) shall in any way affect Landlord's right to pursue such remedy or any other remedy provided Landlord herein or under law or in equity, unless Landlord, in its sole discretion, elects to waive such Default.

(i) This Lease and the Term and estate hereby granted are subject to the limitation that whenever a Default shall have happened and be continuing, Landlord shall have the right, at its election, then or thereafter while any such Default shall continue and notwithstanding the fact that Landlord may have some other remedy hereunder or at law or in equity, to give Tenant written notice of Landlord's intention to terminate this Lease on a date specified in such notice, which date shall be not less than 5 days after the giving of such notice, and upon the date so specified, this Lease and the estate hereby granted shall expire and terminate with the same force and effect as if the date specified in such notice were the date hereinbefore fixed for the expiration of this Lease, and all rights of Tenant hereunder shall expire and terminate, and Tenant shall be liable as hereinafter in this Section 21(c) provided. If any such notice is given, Landlord shall have, on such date so specified, the right of re-entry and possession of the Premises and the right to remove all persons and property therefrom and to store such property in a warehouse or elsewhere at the risk and expense, and for the account, of Tenant. Should Landlord elect to re-enter as herein provided or should Landlord take possession pursuant to legal proceedings or pursuant to any notice provided for by law, Landlord may, subject to Section 21(c)(ii) from time to time re-let the Premises or any part thereof for such term or terms and at such rental or rentals and upon such terms and conditions as Landlord may deem advisable, with the right to make commercially reasonable alterations in and repairs to the Premises.

(ii) Landlord shall be deemed to have satisfied any obligation to mitigate its damages by hiring an experienced commercial real estate broker to market the Premises and directing such broker to advertise and show the Premises to prospective tenants.

(iii) In the event of any termination of this Lease as in this Section 21 provided or as required or permitted by law or in equity, Tenant shall forthwith quit and surrender the Premises to Landlord, and Landlord may, without further notice, enter upon, re-enter, possess and repossess the same by summary proceedings, ejectment or otherwise, and again have, repossess and enjoy the same free of any rights of Tenant, and in any such event Tenant and no person claiming through or under Tenant by virtue of any law or an order of any court shall be entitled to possession or to remain in possession of the Premises.

(iv) If this Lease is terminated or if Landlord shall re-enter the Premises as aforesaid, or in the event of the termination of this Lease, or of re-entry, by or under any proceeding or action or any provision of law by reason of a Default by Tenant, Tenant covenants and agrees forthwith to pay and be liable for, on the days originally fixed in this Lease for the payment

thereof, amounts equal to the installments of Base Rent and all Additional Rent as they would, under the terms of this Lease become due if this Lease had not been terminated or if Landlord had not entered or re-entered, as aforesaid, and whether the Premises be relet or remain vacant, in whole or in part, or for a period less than the remainder of the Term, or for the whole thereof, but in the event that the Premises be relet by Landlord, Tenant shall be entitled to a credit in the net amount of rent and other charges received by Landlord in reletting, after deduction of all of Landlord's expenses incurred in reletting the Premises (including, without limitation, tenant improvement, demising and remodeling costs, brokerage fees and the like), and in collecting the rent in connection therewith, in the following manner: Amounts received by Landlord after reletting, if any, shall first be applied against such Landlord's expenses, until the same are recovered, and until such recovery, Tenant shall pay, as of each day when a payment would fall due under this Lease, the amount which Tenant is obligated to pay under the terms of this Lease (Tenant's liability prior to any such reletting and such recovery by Landlord no in any way to be diminished as a result of the fact that such reletting might be for a rent higher than the rent provided for in this Lease); when and if such expenses have been completely recovered by Landlord, the amounts received from reletting by Landlord as have not previously been applied shall be credited against Tenant's obligations as of each day when a payment would fall due under this Lease, and only the net amount thereof shall be payable by Tenant. Further, Tenant shall not be entitled to any credit of any kind for any period after the date when the Term of this Lease is scheduled to expire according to its terms.

Actions, proceedings or suits for the recovery of damages, whether liquidated or other damages, under this Lease, or any installments thereof, may be brought by Landlord from time to time at its election, and nothing contained herein shall be deemed to require Landlord to postpone suit until the date when the Term of this Lease would have expired if it had not been terminated hereunder.

(v) In addition, Landlord, at its election, notwithstanding any other provision of this Lease, by written notice to Tenant (the "**Lump Sum Election**"), shall be entitled to recover from Tenant, as and for liquidated damages, at any time following any termination of this Lease, a lump sum payment representing, at the time of Landlord's written notice of its Lump Sum Election, the sum of:

(A) the then present value (calculated in accordance with accepted financial practice using as the discount rate the yield to maturity on United States Treasury Notes as set forth below) of the amount of unpaid Base Rent and Additional Rent that would have been payable pursuant to this Lease for the remainder of the Term following Landlord's Lump Sum Election if this Lease had not been terminated, and

(B) all other damages and expenses (including reasonable attorneys' fees and expenses), if any, which Landlord shall have sustained by reason of the breach of any provision of this Lease; less

(C) the then present value (calculated in accordance with accepted financial practice using as the discount rate the yield to maturity on United States Treasury Notes as set forth below) of the aggregate net fair market rent plus additional charges payable for the Premises (if less than the then present value of Base Rent and Additional Rent that would have been payable pursuant to this Lease) for the remainder of the Term following Landlord's Lump Sum Election, calculated as of the date of Landlord's Lump Sum Election, and taking into account reasonable estimates of the future costs to relet any then vacant portions of the Premises (except to the extent that Tenant has actually paid such costs pursuant to this Section 21) in order to calculate the net rental revenue that Landlord may expect to obtain for the Premises for the balance of the Term.

Landlord's recovery under its Lump Sum Election shall be in addition to Tenant's obligations to pay Base Rent and Additional Rent due and costs incurred prior to the date of Landlord's Lump Sum Election, and in lieu of any Base Rent and Additional Rent which would otherwise have been due under this Section from and after the date of Landlord's Lump Sum Election. The yield to maturity on United States Treasury Notes having a maturity date that is nearest the date that would have been the last day of the Term of the Lease, as reported in the Wall Street Journal or a comparable publication if it ceases to publish such yields, shall be used in calculating present values for purposes of Landlord's Lump Sum Election. For the purposes of this Section, if Landlord makes the Lump Sum Election to recover liquidated damages in accordance with this Section, the total Additional Rent shall be computed based upon Landlord's reasonable estimate of Tenant's Share of Operating Expenses and other Additional Rent for each 12-month period in what would have been the remainder of the Term of the Lease and any part thereof at the end of such remainder of the Term, but in no event less than the amounts therefor payable for the twelve (12) calendar months (or if less than twelve (12) calendar months have elapsed since the date hereof, the partial year) immediately preceding the date of Landlord's Lump Sum Election. Amounts of Tenant's Share of Operating Expenses and any other Additional Rent for any partial year at the beginning of the Term or at the end of what would have been the remainder of the Term shall be prorated.

(vi) Nothing herein contained shall limit or prejudice the right of Landlord, in any bankruptcy or insolvency proceeding, to prove for and obtain as liquidated damages by reason of such termination an amount equal to the maximum allowed by any bankruptcy or insolvency proceedings, or to prove for and obtain as liquidated damages by reason of such termination, an amount equal to the maximum allowed by any statute or rule of law, but in each case not more than the amount to which Landlord would otherwise be entitled under this Section 21.

(vii) Nothing in this Section 21 shall be deemed to affect the right of either party to indemnifications pursuant to this Lease.

(viii) If Landlord terminates this Lease upon the occurrence of a Default, Tenant will quit and surrender the Premises to Landlord or its agents, and Landlord may, without further notice, enter upon, re-enter and repossess the Premises by summary proceedings, ejectment or otherwise. The words "enter", "re-enter", and "re-entry" are not restricted to their technical legal meanings.

(ix) If either party shall be in default in the observance or performance of any provision of this Lease, and an action shall be brought for the enforcement thereof, the non-prevailing party shall pay to the prevailing party all fees, costs and other expenses which may become payable as a result thereof or in connection therewith, including reasonable attorneys' fees and expenses.

(x) If default by Tenant shall occur in the keeping, observance or performance of any covenant, agreement, term, provision or condition herein contained, Landlord, without thereby waiving such default, may perform the same for the account and at the expense of Tenant (a) immediately or at any time thereafter and with only such notice, if any, as may be practicable under the circumstances in the case of an emergency or in case such default will result in a violation of any legal or insurance requirements, or in the imposition of any lien against all or any portion of the Premises or the Project (but only after Tenant has failed to respond to such lien as permitted by Section 15 within the time period provided in Section 15) not discharged, released or bonded over to Landlord's satisfaction by Tenant within the time period required pursuant to Section 15 of this Lease, and (b) in any other case if such default continues after any applicable notice and cure period provided in Section 20. All reasonable costs and expenses incurred by Landlord in connection with any such performance by it for the account of Tenant and also all reasonable costs and expenses, including attorneys' fees and disbursements incurred by Landlord in any action or proceeding (including any summary dispossess proceeding) brought by Landlord to enforce any obligation of Tenant under this Lease and/or right of Landlord in or to the Premises, shall be paid by Tenant to Landlord within 10 days after demand.

(xi) Independent of the exercise of any other remedy of Landlord hereunder or under applicable law, Landlord may conduct an environmental test of the Premises as generally described in Section 30(c).

(xii) In the event that Tenant is in breach or Default under this Lease, whether or not Landlord exercises its right to terminate or any other remedy, Tenant shall reimburse Landlord within 10 days after written demand for any out of pocket costs and expenses that Landlord may incur in connection with any such breach or Default, as provided in this Section 21(c). Such costs shall include reasonable legal fees and costs incurred for the negotiation of a settlement, enforcement of rights or otherwise. Tenant shall also indemnify Landlord against and hold Landlord harmless from all costs, expenses, demands and liability, including without limitation, reasonable legal fees and costs Landlord shall incur if Landlord shall become or be made a party to any claim or action instituted by Tenant against any third party, by any third party against Tenant or by or against any person holding any interest under or using the Premises by license of or agreement with Tenant.

(xiii) Except as otherwise provided in this Section 21, no right or remedy herein conferred upon or reserved to Landlord is intended to be exclusive of any other right or remedy, and every right and remedy shall be cumulative and in addition to any other legal or equitable right or remedy given hereunder, or now or hereafter existing. No waiver by Landlord of any provision of this Lease shall be deemed to have been made unless expressly so made in writing by Landlord expressly waiving such provision. Landlord shall be entitled, to the extent permitted by law, to seek injunctive relief in case of the violation, or attempted or threatened violation, of any provision of this Lease, or to seek a decree compelling observance or performance of any provision of this Lease, or to seek any other legal or equitable remedy. Notwithstanding any contrary provision of this Lease, Tenant shall not be liable to Landlord for any indirect, special or consequential damages, arising from a default by Tenant under this Lease; provided that this sentence shall not apply to Landlord's damages (x) as expressly provided for in Section 8, and/or (y) in connection with Tenant's obligations as more fully set forth in Section 30.

22. **Assignment and Subletting**.

(a) **General Prohibition**. Without Landlord's prior written consent subject to and on the conditions described in this Section 22, Tenant shall not, directly or indirectly, voluntarily or by operation of law, assign this Lease or sublease the Premises or any part thereof or mortgage, pledge, or hypothecate its leasehold interest or grant any concession or license within the Premises, and any attempt to do any of the foregoing shall be void and of no effect. If Tenant is a corporation, partnership or limited liability company, the shares or other ownership interests thereof which are not actively traded upon a stock exchange or in the over-the-counter market, a transfer or series of transfers whereby 50% or more of the issued and outstanding shares or other ownership interests of such corporation are, or voting control is, transferred (but excepting transfers upon deaths of individual owners) from a person or persons or entity or entities which were owners thereof at time of execution of this Lease to persons or entities who were not owners of shares or other ownership interests of the corporation, partnership or limited liability company at time of execution of this Lease, shall be deemed an assignment of this Lease requiring the consent of Landlord as provided in this Section 22. Notwithstanding the foregoing, Tenant shall have the right to obtain financing from institutional investors (including venture capital funding and corporate partners) or undergo a public offering which results in a change in control of Tenant without such change of control constituting an assignment under this Section 22 requiring Landlord consent, provided that (i) Tenant notifies Landlord in writing of the financing at least 5 business days prior to the closing of the financing, and (ii) provided that in no event shall such financing result in a change in use of the Premises from the use contemplated by Tenant at the commencement of the Term.

(b) **Permitted Transfers**.

(i) **Permitted Transfers Generally**. If Tenant desires to assign, sublease, hypothecate or otherwise transfer this Lease or sublet the Premises, other than pursuant to a Permitted Assignment (as defined below), then at least 15 business days, but not more than 45 business days, before the date Tenant desires the assignment or sublease to be effective (the "**Assignment Date**"), Tenant shall give Landlord a notice (the "**Assignment Notice**") containing such information about the proposed assignee or sublessee, including the proposed use of the Premises and any Hazardous Materials proposed to be used, stored handled, treated, generated in or released or disposed of from the Premises, the Assignment Date, any relationship between Tenant and the proposed assignee or sublessee, and all material terms and conditions of the proposed assignment or sublease, including a copy of any proposed assignment or sublease in its final form, and such other information as Landlord may deem reasonably necessary or appropriate to its consideration whether to grant its consent. Landlord may, by giving written notice to Tenant within 15 business days after receipt of the Assignment Notice: (i) grant such consent, (ii) refuse such consent, in its sole and absolute discretion, if the proposed assignment, hypothecation or other transfer or subletting concerns more than (together with all other then effective subleases) 50% of the Premises, (iii) with respect to any assignment or sublease that would result in more than 50% of the Premises being subleased for substantially the remainder of the Base Term, refuse such consent, in its reasonable discretion, if the proposed subletting concerns (together with all other then-effective subleases) 50% or less of the Premises (provided that Landlord shall further have the right to review and approve or disapprove the proposed form of sublease prior to the effective date of any such subletting), or (iv) terminate this Lease with respect to the space described in the Assignment Notice as of the Assignment Date (an "**Assignment Termination**"). If Landlord delivers notice of its election to exercise an Assignment Termination, Tenant shall have the right to withdraw such Assignment Notice by written notice to Landlord of such election within 5 business days after Landlord's notice electing to exercise the Assignment Termination. If Tenant withdraws such Assignment Notice, this Lease shall continue in full force and effect. If Tenant does not withdraw such Assignment Notice, this Lease, and the term and estate herein granted, shall terminate as of the Assignment Date with respect to the space described in such Assignment Notice. No failure of Landlord to exercise any such option to terminate this Lease, or to deliver a timely notice in response to the Assignment Notice, shall be deemed to be Landlord's consent to the proposed assignment, sublease or other transfer. Tenant shall pay to Landlord a fee equal to Three Thousand Dollars ($3,000) in connection with its consideration of any Assignment Notice and/or its preparation or review of any consent documents. In any event, Landlord shall further have the right to review and approve or disapprove the proposed form of sublease prior to the effective date of any such subletting.

(ii) **Affiliate Transactions**. Notwithstanding the foregoing, Landlord's consent to a sublease to any entity controlling, controlled by or under common control with Tenant (each, an "**Affiliate**" and collectively "Affiliates") shall not be required, provided that Landlord shall have the right to approve the form of any such sublease, such approval not to be unreasonably withheld, conditioned or delayed. In addition, Tenant shall have the right to assign this Lease, upon 10 days' prior written notice to Landlord but without obtaining Landlord's prior written consent, to an Affiliate or to a corporation or other entity which is a successor in interest to Tenant, by way of merger, consolidation or corporate reorganization, or by the purchase of all or substantially all of the assets or the ownership interests of Tenant provided that: (A) in the case of an assignment to a successor in interest, such merger, consolidation, reorganization or purchase, as the case may be, is for a good business purpose and not principally for the purpose of transferring the Lease; and (B) in all events the net worth (as determined in accordance with generally accepted accounting principles ("**GAAP**")) of the Affiliate assignee or successor in interest to Tenant is not less than the net worth (as determined in accordance with GAAP) of Tenant as of the date of Tenant's most current quarterly or annual financial statements as delivered under Section 40(c) or filed with the Securities and Exchange Commission; and (C) such Affiliate assignee or successor-in-interest to Tenant shall agree in writing to assume all of the terms, covenants and conditions of this Lease (an assignment of this Lease to an Affiliate assignee or a successor-in-interest in accordance with this paragraph is referred to herein as a "**Permitted Assignment**").

(c) **Additional Conditions**. As a condition to any such assignment or subletting, whether or not Landlord's consent is required, Landlord may require:

(i) that any assignee or subtenant agree, in writing at the time of such assignment or subletting, that if Landlord gives such party notice that Tenant is in default under this Lease, such party shall thereafter make all payments otherwise due Tenant directly to Landlord, which payments will be received by Landlord without any liability except to credit such payment against those due under the Lease, and any such third party shall agree to attorn to Landlord or its successors and assigns should this Lease be terminated for any reason; provided, however, in no event shall Landlord or its successors or assigns be obligated to accept such attornment; and

(ii) A list of Hazardous Materials, certified by the proposed assignee or sublessee to be true and correct, which the proposed assignee or sublessee intends to use, store, handle, treat, generate in or release or dispose of from the Premises, together with copies of all documents relating to such use, storage, handling, treatment, generation, release or disposal of Hazardous Materials by the proposed assignee or subtenant in the Premises or on the Project, prior to the proposed assignment or subletting, including, without limitation: permits; approvals; reports and correspondence; storage and management plans; plans relating to the installation of any storage tanks to be installed in or under the Project (provided, said installation of tanks shall only be permitted after Landlord has given its written consent to do so, which consent may be withheld in Landlord's sole and absolute discretion); and all closure plans or any other documents required by any and all federal, state and local Governmental Authorities for any storage tanks installed in, on or under the Project for the closure of any such tanks. Neither Tenant nor any such proposed assignee or subtenant is required, however, to provide Landlord with any portion(s) of the such documents containing information of a proprietary nature which, in and of themselves, do not contain a reference to any Hazardous Materials or hazardous activities.

(d) **No Release of Tenant, Sharing of Excess Rents**. Notwithstanding any assignment or subletting, Tenant and any guarantor or surety of Tenant's obligations under this Lease shall at all times remain fully and primarily responsible and liable for the payment of Rent and for compliance with all of Tenant's other obligations under this Lease. Except in connection with a Permitted Assignment, if the Rent due and payable by a sublessee or assignee (or a combination of the rental payable under such sublease or assignment plus any bonus or other consideration therefor or incident thereto in any form) exceeds the sum of the rental payable under this Lease (excluding however, any Rent payable under this Section) and actual and reasonable brokerage fees, legal costs and any design or construction fees directly related to and required pursuant to the terms of any such sublease (such excess, the "**Excess Rent**"), then Tenant shall be bound and obligated to pay Landlord as Additional Rent hereunder 50% of such Excess Rent within 10 days following receipt thereof by Tenant. If Tenant shall sublet the Premises or any part thereof, Tenant hereby immediately and irrevocably assigns to Landlord, as security for Tenant's obligations under this Lease, all rent from any such subletting, and Landlord as assignee and as attorney-in-fact for Tenant, or a receiver for Tenant appointed on Landlord's application, may collect such rent and apply it toward Tenant's obligations under this Lease; except that, until the occurrence of a Default, Tenant shall have the right to collect such rent.

(e) **No Waiver**. The consent by Landlord to an assignment or subletting shall not relieve Tenant or any assignees of this Lease or any sublessees of the Premises from obtaining the consent of Landlord to any further assignment or subletting nor shall it release Tenant or any assignee or sublessee of Tenant from full and primary liability under the Lease. The acceptance of Rent hereunder, or the acceptance of performance of any other term, covenant, or condition thereof, from any other person or entity shall not be deemed to be a waiver of any of the provisions of this Lease or a consent to any subletting, assignment or other transfer of the Premises.

23. **Estoppel Certificate**. Tenant shall, within 10 business days of written notice from Landlord, execute, acknowledge and deliver a statement in writing in any form reasonably requested by a proposed lender or purchaser, (i) certifying that this Lease is unmodified and in full force and effect (or, if modified, stating the nature of such modification and certifying that this Lease as so modified is in full force and effect) and the dates to which the rental and other charges are paid in advance, if any, (ii) acknowledging that to the best of Tenant's knowledge there are not any uncured defaults on the part of Landlord hereunder, or specifying such defaults if any are claimed, and (iii) setting forth such further information with respect to the status of this Lease or the Premises as may be reasonably requested thereon. Any such statement may be relied upon by any prospective purchaser or encumbrancer of all or any portion of the real property of which the Premises are a part. Tenant's failure to deliver such statement within such time shall, at the option of Landlord, be conclusive upon Tenant that the Lease is in full force and effect and without modification except as may be represented by Landlord in any certificate prepared by Landlord and delivered to Tenant for execution.

24. **Quiet Enjoyment**. So long as Tenant shall perform all of the covenants and agreements herein required to be performed by Tenant, Tenant shall, subject to the terms of this Lease, at all times during the Term, have peaceful and quiet enjoyment of the Premises against any person claiming by, through or under Landlord.

25. **Prorations**. All prorations required or permitted to be made hereunder shall be made on the basis of a 360 day year and 30 day months.

26. **Rules and Regulations**. Tenant shall, at all times during the Term and any extension thereof, comply with all reasonable rules and regulations at any time or from time to time established by Landlord covering use of the Premises and the Project or portion thereof of which the Premises are a part. The current rules and regulations are attached hereto as **Exhibit E**. If there is any conflict between said rules and regulations and other provisions of this Lease, the terms and provisions of this Lease shall control. Landlord shall not have any liability or obligation for the breach of any rules or regulations by other tenants in the Project and shall not enforce such rules and regulations in a discriminatory manner.

27. **Subordination**. This Lease and Tenant's interest and rights hereunder are hereby made and shall be subject and subordinate at all times to the lien of any Mortgage now existing or hereafter created on or against the Project, Property, Building or Premises, and all amendments, restatements, renewals, modifications, consolidations, refinancing, assignments and extensions thereof, without the necessity of any further instrument or act on the part of Tenant; provided, however that so long as there is no Default hereunder, Tenant's right to possession of the Premises shall not be disturbed by the Holder of any such Mortgage. Tenant agrees, at the election of the Holder of any such Mortgage, to attorn to any such Holder. Tenant agrees upon demand to execute, acknowledge and deliver such instruments, confirming such subordination, and such instruments of attornment as shall be requested by any such Holder, provided any such instruments contain appropriate non-disturbance provisions assuring Tenant's quiet enjoyment of the Premises as set forth in Section 24 hereof. Notwithstanding the foregoing, any such Holder may at any time subordinate its Mortgage to this Lease, without Tenant's consent, by notice in writing to Tenant, and thereupon this Lease shall be deemed prior to such Mortgage without regard to their respective dates of execution, delivery or recording and in that event such Holder shall have the same rights with respect to this Lease as though this Lease had been executed prior to the execution, delivery and recording of such Mortgage and had been assigned to such Holder. The term "**Mortgage**" whenever used in this Lease shall be deemed to include deeds of trust, security assignments, ground leases or other superior leases and any other encumbrances, and any reference to the "**Holder**" of a Mortgage shall be deemed to include the beneficiary under a deed of trust.

28. **Surrender**. Upon the expiration of the Term or earlier termination of Tenant's right of possession, Tenant shall surrender the Premises to Landlord in the same condition as received, subject to any Alterations or Installations permitted by Landlord to remain in the Premises, free of Hazardous Materials brought upon, kept, used, stored, handled, treated, generated in, or released or disposed of from, the Premises by any person other than a Landlord Party, broom clean, ordinary wear and tear and casualty loss and condemnation covered by Sections 18 and 19 excepted.

Tenant shall immediately return to Landlord all keys and/or access cards to parking, the Building, restrooms or all or any portion of the Premises, Building or Project furnished to or otherwise procured by Tenant. If any such access card or key is lost, Tenant shall pay to Landlord, at Landlord's election, either the cost of replacing such lost access card or key or the cost of reprogramming the access security system in which such access card was used or changing the lock or locks opened by such lost key. Any Tenant's Property, Alterations and property not so removed by Tenant as permitted or required herein shall be deemed abandoned and may be stored, removed, and disposed of by Landlord at Tenant's expense, and Tenant waives all claims against Landlord for any damages resulting from Landlord's retention and/or disposition of such property. All obligations of Tenant hereunder not fully performed as of the termination of the Term, including the obligations of Tenant under Section 30 hereof, shall survive the expiration or earlier termination of the Term, including, without limitation, indemnity obligations, payment obligations with respect to Rent and obligations concerning the condition and repair of the Premises.

29. **Waiver of Jury Trial**. TENANT AND LANDLORD WAIVE ANY RIGHT TO TRIAL BY JURY OR TO HAVE A JURY PARTICIPATE IN RESOLVING ANY DISPUTE, WHETHER SOUNDING IN CONTRACT, TORT, OR OTHERWISE, BETWEEN LANDLORD AND TENANT ARISING OUT OF THIS LEASE OR ANY OTHER INSTRUMENT, DOCUMENT, OR AGREEMENT EXECUTED OR DELIVERED IN CONNECTION HEREWITH OR THE TRANSACTIONS RELATED HERETO.

30. **Environmental Requirements**.

(a) **Prohibition/Compliance**. Except for Hazardous Material contained in products customarily used by tenants in de minimis quantities for ordinary cleaning and office purposes, Tenant shall not permit or cause any party to bring any Hazardous Material upon the Premises, Building, Property or Project or use, store, handle, treat, generate, manufacture, transport, release or dispose of any Hazardous Material in, on or from the Premises or the Project without Landlord's prior written consent which may be withheld in Landlord's sole discretion. Tenant, at its sole cost and expense, shall operate its business in the Premises in strict compliance with all Environmental Requirements and shall remove or remediate in a manner satisfactory to Landlord any Hazardous Materials released on or from the Premises, Building, Property or Project by Tenant or any Tenant Party. Tenant shall complete and certify disclosure statements as requested by Landlord from time to time relating to Tenant's use, storage, handling, treatment, generation, manufacture, transportation, release or disposal of Hazardous Materials on or from the Premises. The term "**Environmental Requirements**" means all applicable present and future statutes, regulations, ordinances, rules, codes, judgments, orders or other similar enactments of any Governmental Authority regulating or relating to health, safety, or environmental conditions on, under, or about the Premises, Building, Property or Project, or the environment, including without limitation, the following: the Comprehensive Environmental Response, Compensation and Liability Act; the Resource Conservation and Recovery Act; and all state and local counterparts thereto, and any regulations or policies promulgated or issued thereunder. The term "**Hazardous Materials**" means and includes any substance, material, waste, pollutant, or contaminant listed or defined as hazardous or toxic, or regulated by reason of its impact or potential impact on humans, animals and/or the environment under any Environmental Requirements, asbestos and petroleum, including crude oil or any fraction thereof, natural gas liquids, liquefied natural gas, or synthetic gas usable for fuel (or mixtures of natural gas and such synthetic gas). As defined in Environmental Requirements, Tenant is and shall be deemed to be the "**operator**" of Tenant's "**facility**" and the "**owner**" of all Hazardous Materials brought on the Premises by Tenant or any Tenant Party, and the wastes, by-products, or residues generated, resulting, or produced therefrom.

(b) **Indemnity**. Tenant hereby indemnifies and shall defend and hold Landlord, its officers, directors, employees, agents and contractors harmless from any and all actions (including, without limitation, remedial or enforcement actions of any kind, administrative or judicial proceedings, and

orders or judgments arising out of or resulting therefrom), costs, claims, damages (including, without limitation, punitive damages and damages based upon diminution in value of the Premises, Building, Property or Project, or the loss of, or restriction on, use of the Premises or any portion of the Building, Property or Project), expenses (including, without limitation, attorneys', consultants' and experts' fees, court costs and amounts paid in settlement of any claims or actions), fines, forfeitures or other civil, administrative or criminal penalties, injunctive or other relief (whether or not based upon personal injury, property damage, or contamination of, or adverse effects upon, the environment, water tables or natural resources), liabilities or losses (collectively, "**Environmental Claims**") which arise during or after the Term as a result of such contamination or breach by Tenant of its obligations under this Section 30. This indemnification of Landlord by Tenant includes, without limitation, costs incurred in connection with any investigation of site conditions or any cleanup, remedial, removal, or restoration work required by any federal, state or local Governmental Authority because of Hazardous Materials present in the air, soil or ground water above, on, or under the Premises. Without limiting the foregoing, if the presence of any Hazardous Materials on the Premises**,** Building, Property, Project or any adjacent property caused or permitted by Tenant or any Tenant Party results in any contamination of the Premises, Building, Property, Project or any adjacent property, Tenant shall promptly take all actions at its sole expense and in accordance with applicable law as are necessary to return the Premises, Building, Property, Project or any adjacent property to the condition existing prior to the time of such contamination, provided that Landlord's approval of such action shall first be obtained, which approval shall not unreasonably be withheld so long as such actions would not potentially have any material adverse long-term or short-term effect on the Premises, Building, Property or Project. Notwithstanding anything to the contrary contained in this Section 30, Tenant shall not be responsible for, and the indemnification and hold harmless obligation set forth in this paragraph shall not apply to (i) contamination in the Premises which Tenant can prove existed in the Premises immediately prior to the Commencement Date, (ii) the presence of any Hazardous Materials in the Premises which Tenant can prove migrated from outside of the Premises into the Premises, or (iii) contamination caused by Landlord or any of Landlord's employees, agents and contractors, unless in any case, the presence of such Hazardous Materials (x) is the result of a breach by Tenant of any of its obligations under this Lease, or (y) was caused, contributed to or exacerbated by Tenant or any Tenant Party.

(c) **Landlord's Tests**. Landlord shall have access to, and a right to perform inspections and tests of, the Premises to determine Tenant's compliance with Environmental Requirements, its obligations under this Section 30, or the environmental condition of the Premises, Building, Property or Project. In connection with such testing, upon the request of Landlord, Tenant shall deliver to Landlord or its consultant such non-proprietary information concerning the use of Hazardous Materials in or about the Premises by Tenant or any Tenant Party. Access shall be granted to Landlord upon Landlord's prior notice to Tenant and at such times so as to minimize, so far as may be reasonable under the circumstances, any disturbance to Tenant's operations. Such inspections and tests shall be conducted at Landlord's expense, unless such inspections or tests reveal that Tenant has not complied with any Environmental Requirement, in which case Tenant shall reimburse Landlord for the reasonable cost of such inspection and tests. Tenant shall, at its sole cost and expense, promptly and satisfactorily remediate any environmental conditions identified by such testing in accordance with all Environmental Requirements. Landlord's receipt of or satisfaction with any environmental assessment in no way waives any rights that Landlord may have against Tenant.

(d) **Tenant's Obligations**. Tenant's obligations under this Section 30 shall survive the expiration or earlier termination of the Lease. During any period of time after the expiration or earlier termination of this Lease required by Tenant or Landlord to complete the removal from the Premises of any Hazardous Materials (including, without limitation, the release and termination of any licenses or permits restricting the use of the Premises and the completion of the approved Surrender Plan), Tenant shall continue to pay the full Rent in accordance with this Lease for any portion of the Premises not relet by Landlord in Landlord's sole discretion, which Rent shall be prorated daily.

(e) **Asbestos**.

(i) **Notification of Asbestos**. Landlord hereby notifies Tenant of the presence of asbestos-containing materials ("**ACMs**") and/or presumed asbestos-containing materials ("**PACMs**") within or about the Premises in the locations identified in **Exhibit G**.

(ii) **Tenant Acknowledgement**. Tenant hereby acknowledges receipt of the notification in paragraph (i) of this Section 30(e) and understand that the purpose of such notification is to make Tenant, and any agents, employees, and contractors of Tenant, aware of the presence of ACMs and/or PACMs within or about the Building in order to avoid or minimize any damage to or disturbance of such ACMs and/or PACMs.

GM

Tenant's Initials

(iii) **Acknowledgement from Contractors/Employees**. Tenant shall give Landlord at least 14 days' prior written notice before conducting, authorizing or permitting any of the activities listed below within or about the Premises, and before soliciting bids from any person to perform such services. Such notice shall identify or describe the proposed scope, location, date and time of such activities and the name, address and telephone number of each person who may be conducting such activities. Thereafter, Tenant shall grant Landlord reasonable access to the Premises to determine whether any ACMs or PACMs will be disturbed in connection with such activities. Tenant shall not solicit bids from any person for the performance of such activities without Landlord's prior written approval. Upon Landlord's request, Tenant shall deliver to Landlord a copy of a signed acknowledgement from any contractor, agent, or employee of Tenant acknowledging receipt of information describing the presence of ACMs and/or PACMs within or about the Premises in the locations identified in **Exhibit G** prior to the commencement of such activities. Nothing in this Section 30(e) shall be deemed to expand Tenant's rights under the Lease or otherwise to conduct, authorize or permit any such activities.

(A) Removal of thermal system insulation ("**TSI**") and surfacing ACMs and PACMs (i.e., sprayed-on or troweled-on material, e.g., textured ceiling paint or fireproofing material);

(B) Removal of ACMs or PACMs that are not TSI or surfacing ACMs or PACMs; or

(C) Repair and maintenance of operations that are likely to disturb ACMs or PACMs.

31. **Tenant's Remedies/Limitation of Liability**. Landlord shall not be in default hereunder unless Landlord fails to perform any of its obligations hereunder within 30 days after written notice from Tenant specifying such failure (unless such performance will, due to the nature of the obligation, require a period of time in excess of 30 days, then after such period of time as is reasonably necessary). Upon any default by Landlord, Tenant shall give notice by registered or certified mail to any Holder of a Mortgage covering the Premises and to any landlord of any lease of property in or on which the Premises are located (to the extent that Tenant has received notice of the same) and Tenant shall offer such Holder and/or landlord a reasonable opportunity to cure the default, including time to obtain possession of the Project, or portion thereof of which the Premises are a part, by power of sale or a judicial action if such should prove necessary to effect a cure; provided Landlord shall have furnished to Tenant in writing the names and addresses of all such persons who are to receive such notices. All obligations of Landlord hereunder shall be construed as covenants, not conditions; and, except as may be otherwise expressly provided in this Lease, Tenant may not terminate this Lease for breach of Landlord's obligations hereunder.

All obligations of Landlord under this Lease will be binding upon Landlord only during the period of its ownership of the Premises and not thereafter. The term "**Landlord**" in this Lease shall mean only the owner for the time being of the Premises. Upon the transfer by such owner of its interest in the Premises, such owner shall thereupon be released and discharged from all obligations of Landlord thereafter accruing, but such obligations shall be binding during the Term upon each new owner for the duration of such owner's ownership.

32. **Inspection and Access**. Landlord and its agents, representatives, and contractors may enter the Premises at any reasonable time to inspect the Premises and to make such repairs as may be required or permitted pursuant to this Lease and for any other reasonable business purpose. Landlord and Landlord's representatives may enter the Premises during business hours on not less than 48 hours advance written notice (except in the case of emergencies in which case no such notice shall be required and such entry may be at any time) for the purpose of effecting any such repairs, inspecting the Premises, showing the Premises to prospective purchasers and, during the last year of the Term, to prospective tenants or for any other business purpose. Landlord may erect a suitable sign on the Premises, Building or Property stating the Premises or Building are available to let or that the Building, Property or Project is available for sale. Landlord may grant easements, make public dedications, designate Common Areas and create restrictions on or about the Premises, Building and Property, provided that no such easement, dedication, designation or restriction materially, adversely affects Tenant's use or occupancy of the Premises for the Permitted Use. At Landlord's request, Tenant shall execute such instruments as may be reasonably necessary for such easements, dedications or restrictions. Tenant shall at all times, except in the case of emergencies, have the right to escort Landlord or its agents, representatives, contractors or guests while the same are in the Premises, provided such escort does not materially and adversely affect Landlord's access rights hereunder.

33. **Security**. Tenant acknowledges and agrees that security devices and services, if any, while intended to deter crime may not in given instances prevent theft or other criminal acts and that Landlord is not providing any security services with respect to the Premises. Tenant agrees that Landlord shall not be liable to Tenant for, and Tenant waives any claim against Landlord with respect to, any loss by theft or any other damage suffered or incurred by Tenant in connection with any unauthorized entry into the Premises or any other breach of security with respect to the Premises. Tenant shall be solely responsible for the personal safety of Tenant's officers, employees, agents, contractors, guests and invitees while any such person is in, on or about the Premises, Building, Property and/or Project. Tenant shall at Tenant's cost obtain insurance coverage to the extent Tenant desires protection against such criminal acts.

34. **Force Majeure**. Except for the payment of Rent, neither Landlord nor Tenant shall be held responsible or liable for delays in the performance of its obligations hereunder when caused by, related to, or arising out of acts of God, strikes, lockouts, or other labor disputes, embargoes, quarantines, weather, national, regional, or local disasters, calamities, or catastrophes, inability to obtain labor or materials (or reasonable substitutes therefor) at reasonable costs or failure of, or inability to obtain, utilities necessary for performance, governmental restrictions, orders, limitations, regulations, or controls, national emergencies, delay in issuance or revocation of permits, enemy or hostile governmental action, terrorism, insurrection, riots, civil disturbance or commotion, fire or other casualty, and other causes or events beyond their reasonable control ("**Force Majeure**").

35. **Brokers**. Landlord and Tenant each represents and warrants that it has not dealt with any broker, agent or other person (collectively, "**Broker**) in connection with this transaction and that no Broker brought about this transaction, other than Colliers International and NKF. Landlord and Tenant each hereby agree to indemnify and hold the other harmless from and against any claims by any Broker, other than the broker, if any named in this Section 35, claiming a commission or other form of compensation by virtue of having dealt with Tenant or Landlord, as applicable, with regard to this leasing transaction. Landlord shall be responsible for all commissions due to Colliers International and NKF arising out of the execution of this Lease in accordance with the terms of a separate written agreement between Landlord, on the one hand, and Colliers International and NKF, on the other hand.

36. **Limitation on Landlord's Liability**. NOTWITHSTANDING ANYTHING SET FORTH HEREIN OR IN ANY OTHER AGREEMENT BETWEEN LANDLORD AND TENANT TO THE CONTRARY: (A) LANDLORD SHALL NOT BE LIABLE TO TENANT OR ANY OTHER PERSON FOR (AND TENANT AND EACH SUCH OTHER PERSON ASSUME ALL RISK OF) LOSS, DAMAGE OR INJURY, WHETHER ACTUAL OR CONSEQUENTIAL TO: TENANT'S PERSONAL PROPERTY OF EVERY KIND AND DESCRIPTION, INCLUDING, WITHOUT LIMITATION TRADE FIXTURES, EQUIPMENT, INVENTORY, SCIENTIFIC RESEARCH, SCIENTIFIC EXPERIMENTS, LABORATORY ANIMALS, PRODUCT, SPECIMENS, SAMPLES, AND/OR SCIENTIFIC, BUSINESS, ACCOUNTING AND OTHER RECORDS OF EVERY KIND AND DESCRIPTION KEPT AT THE PREMISES AND ANY AND ALL INCOME DERIVED OR DERIVABLE THEREFROM; (B) THERE SHALL BE NO PERSONAL RECOURSE TO LANDLORD FOR ANY ACT OR OCCURRENCE IN, ON OR ABOUT THE PREMISES OR ARISING IN ANY WAY UNDER THIS LEASE OR ANY OTHER AGREEMENT BETWEEN LANDLORD AND TENANT WITH RESPECT TO THE SUBJECT MATTER HEREOF AND ANY LIABILITY OF LANDLORD HEREUNDER SHALL BE STRICTLY LIMITED SOLELY TO LANDLORD'S INTEREST IN THE PROPERTY OR ANY PROCEEDS FROM SALE OR CONDEMNATION THEREOF AND ANY INSURANCE PROCEEDS PAYABLE IN RESPECT OF LANDLORD'S INTEREST IN THE PROPERTY OR IN CONNECTION WITH ANY SUCH LOSS; AND (C) IN NO EVENT SHALL ANY PERSONAL LIABILITY BE ASSERTED AGAINST ANY OF LANDLORD'S OFFICERS, DIRECTORS, EMPLOYEES, AGENTS OR CONTRACTORS. UNDER NO CIRCUMSTANCES SHALL LANDLORD OR ANY OF LANDLORD'S OFFICERS, DIRECTORS, EMPLOYEES, AGENTS OR CONTRACTORS BE LIABLE FOR INJURY TO TENANT'S BUSINESS OR FOR ANY LOSS OF INCOME OR PROFIT THEREFROM.

37. **Severability**. If any clause or provision of this Lease is illegal, invalid or unenforceable under present or future laws, then and in that event, it is the intention of the parties hereto that the remainder of this Lease shall not be affected thereby. It is also the intention of the parties to this Lease that in lieu of each clause or provision of this Lease that is illegal, invalid or unenforceable, there be added, as a part of this Lease, a clause or provision as similar in effect to such illegal, invalid or unenforceable clause or provision as shall be legal, valid and enforceable.

38. **Signs; Exterior Appearance**. Tenant shall not, without the prior written consent of Landlord, which may be granted or withheld in Landlord's reasonable discretion: (i) attach any awnings, exterior lights, decorations, balloons, flags, pennants, banners, painting or other projection to any outside wall of the Building, (ii) use any curtains, blinds, shades or screens other than Landlord's standard window coverings, (iii) coat or otherwise sunscreen the interior or exterior of any windows, (iv) place any bottles, parcels, or other articles on the window sills, (v) place any equipment, furniture or other items of personal property on any exterior balcony, or (vi) paint, affix or exhibit on any part of the Premises, Building, Property or Project any signs, notices, window or door lettering, placards, decorations, or advertising media of any type which can be viewed from the exterior of the Premises. Building standard signage in the lobby, on the floor on which the Premises is located and on the directory tablet shall be inscribed, painted or affixed for Tenant by Landlord, at Landlord's cost, and shall be of a size, color and type acceptable to Landlord. Nothing may be placed on the exterior of corridor walls or corridor doors other than Landlord's standard lettering. The directory tablet shall be provided exclusively for the display of the name and location of tenants.

39. **Intentionally Omitted**.

40. **Miscellaneous**.

(a) **Notices**. All notices or other communications between the parties shall be in writing and shall be deemed duly given upon delivery or refusal to accept delivery by the addressee thereof if delivered in person, or upon actual receipt if delivered by reputable overnight guaranty courier, addressed and sent to the parties at their addresses set forth above. Landlord and Tenant may from time to time by written notice to the other designate another address for receipt of future notices.

(b) **Joint and Several Liability**. If and when included within the term "**Tenant**," as used in this instrument, there is more than one person or entity, each shall be jointly and severally liable for the obligations of Tenant.

(c) **Financial Information**. Upon written request from Landlord, Tenant shall furnish Landlord with true and complete copies of (i) Tenant's most recent unaudited (or, if available, audited) annual financial statements within 90 days of the end of each of Tenant's fiscal years during the Term, and (ii) Tenant's most recent unaudited (or, if available, audited) quarterly financial statements within 45 days of the end of each of Tenant's first three fiscal quarters of each of Tenant's fiscal years during the Term. If the stock of Tenant is publicly traded on a recognized national exchange, then Tenant's filing of quarterly and annual financial statements with the Securities and Exchange Commission shall be deemed to satisfy Tenant's obligations to deliver financial statements under this Section.

(d) **Recordation**. Neither this Lease nor a memorandum of lease shall be filed by or on behalf of Tenant in any public record. Landlord may prepare and file, and upon request by Landlord Tenant will execute, a memorandum of lease.

(e) **Interpretation**. The normal rule of construction to the effect that any ambiguities are to be resolved against the drafting party shall not be employed in the interpretation of this Lease or any exhibits or amendments hereto. Words of any gender used in this Lease shall be held and construed to include any other gender, and words in the singular number shall be held to include the plural, unless the context otherwise requires. The captions inserted in this Lease are for convenience only and in no way define, limit or otherwise describe the scope or intent of this Lease, or any provision hereof, or in any way affect the interpretation of this Lease.

(f) **Not Binding Until Executed**. The submission by Landlord to Tenant of this Lease shall have no binding force or effect, shall not constitute an option for the leasing of the Premises, nor confer any right or impose any obligations upon either party until execution of this Lease by both parties.

(g) **Entire Agreement**; **Amendment**. This Lease constitutes the entire agreement between Landlord and Tenant pertaining to the lease of the Premises and supersedes all other agreements, whether oral or written, pertaining to the lease of the Premises, and no other agreements with respect thereto shall be effective. Any amendments or modifications of this Lease shall be in writing and signed by both Landlord and Tenant, and any other attempted amendment or modification of this Lease shall be void.

(h) **Limitations on Interest**. It is expressly the intent of Landlord and Tenant at all times to comply with applicable law governing the maximum rate or amount of any interest payable on or in connection with this Lease. If applicable law is ever judicially interpreted so as to render usurious any interest called for under this Lease, or contracted for, charged, taken, reserved, or received with respect to this Lease, then it is Landlord's and Tenant's express intent that all excess amounts theretofore collected by Landlord be credited on the applicable obligation (or, if the obligation has been or would thereby be paid in full, refunded to Tenant), and the provisions of this Lease immediately shall be deemed reformed and the amounts thereafter collectible hereunder reduced, without the necessity of the execution of any new document, so as to comply with the applicable law, but so as to permit the recovery of the fullest amount otherwise called for hereunder.

(i) **Choice of Law**. Construction and interpretation of this Lease shall be governed by the internal laws of the Commonwealth of Massachusetts, excluding any principles of conflicts of laws.

(j) **Time**. Time is of the essence as to the performance of Tenant's obligations under this Lease.

(k) **OFAC**. Tenant, and all beneficial owners of Tenant, are currently (a) in compliance with, and shall at all times during the Term of this Lease remain in compliance with, the regulations of the Office of Foreign Assets Control ("**OFAC**") of the U.S. Department of Treasury and any statute, executive order, or regulation relating thereto (collectively, the "**OFAC Rules**"), (b) not listed on, and shall not during the Term of this Lease be listed on, the Specially Designated Nationals and Blocked Persons List maintained by OFAC and/or on any other similar list maintained by OFAC or other governmental authority pursuant to any authorizing statute, executive order, or regulation, and (c) not a person or entity with whom a U.S. person is prohibited from conducting business under the OFAC Rules.

(l) **Incorporation by Reference**. All exhibits and addenda attached hereto are hereby incorporated into this Lease and made a part hereof. If there is any conflict between such exhibits or addenda and the terms of this Lease, such exhibits or addenda shall control.

(m) **No Accord and Satisfaction**. No payment by Tenant or receipt by Landlord of a lesser amount than the monthly installment of Base Rent or any Additional Rent will be other than on account of the earliest stipulated Base Rent and Additional Rent, nor will any endorsement or statement on any check or letter accompanying a check for payment of any Base Rent or Additional Rent be an accord and satisfaction. Landlord may accept such check or payment without prejudice to Landlord's right to recover the balance of such Rent or to pursue any other remedy provided in this Lease.

[Signatures on next page]

IN WITNESS WHEREOF, Landlord and Tenant have executed this Lease as of the day and year first above written.

TENANT:

AVROBIO, INC.,
a Delaware corporation

By: /s/ Geoff MacKay
Print Name: Geoff MacKay
Title: President and CEO

LANDLORD:

ARE-MA REGION NO. 59, LLC,
a Delaware limited liability company

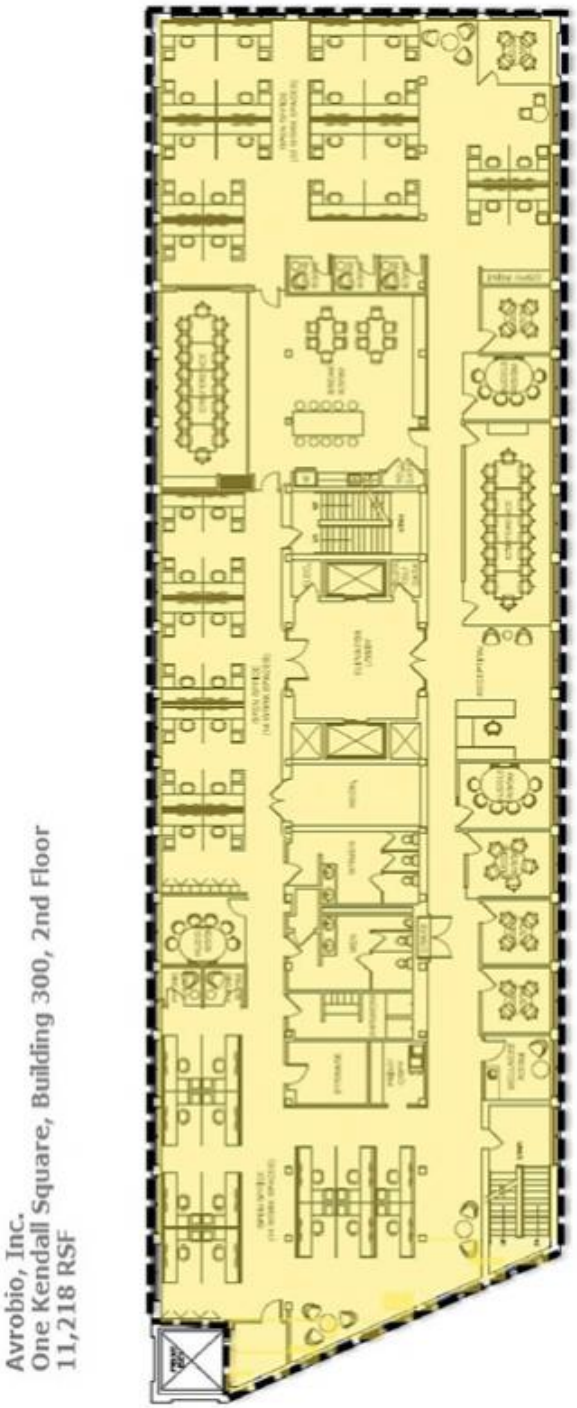
By: ALEXANDRIA REAL ESTATE EQUITIES, L.P.,
a Delaware limited partnership, managing member

By: ARE-QRS CORP.,
a Maryland corporation, general partner

By: /s/ Jackie Clem
Print Name: Jackie Clem
Title: Senior Vice President
RE Legal Affairs

EXHIBIT A TO LEASE

DESCRIPTION OF PREMISES



Avrobio, Inc.
One Kendall Square, Building 300, 2nd Floor
11,218 RSF

EXHIBIT B TO LEASE

DESCRIPTION OF PROPERTY

Real property in the County of Middlesex, Commonwealth of Massachusetts, described as follows:

Buildings 100, 200, 300, 400 and 500:

Four registered parcels of land located in the City of Cambridge, Middlesex County, Massachusetts, bounded and described as follows:

Lot 35 – L.C. Plan 10378G

Commencing at the intersection of the northeasterly line of Hampshire Street with the southeasterly line of Cardinal Medeiros Avenue;

Thence running N 36°06’35” E along said southeasterly line of Cardinal Medeiros Avenue, a distance of 262.69 feet, to a point;

Thence running S 53°46’58” E, by land now or formerly of Trustees of Old Kendall Realty Trust, a distance of 322.66 feet, to a point;

Thence running S 36°16’40” W, by Lot 42 shown on Land Court Plan 10378J, a distance of 48.01 feet, to a point;

Thence running by Lot 36, shown on Land Court Plan 10378G, on the following four (4) courses:

N 53°40’39” W, a distance of 65.11 feet, to a point;

S 36°04’50” W, a distance of 126.58 feet, to a point;

S 53°32’32” E, a distance of 42.30 feet, to a point; and

S 28°34’58” E, a distance of 12.62 feet, to a point at land now or formerly of Trustees of Kendall Three Realty Trust;

Thence running S 60°21’50” W, in part by land of said Trustees and in part by land now or formerly of Charles Stark Draper Laboratory, Inc. a distance of 205.87 feet, to a point on the aforesaid northeasterly line of Hampshire Street;

Thence running N 28°54’10” W, along said northeasterly line of Hampshire Street, a distance of 250.01 feet, to the Point of Beginning.

Together with the benefit of easement rights set forth in an Easement from The Charles Stark Draper Laboratory, Inc. to Cambridge Athenaeum LLC, dated April 16, 2000 and filed as Document No. 1137082.

Lot 36 – L.C. Plan 10378G

Commencing at a point on the easterly line of the above described parcel, said point being S 36°16’40” W and a distance of 48.01 feet from the northeast corner of the above described parcel;

Thence running S 36°16’40” W, by land of the Trustees of Kendall Three Realty Trust, a distance of 107.52 feet; to a point;

Thence running S 60°21’50” W, by land of said Trustees, a distance of 26.84 feet, to a point;

Thence running by Lot 35, shown on Land Court Plan 10378G, on the following four (4) courses:

N 28°34’58” W, a distance of 12.62 feet, to a point;

N 53°32’32” W, a distance of 42.30 feet, to a point;

N 36°04’50” E, a distance 126.58 feet, to a point; and

S 53°40’39” E, a distance of 65.11 feet, to the Point of Beginning.

Lot 42 – Land Court Plan 10378J

Commencing at the northeast corner of Lot 35, hereinbefore described;

Thence running by land, now or formerly of Trustees of Kendall Three Realty Trust, on the following three (3) courses:

S 53°46’58” E, a distance of 1.97 feet, to a point;

S 36°25’25” W, a distance of 48.02 feet, to a point; and

N 53°40’39” W, a distance of 1.85 feet, to a point;

Thence running N 36°16’40” E, by Lot 35, a distance of 48.01 feet, to the Point of Beginning.

Lot 43 – Land Court Plan 10378J

A certain parcel of land situate in Cambridge in the County of Middlesex, Commonwealth of Massachusetts:

Northeasterly by lot 39 as shown on plan hereinafter mentioned, thirteen and 05/100 feet;

Southeasterly forty-eight and 04/100 feet; and

Southwesterly thirteen and 28/100 feet by lot 41 on said plan; and

Northwesterly by lot 42 on said plan, forty-eight and 02/100 feet.

Said parcel is shown as Lot 43 on Land Court Plan 10378J.

All of said boundaries are determined by the Court to be located as shown on a subdivision plan, as approved by the Court, filed in the Land Registration Office, a copy of which is filed in the Registry of Deeds in Registration Book 1050, Page 90, with Certificate 184040.

Together with the rights and easements set forth in that certain Grant of Easement from Charles Stark Draper Laboratory, Inc. dated August 31, 1983, filed with the Middlesex County Registry District of the Land Court (the “District”) as Document No. 657256.

Together with the rights and easements set forth in that certain Easements Agreement dated December 17, 1984 and filed as Document No. 673502, as affected by Amendment to Easements Agreement, dated April 7, 2006 and filed as Document No. 1416496.

Together with the rights and easements set forth in a Grant of Easement dated August 30, 1983 and filed as Document No. 654750.

Together with the rights and easements set forth in a Grant of Easement from the City of Cambridge, dated January 29, 2009 and recorded in Book 52168, Page 362.

The foregoing parcels collectively are also described as follows:

Those certain parcels of registered land located in Cambridge, Middlesex County, Massachusetts, shown as Lots 35 and 36 on Land Court Plan 10378G and Lots 42 and 43 shown on Land Court Plan 10378J, bounded and described as follows:

Beginning at the point on the northeasterly sideline of Hampshire Street 250.01 feet distance southeasterly from intersection of easterly sideline of Cardinal Medeiros Avenue and northeasterly side line of Hampshire Street thence bounded:

Southwesterly by the northeasterly line of Hampshire Street, two hundred fifty and 01/100 (250.01) feet;

Northwesterly by the southeasterly line of Cardinal Medeiros Avenue, two hundred sixty two and 69/100 (262.69) feet;

Northeasterly by land now or formerly of Cambridge Athenaeum LLC, three hundred thirty seven and 68/100 (337.68) feet;

Southeasterly by land now or formerly of Amgen Cambridge Real Estate Holdings Inc., forty-eight and 04/100 (48.04) feet;

Southwesterly by land of said Amgen Cambridge Real Estate Holdings Inc., fifteen and 13/100 (15.13) feet;

Southeasterly by said land now or formerly of Amgen Cambridge Real Estate Holdings Inc., one hundred seven and 52/100 (107.52) feet; and

Southeasterly by land now or formerly of Amgen Cambridge Real Estate Holdings Inc. and Charles Stark Draper Laboratory, Inc., two hundred thirty two and 71/100 (232.71) feet.

Buildings 600, 650 and 700:

Lot 39 – Land Court Plan 10378H

That certain parcel of land situated in the City of Cambridge, Middlesex County, Massachusetts, bounded and described as follows:

Commencing at a point on the Easterly side of Cardinal Medeiros Avenue, said point being sixty feet from the intersection of said Easterly side of Cardinal Medeiros Avenue and the Southerly line of Binney Street;

Northerly, by Lot 40 shown in Land Court Plan 10378I, two hundred thirty-eight and sixty-three hundredths (238.63) feet, eighty-two and forty-one hundredths (82.41) feet and seventeen and four hundredths (17.04) feet;

Easterly, by Lots 40 and 41 shown on Land Court Plan 10378I, one hundred ninety-six and eighty-four hundredths (196.84) feet,

Southerly by Lots 43 and 42 shown on Land Court Plan 10378J and Lot 35 shown on Land Court Plan 10378G three hundred thirty-seven and sixty-eight hundredths (337.68) feet;

Westerly, on aforesaid Cardinal Medeiros Avenue, one hundred ninety-nine and seventy-one hundredths (199.71) feet.

The parcel of land described above is shown as Lot 39 on Land Court Plan 10378H.

Lot 40 (Building 1400)

The land with the buildings and improvements thereon, shown as Lot 40 on Land Court Plan 10378I, situated on Binney Street in the City of Cambridge, County of Middlesex, Massachusetts, also shown on a plan entitled “Topographic Plan for Old Binney Realty Trust, Cardinal Medeiros Avenue, Binney Street; Cambridge, Massachusetts”, dated June 29, 1987, as revised July 10, 1987, April 13, 1988, August 12, 1988, September 6, 1988, and September 26, 1988, prepared by Cullinan Engineering Co., Inc., being bounded and described as follows;

NORTHEASTERLY by the southwesterly line of Binney Street, two hundred sixty-six and 80/100 (266.80) feet and two hundred twenty and 44/100 (220.44) feet;

EASTERLY by land now or formerly of Consolidated Rail Corporation, eighty-nine and 24/100 (89.24) feet;

SOUTHWESTERLY by Lot 41 on Land Court Plan 10378I, twenty seven and 16/100 (27.16) feet;

SOUTHWESTERLY by said Lot 41, thirty-five and 12/ 100 (35.12) feet and one hundred two and 73/100 (102.73) feet;

NORTHWESTERLY by Lot 39 on Land Court Plan 10378H, sixty-six and 15/100 (66.15) feet;

SOUTHWESTERLY by said Lot 39, seventeen and 04/100 (17.04) feet;

SOUTHWESTERLY by said Lot 39, eighty-two and 41/100 (82.41) feet;

SOUTHWESTERLY by said Lot 39, two hundred thirty-eight and 63/100 (238.63) feet;

NORTHWESTERLY by Cardinal Medeiros Avenue (formerly known as Portland Street), sixty and 00/100 (60) feet.

Together with the rights set forth in Easements Agreement dated December 17, 1984, between Old Cambridge Realty Trust and the Old Kendall Trustees, filed as Document No. 673502, as affected by Amendment to Easements Agreement, dated April 7, 2006 and filed as Document No. 1416496.

Together with the rights set forth in Parking Access Easement Agreement filed as Document No. 771896, as affected by Release of Parking Rights by Robert A. Jones and George Najarian, Trustees of Old Binney Realty Trust, dated January 11, 1995, recorded in Book 25122, Page 94 and filed as Document No. 966485, Release of Parking Rights by Robert A. Jones, Managing Trustee of Old Cambridge Realty Trust dated January 11, 1995, recorded in Book 25122, Page 98 and filed as Document No. 966486; Release of Parking Rights by Robert A. Jones, Managing Trustee of Old Kendall Realty Trust, dated January 11, 1995, recorded in Book 25122, Page 102 and filed as Document No.966487; Release of Parking Rights by State Street Bank and Trust Company, Trustees of Kendall One Realty Trust dated January 5, 1995, recorded in Book 25122, Page 106 and filed as Document No. 966488, and Release of Parking Rights dated January 10, 1995, recorded in Book 25153, Page 386 and as filed as Document No. 967459.

Together with the rights set forth in that certain Parking and Access Easement Agreement, by and between DWF IV One Kendall, LLC and DWF IV One Kendall Garage, LLC, dated as of January 16, 2014 and recorded in Book 63188, Page 559, and filed as Document No. 1663415.

EXHIBIT C TO LEASE

WORK LETTER

THIS **WORK LETTER** (this "**Work Letter**") is attached to and incorporated into that certain Lease dated (the "**Lease**") by and between **ARE-MA REGION NO. 59, LLC**, a Delaware limited liability company ("**Landlord**"), and **AVROBIO, INC.**, a Delaware corporation ("**Tenant**"). Any initially capitalized terms used but not defined herein shall have the meanings given them in the Lease.

them in the Lease.

1. **General Requirements**.

(a) **Tenant's Authorized Representative**. Tenant designates Kirsten Dupuis and Carolina Romano (either such individual acting alone, "**Tenant's Representative**") as the only persons authorized to act for Tenant pursuant to this Work Letter. Landlord shall not be obligated to respond to or act upon any request, approval, inquiry or other communication ("**Communication**") from or on behalf of Tenant in connection with this Work Letter unless such Communication is in writing from Tenant's Representative. Tenant may change either Tenant's Representative at any time upon not less than 5 business days advance written notice to Landlord. Neither Tenant nor Tenant's Representative shall be authorized to direct Landlord's contractors in the performance of Landlord's Work (as hereinafter defined).

(b) **Landlord's Authorized Representative**. Landlord designates Tim White and Mike Carli (either such individual acting alone, "**Landlord's Representative**") as the only persons authorized to act for Landlord pursuant to this Work Letter. Tenant shall not be obligated to respond to or act upon any request, approval, inquiry or other Communication from or on behalf of Landlord in connection with this Work Letter unless such Communication is in writing from Landlord's Representative. Landlord may change either Landlord's Representative at any time upon not less than 5 business days advance written notice to Tenant. Landlord's Representative shall be the sole persons authorized to direct Landlord's contractors in the performance of Landlord's Work.

(c) **Architects, Consultants and Contractors**. Landlord and Tenant hereby acknowledge and agree that: (i) the general contractor and any subcontractors for the Tenant Improvements shall be selected by Landlord, in Landlord's sole and absolute discretion, and (ii) R.E. Dinneen shall be the architect (the "**TI Architect**") for the Tenant Improvements.

2. **Tenant Improvements**.

(a) **Tenant Improvements Defined**. As used herein, "**Tenant Improvements**" shall mean all improvements to the Initial Premises and the Subsequent Premises of a fixed and permanent nature as shown on the TI Construction Drawings, as defined in Section 2(c) below. Other than Landlord's Work (as defined in Section 3(a) below, Landlord shall not have any obligation whatsoever with respect to the finishing of the Premises for Tenant's use and occupancy.

(b) **Tenant's Space Plans**. Landlord and Tenant acknowledge and agree that the plans for the Initial Premises and the Subsequent Premises prepared by the TI Architect attached hereto as **Annex 1** (the "**Space Plans**") have been approved by both Landlord and Tenant. Landlord and Tenant further acknowledge and agree that any changes to the Space Plans constitutes a Change Request the cost of which changes shall be paid for by Tenant. Tenant shall be solely responsible for all costs incurred by Landlord to alter the Building (or Landlord's plans for the Building) as a result of Tenant's requested changes.

(c) **Working Drawings**. Landlord shall cause the TI Architect to prepare and deliver to Tenant for review and comment construction plans, specifications and drawings for the Tenant Improvements ("**TI Construction Drawings**"), which TI Construction Drawings shall be prepared substantially in accordance with the Space Plans. Tenant shall be solely responsible for ensuring that the TI Construction Drawings reflect Tenant's requirements for the Tenant Improvements. Tenant shall deliver its written comments on the TI Construction Drawings to Landlord not later than 10 business days after Tenant's receipt of the same; provided, however, that Tenant may not disapprove any matter that is consistent with the Space Plans without submitting a Change Request. Landlord and the TI Architect shall consider all such comments in good faith and shall, within 10 business days after receipt, notify Tenant how Landlord proposes to respond to such comments, but Tenant's review rights pursuant to the foregoing sentence shall not delay the design or construction schedule for the Tenant Improvements. Any disputes in connection with such comments shall be resolved in accordance with Section 2(d) hereof. Provided that the design reflected in the TI Construction Drawings is consistent with the Space Plans, Tenant shall approve the TI Construction Drawings submitted by Landlord, unless Tenant submits a Change Request. Once approved by Tenant, subject to the provisions of Section 4 below, Landlord shall not materially modify the TI Construction Drawings except as may be reasonably required in connection with the issuance of the TI Permit (as defined in Section 3(b) below).

(d) **Approval and Completion**. It is hereby acknowledged by Landlord and Tenant that (x) TI Construction Drawings are not required on connection with Landlord's Work being performed in the Initial Premises, and (y) the TI Construction Drawings for Landlord's Work in the Subsequent Premises must be completed and approved not later than February 15, 2018, in order for the Landlord's Work in the Subsequent Premises to be Substantially Complete by the Subsequent Premises Target Commencement Date (as defined in the Lease). Upon any dispute regarding the design of the Tenant Improvements, which is not settled within 10 business days after notice of such dispute is delivered by one party to the other, Tenant may make the final decision regarding the design of the Tenant Improvements, provided (i) Tenant acts reasonably and such final decision is either consistent with or a compromise between Landlord's and Tenant's positions with respect to such dispute, (ii) that all costs and expenses resulting from any such decision by Tenant shall be payable out of the TI Fund (as defined in Section 5(d) below), and (iii) Tenant's decision will not affect the base Building, structural components of the Building or any Building systems. Any changes to the TI Construction Drawings following Landlord's and Tenant's approval of same requested by Tenant shall be processed as provided in Section 4 hereof.

3. **Performance of Landlord's Work**.

(a) **Definition of Landlord's Work**. As used herein, "**Landlord's Work**" shall mean (i) the work of constructing the Tenant Improvements, and (ii) replacing the damaged door of the tele/data area located in the Initial Premises, which replacement shall be completed at Landlord's sole cost and expense.

(b) **Commencement and Permitting**. Landlord shall commence construction of the Tenant Improvements upon obtaining a building permit (the "**TI Permit**") authorizing the construction of the Tenant Improvements consistent with the TI Construction Drawings approved by Tenant. The cost of obtaining the TI Permit shall be payable from the TI Fund. Tenant shall assist Landlord in obtaining the TI Permit. If any Governmental Authority having jurisdiction over the construction of Landlord's Work or any portion thereof shall impose terms or conditions upon the construction thereof that: (i) are inconsistent with Landlord's obligations hereunder, (ii) increase the cost of constructing Landlord's Work, or (iii) will materially delay the construction of Landlord's Work, Landlord and Tenant shall reasonably and in good faith seek means by which to mitigate or eliminate any such adverse terms and conditions.

(c) **Completion of Landlord's Work**. On or before the Target Commencement Date (subject to Tenant Delays and Force-Majeure Delays) with respect to the Initial Premises and on or before the Subsequent Premises Target Commencement Date (subject to Tenant Delays and Force-Majeure Delays) with respect to the Subsequent Premises, Landlord shall substantially complete or cause to be substantially completed Landlord's Work in a good and workmanlike manner, in accordance with the TI Permit subject, in each case, to Minor Variations and normal "punch list" items of a non-material nature that do not interfere with the use of the Initial Premises or Subsequent Premises, as applicable

("**Substantial Completion**" or "**Substantially Complete**"). Upon Substantial Completion of Landlord's Work, Landlord shall require the TI Architect and the general contractor to execute and deliver, for the benefit of Tenant and Landlord, a Certificate of Substantial Completion in the form of the American Institute of Architects ("**AIA**") document G704. For purposes of this Work Letter, "**Minor Variations**" shall mean any modifications reasonably required: (i) to comply with all applicable Legal Requirements and/or to obtain or to comply with any required permit (including the TI Permit); (ii) to comply with any request by Tenant for modifications to Landlord's Work; (iii) to comport with good design, engineering, and construction practices that are not material; or (iv) to make reasonable adjustments for field deviations or conditions encountered during the construction of Landlord's Work.

(d) **Selection of Materials**. Where more than one type of material or structure is indicated on the TI Construction Drawings approved by Landlord and Tenant, the option will be selected at Landlord's sole and absolute subjective discretion. As to all building materials and equipment that Landlord is obligated to supply under this Work Letter, Landlord shall select the manufacturer thereof in its sole and absolute subjective discretion.

(e) **Delivery of the Subsequent Premises**. When Landlord's Work is Substantially Complete, subject to the remaining terms and provisions of this Section 3(e), Tenant shall accept the Initial Premises and the Subsequent Premises, respectively. Tenant's taking possession and acceptance of the Initial Premises and the Subsequent Premises, respectively, shall not constitute a waiver of: (i) any warranty with respect to workmanship (including installation of equipment) or material (exclusive of equipment provided directly by manufacturers), (ii) any non-compliance of Landlord's Work with applicable Legal Requirements, or (iii) any claim that Landlord's Work was not completed substantially in accordance with the TI Construction Drawings (subject to Minor Variations and such other changes as are permitted hereunder) (collectively, a "**Construction Defect**"). Tenant shall have one year after Substantial Completion of Landlord's Work in the Initial Premises and the Subsequent Premises, respectively, within which to notify Landlord of any such Construction Defect discovered by Tenant, and Landlord shall use reasonable efforts to remedy or cause the responsible contractor to remedy any such Construction Defect within 30 days thereafter. Notwithstanding the foregoing, Landlord shall not be in default under the Lease if the applicable contractor, despite Landlord's reasonable efforts, fails to remedy such Construction Defect within such 30-day period, in which case Landlord shall have no further obligation with respect to such Construction Defect other than to cooperate, at no cost to Landlord, with Tenant should Tenant elect to pursue a claim against such contractor, provided that Tenant shall defend with counsel reasonably acceptable to Landlord, indemnify and hold Landlord harmless from and against any claims arising out of or in connection with any such claim.

Tenant shall be entitled to receive the benefit of all construction warranties and manufacturer's equipment warranties relating to equipment installed in the Subsequent Premises. If requested by Tenant, Landlord shall attempt to obtain extended warranties from manufacturers and suppliers of such equipment, but the cost of any such extended warranties shall be borne solely out of the TI Fund. Landlord shall promptly undertake and complete, or cause to be completed, all punch list items.

(f) **Commencement Date/Subsequent Premises Commencement Date Delay**. Except as otherwise provided in the Lease, Delivery of the Initial Premises and the Subsequent Premises, respectively, shall occur when Landlord's Work in the Initial Premises and the Subsequent Premises, respectively, has been Substantially Completed, except to the extent that completion of Landlord's Work shall have been actually delayed by any one or more of the following causes ("**Tenant Delay**"):

(i) Tenant's Representative was not available within 2 business days to give or receive any Communication or to take any other action required to be taken by Tenant hereunder;

(ii) Tenant's request for Change Requests (as defined in Section 4(a) below) whether or not any such Change Requests are actually performed;

(iii) Construction of any Change Requests;

(iv) Tenant's request for materials, finishes or installations requiring unusually long lead times;

(v) Tenant's delay in reviewing, revising or approving plans and specifications beyond the periods set forth herein;

(vi) Tenant's delay in providing information critical to the normal progression of the work within 2 business days following written request therefor from Landlord. Tenant shall provide such information as soon as reasonably possible, but in no event longer than one week after receipt of any request for such information from Landlord;

(vii) Tenant's delay in making payments to Landlord for Excess TI Costs (as defined in Section 5(d) below); or

(viii) Any other act or omission by Tenant or any Tenant Party (as defined in the Lease), or persons employed by any of such persons.

If Delivery of the Initial Premises or the Subsequent Premises, respectively, is delayed for any of the foregoing reasons, then Landlord shall cause the TI Architect to certify the date on which the Tenant Improvements in the Initial Premises and the Subsequent Premises, respectively, would have been completed but for such Tenant Delay and such certified date shall be the date of Delivery of the Initial Premises or the Subsequent Premises, if applicable.

4. **Changes**. Any changes requested by Tenant to the Tenant Improvements shall be requested and instituted in accordance with the provisions of this Section 4 and shall be subject to the written approval of Landlord and the TI Architect, such approval not to be unreasonably withheld, conditioned or delayed.

(a) **Tenant's Request For Changes**. If Tenant shall request changes to the Tenant Improvements ("**Changes**"), Tenant shall request such Changes by notifying Landlord in writing in substantially the same form as the AIA standard change order form (a "**Change Request**"), which Change Request shall detail the nature and extent of any such Change. Such Change Request must be signed by Tenant's Representative. Landlord shall, before proceeding with any Change, use commercially reasonable efforts to respond to Tenant as soon as is reasonably possible with an estimate of: (i) the time it will take, and (ii) the architectural and engineering fees and costs that will be incurred, to analyze such Change Request (which costs shall be paid from the TI Fund to the extent actually incurred, whether or not such change is implemented). Landlord shall thereafter submit to Tenant in writing, within 5 business days of receipt of the Change Request (or such longer period of time as is reasonably required depending on the extent of the Change Request), an analysis of the additional cost or savings involved, including, without limitation, architectural and engineering costs and the period of time, if any, that the Change will extend the date on which Landlord's Work in either or both the Initial Premises or the Subsequent Premises will be Substantially Complete. Any such delay in the completion of Landlord's Work caused by a Change, including any suspension of Landlord's Work while any such Change is being evaluated and/or designed, shall be Tenant Delay.

(b) **Implementation of Changes**. If Tenant: (i) approves in writing the cost or savings and the estimated extension in the time for completion of Landlord's Work, if any, and (ii) deposits with Landlord any Excess TI Costs required in connection with such Change, Landlord shall cause the approved Change to be instituted. Notwithstanding any approval or disapproval by Tenant of any estimate of the delay caused by such proposed Change, the TI Architect's determination of the amount of Tenant Delay in connection with such Change shall be final and binding on Landlord and Tenant.

5. **Costs**.

(a) **Budget For Tenant Improvements**. Before the commencement of construction of the Tenant Improvements, Landlord shall obtain a detailed breakdown by trade of the costs incurred or that will be incurred in connection with the design and construction of the Tenant Improvements (as the same may be amended, the "**Budget**"). The Budget shall be based upon the TI Construction Drawings approved by Tenant. If the Budget is greater than the TI Allowance, Tenant shall deposit with Landlord the difference, in cash, prior to the commencement of construction of the Tenant Improvements or Changes, for disbursement by Landlord as described in Section 5(d).

(b) **TI Allowance**. Landlord shall provide a tenant improvement allowance (the "**TI Allowance**") of $75.00 per rentable square foot of the Premises, or $841,350 in the aggregate. The TI Allowance shall be disbursed in accordance with this Work Letter.

Tenant shall have no right to the use or benefit (including any reduction to or payment of Base Rent) of any portion of the TI Allowance not required for the construction of (i) the Tenant Improvements described in the TI Construction Drawings approved pursuant to Section 2(d) or (ii) any Changes pursuant to Section 4.

(c) **Costs Includable in TI Fund**. The TI Fund shall be used solely for the payment of design, permits and construction costs in connection with the construction of the Tenant Improvements, including, without limitation, the cost of electrical power and other utilities used in connection with the construction of the Tenant Improvements, the cost of preparing the Space Plans and the TI Construction Drawings, all costs set forth in the Budget, including out-of-pocket expenses, costs resulting from Tenant Delays and the cost of Changes (collectively, "**TI Costs**"). Notwithstanding anything to the contrary contained herein, the TI Fund shall not be used to purchase any furniture, personal property or other non-Building system materials or equipment, including, but not limited to, Tenant's voice or data cabling, non-ducted biological safety cabinets and other scientific equipment not incorporated into the Tenant Improvements.

(d) **Excess TI Costs**. Landlord shall have no obligation to bear any portion of the cost of any of the Tenant Improvements except to the extent of the TI Allowance. If at any time the remaining TI Costs under the Budget exceed the remaining unexpended TI Allowance, Tenant shall deposit with Landlord, as a condition precedent to Landlord's obligation to complete the Tenant Improvements, 100% of the then current TI Cost in excess of the remaining TI Allowance ("**Excess TI Costs**"). If Tenant fails to deposit any Excess TI Costs with Landlord, Landlord shall have all of the rights and remedies set forth in the Lease for nonpayment of Rent (including, but not limited to, the right to interest at the Default Rate and the right to assess a late charge). For purposes of any litigation instituted with regard to such amounts, those amounts will be deemed Rent under the Lease. The TI Allowance and Excess TI Costs are herein referred to as the "**TI Fund**." Funds deposited by Tenant shall be the first disbursed to pay TI Costs. Notwithstanding anything to the contrary set forth in this Section 5(d), Tenant shall be fully and solely liable for TI Costs and the cost of Minor Variations in excess of the TI Allowance. If upon Substantial Completion of the Tenant Improvements and the payment of all sums due in connection therewith there remains any undisbursed portion of the TI Fund, Tenant shall be entitled to such undisbursed TI Fund solely to the extent of any Excess TI Costs deposit Tenant has actually made with Landlord.

(e) **Construction Contract**. The contract for construction of the Tenant Improvements shall be written substantially on Landlord's standard form of construction agreement with modifications reasonably acceptable to Landlord where the contract sum is the costs of the work plus a fee not to exceed a "Guaranteed Maximum Price" in an amount equal to the construction costs and contingencies set forth in the Budget) (which Budget shall be based upon completed permit drawings and shall not include comments raised by Governmental Authorities as part of their permit review) subject to the terms of such contract and subject to any increases resulting from Changes and any changes to the permit drawings required by Governmental Authorities implemented after approval of the Budget.

6. **Tenant Access**.

(a) **Tenant's Access Rights**. Landlord hereby agrees to permit Tenant access, at Tenant's sole risk and expense, to the Initial Premises and the Subsequent Premises, respectively (i) 7 days prior to the Commencement Date or Subsequent Premises Commencement Date, as applicable, to perform any work ("**Tenant's Work**") required by Tenant other than Landlord's Work, provided that such Tenant's Work is coordinated with the TI Architect and the general contractor, and complies with the Lease and all other reasonable restrictions and conditions Landlord may impose, and (ii) prior to the completion of Landlord's Work, to inspect and observe work in process; all such access shall be during normal business hours or at such other times as are reasonably designated by Landlord. Notwithstanding the foregoing, Tenant shall have no right to enter onto the Initial Premises or the Subsequent Premises unless and until Tenant shall deliver to Landlord evidence reasonably satisfactory to Landlord demonstrating that any insurance reasonably required by Landlord in connection with such pre-commencement access (including, but not limited to, any insurance that Landlord may require pursuant to the Lease) is in full force and effect. Any entry by Tenant shall comply with all established safety practices of Landlord's contractor and Landlord until completion of Landlord's Work and acceptance thereof by Tenant.

(b) **No Interference**. Neither Tenant nor any Tenant Party (as defined in the Lease) shall interfere with the performance of Landlord's Work, nor with any inspections or issuance of final approvals by applicable Governmental Authorities, and upon any such interference, Landlord shall have the right to exclude Tenant and any Tenant Party from the Initial Premises under the Substantial Completion of Landlord's Work in the Initial Premises or from the Subsequent Premises until Substantial Completion of Landlord's Work.

(c) **No Acceptance of Premises**. The fact that Tenant may, with Landlord's consent, enter into the Premises, Building, Property or Project prior to the date Landlord's Work is Substantially Complete for the purpose of performing Tenant's Work shall not be deemed an acceptance by Tenant of possession of the Subsequent Premises, but in such event Tenant shall defend with counsel reasonably acceptable by Landlord, indemnify and hold Landlord harmless from and against any loss of or damage to Tenant's property, completed work, fixtures, equipment, materials or merchandise, and from liability for death of, or injury to, any person, caused by the act or omission of Tenant or any Tenant Party.

7. **Miscellaneous**.

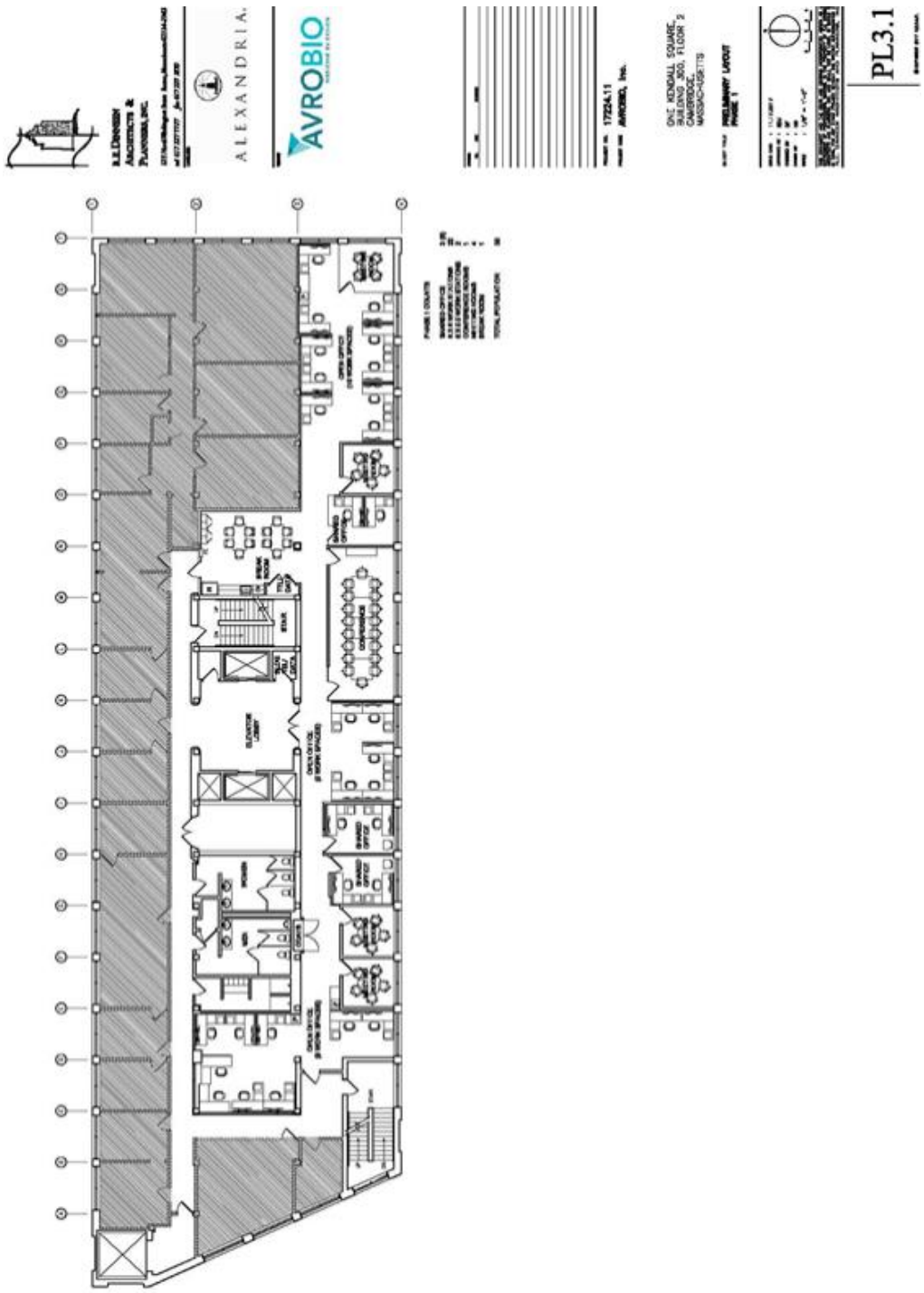
(a) **Consents**. Whenever consent or approval of either party is required under this Work Letter, that party shall not unreasonably withhold, condition or delay such consent or approval, unless expressly set forth herein to the contrary.

(b) **Modification**. No modification, waiver or amendment of this Work Letter or of any of its conditions or provisions shall be binding upon Landlord or Tenant unless in writing signed by Landlord and Tenant.

(c) **Default**. Notwithstanding anything set forth herein or in the Lease to the contrary, Landlord shall not have any obligation to perform any work hereunder or to fund any portion of the TI Fund during any period Tenant is in Default under the Lease.

Annex 1

Space Plans



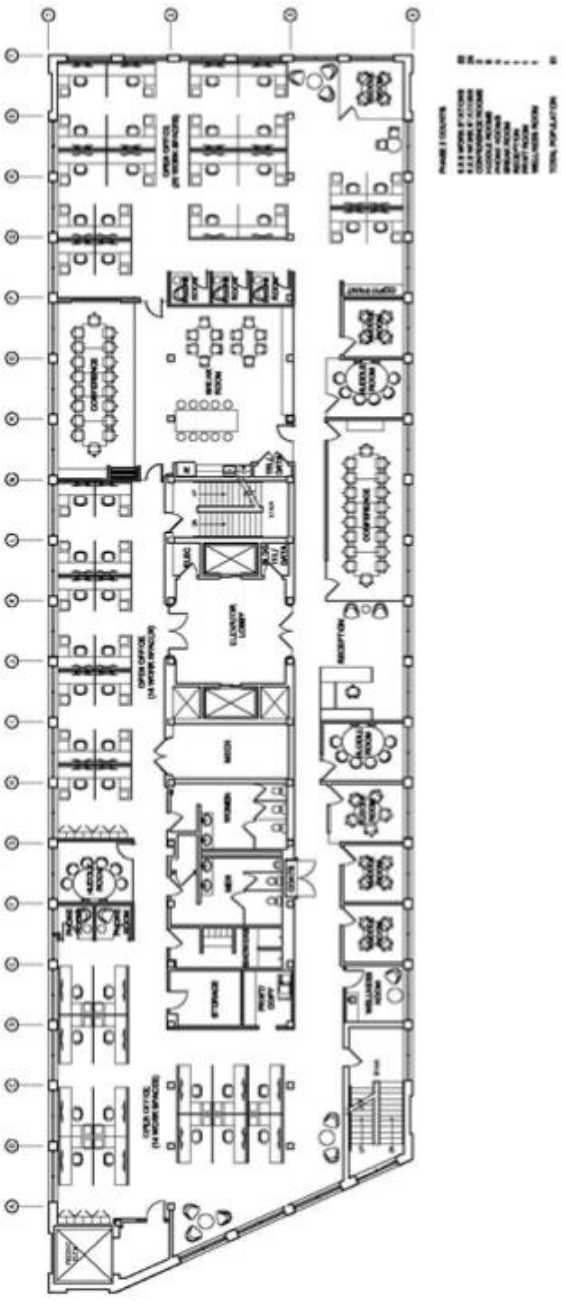


EXHIBIT D TO LEASE

ACKNOWLEDGMENT OF COMMENCEMENT DATE

This **ACKNOWLEDGMENT OF COMMENCEMENT DATE** is made as of this day of , between **ARE-MA REGION NO. 59, LLC**, a Delaware limited liability company ("**Landlord**"), and **AVROBIO, INC.**, a Delaware corporation ("**Tenant**"), and is attached to and made a part of the Lease dated as of , (the "**Lease**"), by and between Landlord and Tenant. Any initially capitalized terms used but not defined herein shall have the meanings given them in the Lease.

Landlord and Tenant hereby acknowledge and agree, for all purposes of the Lease, that the Commencement Date of the Base Term of the Lease is , , the Subsequent Premises Commencement Date is , , and the termination date of the Base Term of the Lease shall be midnight on , . In case of a conflict between this Acknowledgment of Commencement Date and the Lease, this Acknowledgment of Commencement Date shall control for all purposes.

IN WITNESS WHEREOF, Landlord and Tenant have executed this ACKNOWLEDGMENT OF COMMENCEMENT DATE to be effective on the date first above written.

TENANT:

AVROBIO, INC.,
a Delaware corporation

By: _____
Print Name: _____
Title: _____

LANDLORD:

ARE-MA REGION NO. 59, LLC,
a Delaware limited liability company

By: ALEXANDRIA REAL ESTATE EQUITIES, L.P.,
a Delaware limited partnership, managing member

By: ARE-QRS CORP.,
a Maryland corporation, general partner

By: _____
Print Name: _____
Title: _____

EXHIBIT E TO LEASE

RULES AND REGULATIONS

1. The sidewalk, entries, and driveways of the Building, Property or Project shall not be obstructed by Tenant, or any Tenant Party, or used by them for any purpose other than ingress and egress to and from the Premises.

2. Tenant shall not place any objects, including antennas, outdoor furniture, etc., in the parking areas, landscaped areas or other areas outside of its Premises, or on the roof of the Building.

3. Except for animals assisting the disabled, no animals shall be allowed in the offices, halls, or corridors in the Building, Property or Project.

4. Tenant shall not disturb the occupants of the Building, Property or Project or adjoining buildings by the use of any radio or musical instrument or by the making of loud or improper noises.

5. If Tenant desires telegraphic, telephonic or other electric connections in the Premises, Landlord or its agent will direct the electrician as to where and how the wires may be introduced; and, without such direction, no boring or cutting of wires will be permitted. Any such installation or connection shall be made at Tenant's expense.

6. Tenant shall not install or operate any steam or gas engine or boiler, or other mechanical apparatus in the Premises, except as specifically approved in the Lease. The use of oil, gas or inflammable liquids for heating, lighting or any other purpose is expressly prohibited. Explosives or other articles deemed extra hazardous shall not be brought into the Building, Property or Project.

7. Parking any type of recreational vehicles is specifically prohibited on or about the Building, Property or Project. Except for the overnight parking of operative vehicles, no vehicle of any type shall be stored in the parking areas at any time. In the event that a vehicle is disabled, it shall be removed within 48 hours. There shall be no "For Sale" or other advertising signs on or about any parked vehicle. All vehicles shall be parked in the designated parking areas in conformity with all signs and other markings. All parking will be open parking, and no reserved parking, numbering or lettering of individual spaces will be permitted except as specified by Landlord.

8. Tenant shall maintain the Premises free from rodents, insects and other pests.

9. Landlord reserves the right to exclude or expel from the Building, Property or Project any person who, in the judgment of Landlord, is intoxicated or under the influence of liquor or drugs or who shall in any manner do any act in violation of the Rules and Regulations of the Building, Property or Project.

10. Tenant shall not cause any unnecessary labor by reason of Tenant's carelessness or indifference in the preservation of good order and cleanliness. Landlord shall not be responsible to Tenant for any loss of property on the Premises, however occurring, or for any damage done to the effects of Tenant by the janitors or any other employee or person.

11. Tenant shall give Landlord prompt notice of any defects in the water, lawn sprinkler, sewage, gas pipes, electrical lights and fixtures, heating apparatus, or any other service equipment affecting the Premises.

12. Tenant shall not permit storage outside the Premises, including without limitation, outside storage of trucks and other vehicles, or dumping of waste or refuse or permit any harmful materials to be placed in any drainage system or sanitary system in or about the Premises.

13. All moveable trash receptacles provided by the trash disposal firm for the Premises must be kept in the trash enclosure areas, if any, provided for that purpose.

14. No auction, public or private, will be permitted on the Premises, Building, Property or Project.

15. No awnings shall be placed over the windows in the Premises except with the prior written consent of Landlord.

16. The Premises shall not be used for lodging, sleeping or cooking or for any immoral or illegal purposes or for any purpose other than that specified in the Lease. No gaming devices shall be operated in the Premises.

17. Tenant shall ascertain from Landlord the maximum amount of electrical current which can safely be used in the Premises, taking into account the capacity of the electrical wiring in the Building, Property and Premises and the needs of other tenants, and shall not use more than such safe capacity. Landlord's consent to the installation of electric equipment shall not relieve Tenant from the obligation not to use more electricity than such safe capacity.

18. Tenant assumes full responsibility for protecting the Premises from theft, robbery and pilferage.

19. Tenant shall not install or operate on the Premises any machinery or mechanical devices of a nature not directly related to Tenant's ordinary use of the Premises and shall keep all such machinery free of vibration, noise and air waves which may be transmitted beyond the Premises.

EXHIBIT F TO LEASE

TENANT'S PERSONAL PROPERTY

None.

EXHIBIT G TO LEASE

NOTIFICATION OF THE PRESENCE OF ASBESTOS CONTAINING MATERIALS

This notification provides certain information about asbestos within or about the Premises at Building 300, One Kendall Square, Boston, Massachusetts ("Building").

Historically, asbestos was commonly used in building products used in the construction of buildings across the country. Asbestos-containing building products were used because they are fire-resistant and provide good noise and temperature insulation. Because of their prevalence, asbestos-containing materials, or ACMs, are still sometimes found in buildings today.

An asbestos survey of the building conducted in 2017 confirmed the presence of asbestos in exterior window sealants. However, roofing materials and fire rated doors were not sampled to avoid damage and are considered presumed asbestos-containing materials or PACMS.

Because ACMs and PACMs may be present within or about the Building, we have hired an independent environmental consulting firm to prepare an operations and maintenance program ("**O&M Program**"). The O&M Program is designed to minimize the potential of any harmful asbestos exposure to any person within or about the Building. The O&M Program includes a description of work methods to be taken in order to maintain any ACMs or PACMs within or about the Building in good condition and to prevent any significant disturbance of such ACMs or PACMs. Appropriate personnel receive regular periodic training on how to properly administer the O&M Program.

The O&M Program describes the risks associated with asbestos exposure and how to prevent such exposure through appropriate work practices. ACMs and PACMs generally are not thought to be a threat to human health unless asbestos fibers are released into the air and inhaled. This does not typically occur unless (1) the ACMs are in a deteriorating condition, or (2) the ACMs have been significantly disturbed (such as through abrasive cleaning, or maintenance or renovation activities). If inhaled, asbestos fibers can accumulate in the lungs and, as exposure increases, the risk of disease (such as asbestosis or cancer) increases. However, measures to minimize exposure, and consequently minimize the accumulation of asbestos fibers, reduce the risks of adverse health effects.

The O&M Program describes a number of activities that should be avoided in order to prevent a release of asbestos fibers. In particular, you should be aware that some of the activities which may present a health risk include moving, drilling, boring, or otherwise disturbing ACMs. Consequently, such activities should not be attempted by any person not qualified to handle ACMs.

The O&M Program is available for review during regular business hours at Landlord's office located at 400 Technology Square, Suite 101, Cambridge, MA 02139.

Exhibit 10.13

LOAN AND SECURITY AGREEMENT

THIS LOAN AND SECURITY AGREEMENT (this "**Agreement**") dated as of June 23, 2017 (the "**Effective Date**") between **SILICON VALLEY BANK**, a California corporation with a loan production office located at 275 Grove Street, Suite 2-200, Newton, Massachusetts 02466 ("**Bank**"), and **AVROBIO, INC.**, a Delaware corporation ("**Borrower**"), provides the terms on which Bank shall lend to Borrower and Borrower shall repay Bank. The parties agree as follows:

1. ACCOUNTING AND OTHER TERMS

Accounting terms not defined in this Agreement shall be construed following GAAP. Calculations and determinations must be made following GAAP. Notwithstanding the foregoing, all financial covenant calculations shall be computed with respect to the Borrower only, and not on a consolidated basis. Capitalized terms not otherwise defined in this Agreement shall have the meanings set forth in Section 13. All other terms contained in this Agreement, unless otherwise indicated, shall have the meaning provided by the Code to the extent such terms are defined therein.

2. LOAN AND TERMS OF PAYMENT

2.1 Promise to Pay. Borrower hereby unconditionally promises to pay Bank the outstanding principal amount of all Credit Extensions and accrued and unpaid interest thereon as and when due in accordance with this Agreement.

2.1.1 Term Loan.

(a) Availability. Subject to the terms and conditions of this Agreement, upon Borrower's request, during the Tranche 1 Draw Period, Bank shall make term loan advances (each, a "**Tranche 1 Advance**" and collectively, the "**Tranche 1 Advances**") available to Borrower in an aggregate original principal amount not to exceed Three Million Five Hundred Thousand Dollars ($3,500,000.00). Subject to the terms and conditions of this Agreement, upon Borrower's request, during the Tranche 2 Draw Period, Bank shall make term loan advances (each, a "**Tranche 2 Advance**" and collectively, the "**Tranche 2 Advances**") available to Borrower in an aggregate original principal amount not to exceed Three Million Five Hundred Thousand Dollars ($3,500,000.00). Subject to the terms and conditions of this Agreement, upon Borrower's request, during the Tranche 3 Draw Period, Bank shall make term loan advances (each, a "**Tranche 3 Advance**" and collectively, the "**Tranche 3 Advances**") available to Borrower in an aggregate original principal amount not to exceed Three Million Dollars ($3,000,000.00). The Tranche 1 Advances, the Tranche 2 Advances, and the Tranche 3 Advances are hereinafter referred to each singly as a "Term Loan Advance" and, collectively, as the "Term Loan Advances". Borrower may request up to five (5) Term Loan Advances hereunder, and each Term Loan Advance must be in an amount equal to at least One Million Dollars ($1,000,000.00). After repayment, no Term Loan Advance (or any portion thereof) may be reborrowed.

(b) Interest Payments. Commencing on the first Payment Date following the Funding Date of the applicable Term Loan Advance and continuing on each Payment Date thereafter, Borrower shall make monthly payments of interest, in arrears, on the principal amount of each Term Loan Advance at the rate set forth in Section 2.2(a).

(c) Repayment. Commencing on the Amortization Date and continuing on each Payment Date thereafter, Borrower shall repay the aggregate outstanding Term Loan Advances in (i) equal monthly installments of principal based upon the Repayment Schedule, plus (ii) monthly payments of accrued interest at the rate set forth in Section 2.2(a). All outstanding principal and accrued and unpaid interest under the Term Loan Advances, and all other outstanding Obligations with respect to the Term Loan Advances, are due and payable in full on the Term Loan Maturity Date.

(d) Permitted Prepayment of Term Loan Advances. Borrower shall have the option to prepay all, but not less than all, of the Term Loan Advances advanced by Bank under this Agreement, provided Borrower (i) provides written notice to Bank of its election to prepay the Term Loan Advances at least ten (10) days

prior to such prepayment, and (ii) pays, on the date of such prepayment (A) all outstanding principal plus accrued and unpaid interest, (B) the Prepayment Premium, (C) the Final Payment, plus (D) all other sums, if any, that shall have become due and payable under the Loan Documents, including interest at the Default Rate with respect to any past due amounts.

(e) Mandatory Prepayment Upon an Acceleration. If the Term Loan Advances are accelerated by Bank hereunder following the occurrence and during the continuance of an Event of Default, Borrower shall immediately pay to Bank an amount equal to the sum of: (i) all outstanding principal plus accrued and unpaid interest, (ii) the Prepayment Premium, (iii) the Final Payment, plus (iv) all other sums, if any, that shall have become due and payable under the Loan Documents, including interest at the Default Rate with respect to any past due amounts.

2.2 Payment of Interest on the Credit Extensions.

(a) Interest Rate. Subject to Section 2.2(b), the principal amount outstanding for each Term Loan Advance shall accrue interest at a floating per annum rate equal to the greater of (i) one percent (1.0%) and (ii) the Prime Rate minus three percent (3.0%), which interest shall be payable monthly in accordance with Section 2.2(d) below.

(b) Default Rate. Immediately upon the occurrence and during the continuance of an Event of Default, Obligations shall bear interest at a rate per annum which is five percent (5.0%) above the rate that is otherwise applicable thereto (the "**Default Rate**") unless Bank otherwise elects from time to time in its sole discretion to impose a smaller increase. Fees and expenses which are required to be paid by Borrower pursuant to the Loan Documents (including, without limitation, Bank Expenses) but are not paid when due shall bear interest until paid at a rate equal to the highest rate applicable to the Obligations. Payment or acceptance of the increased interest rate provided in this Section 2.2(b) is not a permitted alternative to timely payment and shall not constitute a waiver of any Event of Default or otherwise prejudice or limit any rights or remedies of Bank.

(c) Adjustment to Interest Rate. Changes to the interest rate of any Credit Extension based on changes to the Prime Rate shall be effective on the effective date of any change to the Prime Rate and to the extent of any such change.

(d) Payment; Interest Computation. Interest is payable monthly in arrears on the Payment Date and shall be computed on the basis of a 360-day year for the actual number of days elapsed. In computing interest, (i) all payments received after 2:00 p.m. Eastern time on any day shall be deemed received at the opening of business on the next Business Day, and (ii) the date of the making of any Credit Extension shall be included and the date of payment shall be excluded; provided, however, that if any Credit Extension is repaid on the same day on which it is made, such day shall be included in computing interest on such Credit Extension.

2.3 Fees. Borrower shall pay to Bank:

(a) Final Payment. The Final Payment, when due hereunder;

(b) Prepayment Premium. The Prepayment Premium, when due hereunder;

(c) Bank Expenses. All Bank Expenses (including reasonable attorneys' fees and expenses for documentation and negotiation of this Agreement) incurred through and after the Effective Date, when due (or, if no stated due date, upon demand by Bank).

Unless otherwise provided in this Agreement or in a separate writing by Bank, Borrower shall not be entitled to any credit, rebate, or repayment of any fees earned by Bank pursuant to this Agreement notwithstanding any termination of this Agreement or the suspension or termination of Bank's obligation to make loans and advances hereunder. Bank may deduct amounts owing by Borrower under the clauses of this Section 2.3 pursuant to the terms of Section 2.4(c). Bank shall provide Borrower written notice of deductions made from the Designated Deposit Account pursuant to the terms of the clauses of this Section 2.5.

2.4 Payments; Application of Payments; Debit of Accounts.

(a) All payments to be made by Borrower under any Loan Document shall be made in immediately available funds in Dollars, without setoff or counterclaim, before 2:00 p.m. Eastern time on the date when due. Payments of principal and/or interest received after 2:00 p.m. Eastern time are considered received at the opening of business on the next Business Day. When a payment is due on a day that is not a Business Day, the payment shall be due the next Business Day, and additional fees or interest, as applicable, shall continue to accrue until paid.

(b) Bank has the exclusive right to determine the order and manner in which all payments with respect to the Obligations may be applied. Borrower shall have no right to specify the order or the accounts to which Bank shall allocate or apply any payments required to be made by Borrower to Bank or otherwise received by Bank under this Agreement when any such allocation or application is not specified elsewhere in this Agreement.

(c) Bank may debit any of Borrower's deposit accounts, including the Designated Deposit Account, for principal and interest payments or any other amounts Borrower owes Bank when due. These debits shall not constitute a set-off.

3. CONDITIONS OF LOANS

3.1 Conditions Precedent to Initial Credit Extension. Bank's obligation to make the initial Credit Extension is subject to the condition precedent that Bank shall have received, in form and substance satisfactory to Bank, such documents, and completion of such other matters, as Bank may have reasonably requested, including, without limitation:

(a) duly executed original signatures to the Loan Documents;

(b) duly executed original signatures to the Warrant;

(c) duly executed original signatures to any Control Agreement(s);

(d) the Operating Documents and long-form good standing certificates of Borrower certified by the Secretary of State (or equivalent agency) of Borrower's jurisdiction of organization or formation and each jurisdiction in which Borrower and each Subsidiary is qualified to conduct business, each as of a date no earlier than thirty (30) days prior to the Effective Date;

(e) duly executed original signatures to the completed Borrowing Resolutions for Borrower;

(f) certified copies, dated as of a recent date, of financing statement searches, as Bank may request, accompanied by written evidence (including any UCC termination statements) that the Liens indicated in any such financing statements either constitute Permitted Liens or have been or, in connection with the initial Credit Extension, will be terminated or released;

(g) the Perfection Certificate of Borrower, together with the duly executed original signature thereto;

(h) evidence satisfactory to Bank that the insurance policies and endorsements required by Section 6.5 hereof are in full force and effect, together with appropriate evidence showing lender loss payable and/or additional insured clauses or endorsements in favor of Bank; and

(i) payment of the fees and Bank Expenses then due as specified in Section 2.5 hereof.

3.2 Conditions Precedent to all Credit Extensions. Bank's obligations to make each Credit Extension, including the initial Credit Extension, is subject to the following conditions precedent:

(a) except as otherwise provided in Section 3.5(a), timely receipt of an executed Payment/Advance Form;

(b) the representations and warranties in this Agreement shall be true, accurate, and complete in all material respects on the date of the Payment/Advance Form and on the Funding Date of each Credit Extension; provided, however, that such materiality qualifier shall not be applicable to any representations and warranties that already are qualified or modified by materiality in the text thereof; and provided, further that those representations and warranties expressly referring to a specific date shall be true, accurate and complete in all material respects as of such date, and no Event of Default shall have occurred and be continuing or result from the Credit Extension. Each Credit Extension is Borrower's representation and warranty on that date that the representations and warranties in this Agreement are true, accurate, and complete in all material respects as of such date; provided, however, that such materiality qualifier shall not be applicable to any representations and warranties that already are qualified or modified by materiality in the text thereof; and provided, further that those representations and warranties expressly referring to a specific date shall be true, accurate and complete in all material respects as of such date; and

(c) Bank determines to its satisfaction that there has not been any material impairment in the general affairs, management, results of operation, financial condition or the prospect of repayment of the Obligations then due, or any material adverse deviation by Borrower from the most recent business plan of Borrower presented to and accepted by Bank.

3.3 Covenant to Deliver. Borrower agrees to deliver to Bank each item required to be delivered to Bank under this Agreement as a condition precedent to any Credit Extension. Borrower expressly agrees that a Credit Extension made prior to the receipt by Bank of any such item shall not constitute a waiver by Bank of Borrower's obligation to deliver such item, and the making of any Credit Extension in the absence of a required item shall be in Bank's sole discretion.

3.4 Procedures for Borrowing. Subject to the prior satisfaction of all other applicable conditions to the making of a Credit Extension set forth in this Agreement, to obtain a Credit Extension, Borrower shall notify Bank (which notice shall be irrevocable) by electronic mail, facsimile, or telephone by 2:00 p.m. Eastern time two (2) Business Days before the proposed Funding Date of the Credit Extension. Together with any such electronic or facsimile notification, Borrower shall deliver to Bank by electronic mail or facsimile a completed Payment/Advance Form executed by a Responsible Officer or his or her designee. Bank may rely on any telephone notice given by a person whom Bank reasonably believes is a Responsible Officer or designee. Bank shall credit Credit Extensions to the Designated Deposit Account. Bank may make Credit Extensions under this Agreement based on instructions from a Responsible Officer or his or her designee or without instructions if the Credit Extensions are necessary to meet Obligations which have become due.

4. CREATION OF SECURITY INTEREST

4.1 Grant of Security Interest. Borrower hereby grants Bank, to secure the payment and performance in full of all of the Obligations, a continuing security interest in, and pledges to Bank, the Collateral, wherever located, whether now owned or hereafter acquired or arising, and all proceeds and products thereof.

Borrower acknowledges that it previously has entered, and/or may in the future enter, into Bank Services Agreements with Bank. Regardless of the terms of any Bank Services Agreement, Borrower agrees that any amounts Borrower owes Bank thereunder shall be deemed to be Obligations hereunder and that it is the intent of Borrower and Bank to have all such Obligations secured by the first priority perfected security interest in the Collateral granted herein (subject only to Permitted Liens that are permitted pursuant to the terms of this Agreement to have superior priority to Bank's Lien in this Agreement).

If this Agreement is terminated, Bank's Lien in the Collateral shall continue until the Obligations (other than inchoate indemnity obligations) are repaid in full in cash. Upon payment in full in cash of the Obligations (other than inchoate indemnity obligations) and at such time as Bank's obligation to make Credit Extensions has terminated, Bank shall, at the sole cost and expense of Borrower, release its Liens in the Collateral and all rights therein shall revert to Borrower. In the event (x) all Obligations (other than inchoate indemnity obligations), except for Bank Services, are satisfied in full, and (y) this Agreement is terminated, Bank shall terminate the security

interest granted herein upon Borrower providing cash collateral acceptable to Bank in its good faith business judgment for Bank Services, if any. In the event such Bank Services consist of outstanding Letters of Credit, Borrower shall provide to Bank cash collateral in an amount equal to (x) if such Letters of Credit are denominated in Dollars, then at least one hundred five percent (105.0%); and (y) if such Letters of Credit are denominated in a Foreign Currency, then at least one hundred ten percent (110.0%), of the Dollar Equivalent of the face amount of all such Letters of Credit plus, in each case, all interest, fees, and costs due or to become due in connection therewith (as estimated by Bank in its business judgment), to secure all of the Obligations relating to such Letters of Credit.

4.2 Priority of Security Interest. Borrower represents, warrants, and covenants that the security interest granted herein is and shall at all times continue to be a first priority perfected security interest in the Collateral (subject only to Permitted Liens that are permitted pursuant to the terms of this Agreement to have superior priority to Bank's Lien under this Agreement). If Borrower shall acquire a commercial tort claim, Borrower shall promptly notify Bank in a writing signed by Borrower of the general details thereof and grant to Bank in such writing a security interest therein and in the proceeds thereof, all upon the terms of this Agreement, with such writing to be in form and substance reasonably satisfactory to Bank.

4.3 Authorization to File Financing Statements. Borrower hereby authorizes Bank to file financing statements, without notice to Borrower, with all appropriate jurisdictions to perfect or protect Bank's interest or rights hereunder, including a notice that any disposition of the Collateral, by either Borrower or any other Person, shall be deemed to violate the rights of Bank under the Code. Such financing statements may indicate the Collateral as "all assets of the Debtor" or words of similar effect, or as being of an equal or lesser scope, or with greater detail, all in Bank's discretion.

5. REPRESENTATIONS AND WARRANTIES

Borrower represents and warrants as follows:

5.1 Due Organization, Authorization; Power and Authority. Borrower is duly existing and in good standing as a Registered Organization in its jurisdiction of formation and is qualified and licensed to do business and is in good standing in any jurisdiction in which the conduct of its business or its ownership of property requires that it be qualified except where the failure to do so could not reasonably be expected to have a material adverse effect on Borrower's business. In connection with this Agreement, Borrower has delivered to Bank a completed certificate signed by Borrower entitled "Perfection Certificate". Borrower represents and warrants to Bank that (a) Borrower's exact legal name is that indicated on the Perfection Certificate and on the signature page hereof; (b) Borrower is an organization of the type and is organized in the jurisdiction set forth in the Perfection Certificate; (c) the Perfection Certificate accurately sets forth Borrower's organizational identification number or accurately states that Borrower has none; (d) the Perfection Certificate accurately sets forth Borrower's place of business, or, if more than one, its chief executive office as well as Borrower's mailing address (if different than its chief executive office); (e) Borrower (and each of its predecessors) has not, in the past five (5) years, changed its jurisdiction of formation, organizational structure or type, or any organizational number assigned by its jurisdiction; and (f) all other information set forth on the Perfection Certificate pertaining to Borrower and each of its Subsidiaries is accurate and complete (it being understood and agreed that Borrower may from time to time update certain information in the Perfection Certificate after the Effective Date to the extent permitted by one or more specific provisions in this Agreement). If Borrower is not now a Registered Organization but later becomes one, Borrower shall promptly notify Bank of such occurrence and provide Bank with Borrower's organizational identification number.

The execution, delivery and performance by Borrower of the Loan Documents to which it is a party have been duly authorized, and do not (i) conflict with any of Borrower's organizational documents, (ii) contravene, conflict with, constitute a default under or violate any material Requirement of Law, (iii) contravene, conflict or violate any applicable order, writ, judgment, injunction, decree, determination or award of any Governmental Authority by which Borrower or any of its Subsidiaries or any of their property or assets may be bound or affected, (iv) require any action by, filing, registration, or qualification with, or Governmental Approval from, any Governmental Authority (except such Governmental Approvals which have already been obtained and are in full force and effect (or are being obtained pursuant to Section 6.1(b))) or (v) conflict with, contravene, constitute a default or breach under, or result in or permit the termination or acceleration of, any material agreement by which Borrower is bound. Borrower is not in default under any agreement to which it is a party or by which it is bound in which the default could reasonably be expected to have a material adverse effect on Borrower's business.

5.2 Collateral. Borrower has good title to, rights in, and the power to transfer each item of the Collateral upon which it purports to grant a Lien hereunder, free and clear of any and all Liens except Permitted Liens. Borrower has no Collateral Accounts at or with any bank or financial institution other than Bank or Bank's Affiliates except for the Collateral Accounts described in the Perfection Certificate delivered to Bank in connection herewith and which Borrower has taken such actions as are necessary to give Bank a perfected security interest therein, pursuant to the terms of Section 6.6(b). The Accounts are bona fide, existing obligations of the Account Debtors.

The Collateral is not in the possession of any third party bailee (such as a warehouse) except as otherwise provided in the Perfection Certificate. None of the components of the Collateral (other than mobile equipment such as laptop computers with an aggregate value not exceeding One Hundred Thousand Dollars ($100,000.00) in the possession of Borrower's employees or agents) shall be maintained at locations other than as provided in the Perfection Certificate or as permitted pursuant to Section 7.2.

All Inventory is in all material respects of good and marketable quality, free from material defects.

Borrower is the sole owner of the Intellectual Property which it owns or purports to own except for (a) non-exclusive licenses granted to its customers in the ordinary course of business, (b) over-the-counter software that is commercially available to the public, and (c) material Intellectual Property licensed to Borrower and noted on the Perfection Certificate. Each Patent which it owns or purports to own and which is material to Borrower's business is valid and enforceable, and no part of the Intellectual Property which Borrower owns or purports to own and which is material to Borrower's business has been judged invalid or unenforceable, in whole or in part. To Borrower's knowledge, no claim has been made that any part of the Intellectual Property violates the rights of any third party except to the extent such claim would not reasonably be expected to have a material adverse effect on Borrower's business.

Except as noted on the Perfection Certificate, Borrower is not a party to, nor is it bound by, any Restricted License.

5.3 Litigation. There are no actions or proceedings pending or, to the knowledge of any Responsible Officer, threatened in writing by or against Borrower or any of its Subsidiaries involving more than, individually or in the aggregate, One Hundred Thousand Dollars ($100,000.00)

5.4 Financial Statements; Financial Condition. All consolidated financial statements for Borrower and any of its Subsidiaries delivered to Bank fairly present in all material respects Borrower's consolidated financial condition and Borrower's consolidated results of operations. There has not been any material deterioration in Borrower's consolidated financial condition since the date of the most recent financial statements submitted to Bank.

5.5 Solvency. The fair salable value of Borrower's consolidated assets (including goodwill minus disposition costs) exceeds the fair value of Borrower's liabilities; Borrower is not left with unreasonably small capital after the transactions in this Agreement; and Borrower is able to pay its debts (including trade debts) as they mature.

5.6 Regulatory Compliance. Borrower is not an "investment company" or a company "controlled" by an "investment company" under the Investment Company Act of 1940, as amended. Borrower is not engaged as one of its important activities in extending credit for margin stock (under Regulations X, T and U of the Federal Reserve Board of Governors). Borrower (a) has complied in all material respects with all Requirements of Law, and (b) has not violated any Requirements of Law the violation of which could reasonably be expected to have a material adverse effect on its business. None of Borrower's or any of its Subsidiaries' properties or assets has been used by Borrower or any Subsidiary or, to Borrower's knowledge, by previous Persons, in disposing, producing, storing, treating, or transporting any hazardous substance other than legally. Borrower and each of its Subsidiaries have obtained all consents, approvals and authorizations of, made all declarations or filings with, and given all notices to, all Governmental Authorities that are necessary to continue their respective businesses as currently conducted.

5.7 Subsidiaries; Investments. Borrower does not own any stock, partnership, or other ownership interest or other equity securities except for Permitted Investments.

5.8 Tax Returns and Payments; Pension Contributions. Borrower has timely filed all required tax returns and reports, and Borrower has timely paid all foreign, federal, state and local taxes, assessments, deposits and contributions owed by Borrower except (a) to the extent such taxes are being contested in good faith by appropriate proceedings promptly instituted and diligently conducted, so long as such reserve or other appropriate provision, if any, as shall be required in conformity with GAAP shall have been made therefor, or (b) if such taxes, assessments, deposits and contributions do not, individually or in the aggregate, exceed Five Thousand Dollars ($5,000.00).

To the extent Borrower defers payment of any contested taxes, Borrower shall (i) notify Bank in writing of the commencement of, and any material development in, the proceedings, and (ii) post bonds or take any other steps required to prevent the governmental authority levying such contested taxes from obtaining a Lien upon any of the Collateral that is other than a "Permitted Lien." Borrower is unaware of any claims or adjustments proposed for any of Borrower's prior tax years which could result in additional taxes becoming due and payable by Borrower. Borrower has paid all amounts necessary to fund all present pension, profit sharing and deferred compensation plans in accordance with their terms, and Borrower has not withdrawn from participation in, and has not permitted partial or complete termination of, or permitted the occurrence of any other event with respect to, any such plan which could reasonably be expected to result in any liability of Borrower, including any liability to the Pension Benefit Guaranty Corporation or its successors or any other governmental agency.

5.9 Use of Proceeds. Borrower shall use the proceeds of the Credit Extensions as working capital and to fund its general business requirements and not for personal, family, household or agricultural purposes.

5.10 Full Disclosure. No written representation, warranty or other statement of Borrower in any certificate or written statement given to Bank in connection with the Loan Documents or the transactions contemplated thereby, as of the date such representation, warranty, or other statement was made, taken together with all such written certificates and written statements given to Bank, contains any untrue statement of a material fact or omits to state a material fact necessary to make the statements contained in the certificates or statements not misleading in light of the circumstances in which they were made (it being recognized by Bank that the projections and forecasts provided by Borrower in good faith and based upon reasonable assumptions are not viewed as facts and that actual results during the period or periods covered by such projections and forecasts may differ from the projected or forecasted results).

5.11 Definition of "Knowledge." For purposes of the Loan Documents, whenever a representation or warranty is made to Borrower's knowledge or awareness, to the "best of" Borrower's knowledge, or with a similar qualification, knowledge or awareness means the actual knowledge, after reasonable investigation, of any Responsible Officer.

6. AFFIRMATIVE COVENANTS

Borrower shall do all of the following:

6.1 Government Compliance.

(a) Maintain its and (except as permitted by Section 7.3) all its Subsidiaries' legal existence and good standing in their respective jurisdictions of formation and maintain qualification in each jurisdiction in which the failure to so qualify would reasonably be expected to have a material adverse effect on Borrower's business or operations. Borrower shall comply, and have each Subsidiary comply, in all material respects, with all laws, ordinances and regulations to which it is subject.

(b) Obtain all of the Governmental Approvals necessary for the performance by Borrower of its obligations under the Loan Documents to which it is a party and the grant of a security interest to Bank in all of its property. Borrower shall promptly provide copies of any such obtained Governmental Approvals to Bank.

6.2 Financial Statements, Reports, Certificates. Provide Bank with the following:

(a) Monthly Financial Statements. As soon as available, but no later than thirty (30) days after the last day of each month, a company prepared consolidated balance sheet and income statement covering Borrower's consolidated operations for such month certified by a Responsible Officer and in a form acceptable to Bank (the "**Monthly Financial Statements**");

(b) Monthly Compliance Certificate. Within thirty (30) days after the last day of each month and together with the Monthly Financial Statements, a duly completed Compliance Certificate signed by a Responsible Officer, certifying that as of the end of such month, Borrower was in compliance with all of the terms and conditions of this Agreement, and setting forth calculations showing compliance with the financial covenants (if any) set forth in this Agreement and such other information as Bank may reasonably request;

(c) Board-Approved Projections. Within sixty (60) days after the Borrower's fiscal year, and contemporaneously with any updates or changes thereto, annual Board-approved operating budgets and financial projections, in a form acceptable to Bank;

(d) Annual Audited Financial Statements. As soon as available, but no later than one hundred eighty (180) days after the last day of Borrower's fiscal year, audited consolidated financial statements prepared under GAAP, consistently applied, together with an unqualified opinion on the financial statements from an independent certified public accounting firm reasonably acceptable to Bank;

(e) Other Statements. Within five (5) days of delivery, copies of all statements, reports and notices made available to Borrower's security holders or to any holders of Subordinated Debt;

(f) SEC Filings. In the event that Borrower becomes subject to the reporting requirements under the Exchange Act within five (5) days of filing, copies of all periodic and other reports, proxy statements and other materials filed by Borrower with the SEC, any Governmental Authority succeeding to any or all of the functions of the SEC or with any national securities exchange, or distributed to its shareholders, as the case may be. Documents required to be delivered pursuant to the terms hereof (to the extent any such documents are included in materials otherwise filed with the SEC) may be delivered electronically and if so delivered, shall be deemed to have been delivered on the date on which Borrower posts such documents, or provides a link thereto, on Borrower's website on the Internet at Borrower's website address; provided, however, Borrower shall promptly notify Bank in writing (which may be by electronic mail) of the posting of any such documents;

(g) Legal Action Notice. A prompt report of any legal actions pending or threatened in writing against Borrower or any of its Subsidiaries that could result in damages or costs to Borrower or any of its Subsidiaries of, individually or in the aggregate, One Hundred Thousand Dollars ($100,000.00) or more; and

(h) Other Information. Other information reasonably requested by Bank.

6.3 Inventory; Returns. Keep all Inventory in good and marketable condition, free from material defects. Returns and allowances between Borrower and its Account Debtors shall follow Borrower's customary practices as they exist at the Effective Date. Borrower must promptly notify Bank of all returns, recoveries, disputes and claims that involve more than One Hundred Thousand Dollars ($100,000.00).

6.4 Taxes; Pensions. Timely file, and require each of its Subsidiaries to timely file, all required tax returns and reports and timely pay, and require each of its Subsidiaries to timely pay, all foreign, federal, state and local taxes, assessments, deposits and contributions owed by Borrower and each of its Subsidiaries, except for deferred payment of any taxes contested pursuant to the terms of Section 5.8 hereof, and shall deliver to Bank, on demand, appropriate certificates attesting to such payments, and pay all amounts necessary to fund all present pension, profit sharing and deferred compensation plans in accordance with their terms.

6.5 Insurance.

(a) Keep its business and the Collateral insured for risks and in amounts standard for companies in Borrower's industry and location and as Bank may reasonably request. Insurance policies shall be in a form, with financially sound and reputable insurance companies that are not Affiliates of Borrower, and in amounts that are satisfactory to Bank. All property policies shall have a lender's loss payable endorsement showing Bank as lender loss payee. All liability policies shall show, or have endorsements showing, Bank as an additional insured. Bank shall be named as lender loss payee and/or additional insured with respect to any such insurance providing coverage in respect of any Collateral.

(b) Ensure that proceeds payable under any property policy are, at Bank's option, payable to Bank on account of the Obligations. Notwithstanding the foregoing, (a) so long as no Event of Default has occurred and is continuing, Borrower shall have the option of applying the proceeds of any casualty policy up to Two Hundred Fifty Thousand Dollars ($250,000.00) in the aggregate for all losses under all casualty policies in any one (1) year, toward the replacement or repair of destroyed or damaged property; provided that any such replaced or repaired property (i) shall be of equal or like value as the replaced or repaired Collateral and (ii) shall be deemed Collateral in which Bank has been granted a first priority security interest (subject only to Permitted Liens that are permitted pursuant to the terms of this Agreement to have superior priority to Bank's Lien), and (b) after the occurrence and during the continuance of an Event of Default, all proceeds payable under such casualty policy shall, at the option of Bank, be payable to Bank on account of the Obligations.

(c) At Bank's request, Borrower shall deliver certified copies of insurance policies and evidence of all premium payments. Each provider of any such insurance required under this Section 6.5 shall agree, by endorsement upon the policy or policies issued by it or by independent instruments furnished to Bank, that it will give Bank thirty (30) days prior written notice before any such policy or policies shall be materially altered or canceled. If Borrower fails to obtain insurance as required under this Section 6.5 or to pay any amount or furnish any required proof of payment to third persons and Bank, Bank may make all or part of such payment or obtain such insurance policies required in this Section 6.5, and take any action under the policies Bank deems prudent.

6.6 Operating Accounts.

(a) Maintain all of its and all of its Subsidiaries' operating, depository and securities/investment accounts with Bank and Bank's Affiliates. In addition, Borrower shall use Bank for all cash management, foreign exchange and letters of credit.

(b) Provide Bank five (5) days prior written notice before establishing any Collateral Account at or with any bank or financial institution other than Bank or Bank's Affiliates. For each Collateral Account that Borrower at any time maintains, Borrower shall cause the applicable bank or financial institution (other than Bank) at or with which any Collateral Account is maintained to execute and deliver a Control Agreement or other appropriate instrument with respect to such Collateral Account to perfect Bank's Lien in such Collateral Account in accordance with the terms hereunder which Control Agreement may not be terminated without the prior written consent of Bank. The provisions of the previous sentence shall not apply to deposit accounts exclusively used for payroll, payroll taxes and other employee wage and benefit payments to or for the benefit of Borrower's employees and identified to Bank by Borrower as such.

6.7 Protection of Intellectual Property Rights.

(a) (i) Protect, defend and maintain the validity and enforceability of its Intellectual Property material to Borrower's business; (ii) promptly advise Bank in writing of material infringements or any other event that could reasonably be expected to materially and adversely affect the value of its Intellectual Property; and (iii) not allow any Intellectual Property material to Borrower's business to be abandoned, forfeited or dedicated to the public without Bank's written consent.

(b) Provide written notice to Bank within ten (10) days of entering or becoming bound by any Restricted License (other than over-the-counter software that is commercially available to the public). Borrower shall take such steps as Bank requests to obtain the consent of, or waiver by, any person whose consent or waiver is necessary for (i) any Restricted License to be deemed "Collateral" and for Bank to have a security interest in it that might otherwise be restricted or prohibited by law or by the terms of any such Restricted License, whether now existing or entered into in the future, and (ii) Bank to have the ability in the event of a liquidation of any Collateral to dispose of such Collateral in accordance with Bank's rights and remedies under this Agreement and the other Loan Documents.

6.8 Litigation Cooperation. From the date hereof and continuing through the termination of this Agreement, make available to Bank, without expense to Bank, Borrower and its officers, employees and agents and Borrower's books and records, to the extent that Bank may deem them reasonably necessary to prosecute or defend any third-party suit or proceeding instituted by or against Bank with respect to any Collateral or relating to Borrower.

6.9 Access to Collateral; Books and Records. Allow Bank, or its agents, at reasonable times, on one (1) Business Day's notice (provided no notice is required if an Event of Default has occurred and is continuing), to inspect the Collateral and audit and copy Borrower's Books. The foregoing inspections and audits shall be at Borrower's expense.

6.10 Further Assurances. Execute any further instruments and take further action as Bank reasonably requests to perfect or continue Bank's Lien in the Collateral or to effect the purposes of this Agreement. Deliver to Bank, within five (5) days after the same are sent or received, copies of all correspondence, reports, documents and other filings with any Governmental Authority regarding compliance with or maintenance of Governmental Approvals or Requirements of Law or that could reasonably be expected to have a material effect on any of the Governmental Approvals or otherwise on the operations of Borrower or any of its Subsidiaries.

7. NEGATIVE COVENANTS

Borrower shall not do any of the following without Bank's prior written consent:

7.1 Dispositions. Convey, sell, lease, transfer, assign, or otherwise dispose of (collectively, "Transfer"), or permit any of its Subsidiaries to Transfer, all or any part of its business or property, except for Transfers (a) of Inventory in the ordinary course of business; (b) of worn-out, obsolete or surplus Equipment that is, in the reasonable judgment of Borrower, no longer economically practicable to maintain or useful in the ordinary course of business of Borrower; (c) consisting of Permitted Liens and Permitted Investments; (d) consisting of the sale or issuance of any stock of Borrower permitted under Section 7.2 of this Agreement; (e) consisting of Borrower's use or transfer of money or Cash Equivalents in a manner that is not prohibited by the terms of this Agreement or the other Loan Documents; and (f) of non-exclusive licenses for the use of the property of Borrower or its Subsidiaries in the ordinary course of business.

7.2 Changes in Business, Management Control, or Business Locations. (a) Engage in or permit any of its Subsidiaries to engage in any business other than the businesses currently engaged in by Borrower and such Subsidiary, as applicable, or reasonably related thereto; (b) liquidate or dissolve; or (c) fail to provide notice to Bank of any Key Person departing from or ceasing to be employed by Borrower within five (5) days after such Key Person's departure from Borrower; or (d) permit or suffer any Change in Control.

Borrower shall not, without at least thirty (30) days prior written notice to Bank: (1) add any new offices or business locations, including warehouses (unless each such new office or business location contains less than Fifty Thousand Dollars ($50,000.00) in Borrower's assets or property) or deliver any portion of the Collateral valued, individually or in the aggregate, in excess of One Hundred Thousand Dollars ($100,000.00) to a bailee at a location other than to a bailee and at a location already disclosed in the Perfection Certificate, (2) change its jurisdiction of organization, (3) change its organizational structure or type, (4) change its legal name, or (5) change any organizational number (if any) assigned by its jurisdiction of organization. If Borrower intends to deliver any portion of the Collateral valued, individually or in the aggregate, in excess of One Hundred Thousand Dollars ($100,000.00) to a bailee, and Bank and such bailee are not already parties to a bailee agreement governing both the

Collateral and the location to which Borrower intends to deliver the Collateral, then Borrower will first receive the written consent of Bank, and such bailee shall execute and deliver a bailee agreement in form and substance satisfactory to Bank. If Borrower intends to maintain assets or property valued in excess of One Hundred Thousand Dollars ($100,000.00) at any such leased location, then Borrower shall cause such landlord to execute and deliver a landlord consent in form and substance satisfactory to Bank.

7.3 Mergers or Acquisitions. Merge or consolidate, or permit any of its Subsidiaries to merge or consolidate, with any other Person, or acquire, or permit any of its Subsidiaries to acquire, all or substantially all of the capital stock or property of another Person (including, without limitation, by the formation of any Subsidiary). A Subsidiary may merge or consolidate into another Subsidiary or into Borrower.

7.4 Indebtedness. Create, incur, assume, or be liable for any Indebtedness, or permit any Subsidiary to do so, other than Permitted Indebtedness.

7.5 Encumbrance. Create, incur, allow, or suffer any Lien on any of its property, or assign or convey any right to receive income, including the sale of any Accounts, or permit any of its Subsidiaries to do so, except for Permitted Liens, permit any Collateral not to be subject to the first priority security interest granted herein, or enter into any agreement, document, instrument or other arrangement (except with or in favor of Bank) with any Person which directly or indirectly prohibits or has the effect of prohibiting Borrower or any Subsidiary from assigning, mortgaging, pledging, granting a security interest in or upon, or encumbering any of Borrower's or any Subsidiary's Intellectual Property, except as is otherwise permitted in Section 7.1 hereof and the definition of "Permitted Liens" herein.

7.6 Maintenance of Collateral Accounts. Maintain any Collateral Account except pursuant to the terms of Section 6.6(b) hereof.

7.7 Distributions; Investments. (a) Pay any dividends or make any distribution or payment or redeem, retire or purchase any capital stock; provided that (i) Borrower may convert any of its convertible securities into other securities pursuant to the terms of such convertible securities or otherwise in exchange thereof, (ii) Borrower may pay dividends solely in common stock, and (iii) Borrower may repurchase the stock of former employees or consultants pursuant to stock repurchase agreements so long as an Event of Default does not exist at the time such repurchase and would not exist after giving effect to such repurchase, provided that the aggregate amount of all such repurchases does not exceed Fifty Thousand Dollars ($50,000.00) per fiscal year; or (b) directly or indirectly make any Investment (including, without limitation, by the formation of any Subsidiary) other than Permitted Investments, or permit any of its Subsidiaries to do so.

7.8 Transactions with Affiliates. Directly or indirectly enter into or permit to exist any material transaction with any Affiliate of Borrower, except for (a) transactions that are in the ordinary course of Borrower's business, upon fair and reasonable terms that are no less favorable to Borrower than would be obtained in an arm's length transaction with a non-affiliated Person and (b) equity financings of Borrower that do not result in a Change of Control.

7.9 Subordinated Debt. (a) Make or permit any payment on any Subordinated Debt, except under the terms of the subordination, intercreditor, or other similar agreement to which such Subordinated Debt is subject, or (b) amend any provision in any document relating to the Subordinated Debt which would increase the amount thereof, provide for earlier or greater principal, interest, or other payments thereon, or adversely affect the subordination thereof to Obligations owed to Bank.

7.10 Compliance. Become an "investment company" or a company controlled by an "investment company", under the Investment Company Act of 1940, as amended, or undertake as one of its important activities extending credit to purchase or carry margin stock (as defined in Regulation U of the Board of Governors of the Federal Reserve System), or use the proceeds of any Credit Extension for that purpose; fail to (a) meet the minimum funding requirements of ERISA, (b) prevent a Reportable Event or Prohibited Transaction, as defined in ERISA, from occurring, or (c) comply with the Federal Fair Labor Standards Act, the failure of any of the conditions described in clauses (a) through (c) which could reasonably be expected to have a material adverse effect on Borrower's business; or violate any other law or regulation, if the violation could reasonably be expected to have a

material adverse effect on Borrower's business, or permit any of its Subsidiaries to do so; withdraw or permit any Subsidiary to withdraw from participation in, permit partial or complete termination of, or permit the occurrence of any other event with respect to, any present pension, profit sharing and deferred compensation plan which could reasonably be expected to result in any liability of Borrower, including any liability to the Pension Benefit Guaranty Corporation or its successors or any other governmental agency.

8. EVENTS OF DEFAULT

Any one of the following shall constitute an event of default (an "**Event of Default**") under this Agreement:

8.1 Payment Default. Borrower fails to (a) make any payment of principal or interest on any Credit Extension when due, or (b) pay any other Obligations within three (3) Business Days after such Obligations are due and payable (which three (3) Business Day cure period shall not apply to payments due on the Term Loan Maturity Date). During the cure period, the failure to make or pay any payment specified under clause (b) hereunder is not an Event of Default (but no Credit Extension will be made during the cure period);

8.2 Covenant Default.

(a) Borrower fails or neglects to perform any obligation in Sections 6.2, 6.4, 6.5, 6.6 or 6.7(b), or violates any covenant in Section 7; or

(b) Borrower fails or neglects to perform, keep, or observe any other term, provision, condition, covenant or agreement contained in this Agreement or any Loan Documents, and as to any default (other than those specified in this Section 8) under such other term, provision, condition, covenant or agreement that can be cured, has failed to cure the default within ten (10) days after the occurrence thereof; provided, however, that if the default cannot by its nature be cured within the ten (10) day period or cannot after diligent attempts by Borrower be cured within such ten (10) day period, and such default is likely to be cured within a reasonable time, then Borrower shall have an additional period (which shall not in any case exceed thirty (30) days) to attempt to cure such default, and within such reasonable time period the failure to cure the default shall not be deemed an Event of Default (but no Credit Extensions shall be made during such cure period). Cure periods provided under this section shall not apply, among other things, to financial covenants (if any) or any other covenants set forth in clause (a) above;

8.3 Material Adverse Change. A Material Adverse Change occurs;

8.4 Attachment; Levy; Restraint on Business.

(a) (i) The service of process seeking to attach, by trustee or similar process, any funds of Borrower or of any entity under the control of Borrower (including a Subsidiary), or (ii) a notice of lien or levy is filed against any of Borrower's assets by any Governmental Authority, and the same under subclauses (i) and (ii) hereof are not, within ten (10) days after the occurrence thereof, discharged or stayed (whether through the posting of a bond or otherwise); provided, however, no Credit Extensions shall be made during any ten (10) day cure period; or

(b) (i) any material portion of Borrower's assets is attached, seized, levied on, or comes into possession of a trustee or receiver, or (ii) any court order enjoins, restrains, or prevents Borrower from conducting all or any material part of its business;

8.5 Insolvency. (a) Borrower or any of its Subsidiaries is unable to pay its debts (including trade debts) as they become due or otherwise becomes insolvent; (b) Borrower or any of its Subsidiaries begins an Insolvency Proceeding; or (c) an Insolvency Proceeding is begun against Borrower or any of its Subsidiaries and is not dismissed or stayed within forty-five (45) days (but no Credit Extensions shall be made while any of the conditions described in clause (a) exist and/or until any Insolvency Proceeding is dismissed);

8.6 Other Agreements. There is, under any agreement to which Borrower is a party with a third party or parties, (a) any default resulting in a right by such third party or parties, whether or not exercised, to accelerate the maturity of any Indebtedness in an amount individually or in the aggregate in excess of One Hundred Thousand Dollars ($100,000.00); or (b) any breach or default by Borrower or Guarantor, the result of which could have a material adverse effect on Borrower's business;

8.7 Judgments; Penalties. One or more fines, penalties or final judgments, orders or decrees for the payment of money in an amount, individually or in the aggregate, of at least One Hundred Thousand Dollars ($100,000.00) (not covered by independent third-party insurance as to which liability has been accepted by such insurance carrier) shall be rendered against Borrower by any Governmental Authority, and the same are not, within ten (10) days after the entry, assessment or issuance thereof, discharged, satisfied, or paid, or after execution thereof, stayed or bonded pending appeal, or such judgments are not discharged prior to the expiration of any such stay (provided that no Credit Extensions will be made prior to the satisfaction, payment, discharge, stay, or bonding of such fine, penalty, judgment, order or decree);

8.8 Misrepresentations. Borrower or any Person acting for Borrower makes any representation, warranty, or other statement now or later in this Agreement, any Loan Document or in any writing delivered to Bank or to induce Bank to enter this Agreement or any Loan Document, and such representation, warranty, or other statement is incorrect in any material respect when made;

8.9 Subordinated Debt. Any document, instrument, or agreement evidencing any Subordinated Debt shall for any reason be revoked or invalidated or otherwise cease to be in full force and effect, any Person shall be in breach thereof or contest in any manner the validity or enforceability thereof or deny that it has any further liability or obligation thereunder, or the Obligations shall for any reason be subordinated or shall not have the priority contemplated by this Agreement; or

8.10 Governmental Approvals. Any Governmental Approval shall have been (a) revoked, rescinded, suspended, modified in an adverse manner or not renewed in the ordinary course for a full term or (b) subject to any decision by a Governmental Authority that designates a hearing with respect to any applications for renewal of any of such Governmental Approval or that could result in the Governmental Authority taking any of the actions described in clause (a) above, and such decision or such revocation, rescission, suspension, modification or non-renewal (i) causes, or could reasonably be expected to cause, a Material Adverse Change, or (ii) adversely affects the legal qualifications of Borrower or any of its Subsidiaries to hold such Governmental Approval in any applicable jurisdiction and such revocation, rescission, suspension, modification or non-renewal could reasonably be expected to affect the status of or legal qualifications of Borrower or any of its Subsidiaries to hold any Governmental Approval in any other jurisdiction.

9. BANK'S RIGHTS AND REMEDIES

9.1 Rights and Remedies. Upon the occurrence and during the continuance of an Event of Default, Bank may, without notice or demand, do any or all of the following, to the extent not prohibited by applicable law:

(a) declare all Obligations immediately due and payable (but if an Event of Default described in Section 8.5 occurs all Obligations are immediately due and payable without any action by Bank);

(b) stop advancing money or extending credit for Borrower's benefit under this Agreement or under any other agreement between Borrower and Bank;

(c) demand that Borrower (i) deposit cash with Bank in an amount equal to at least (A) one hundred five percent (105.0%) of the Dollar Equivalent of the aggregate face amount of all Letters of Credit denominated in Dollars remaining undrawn, and (B) one hundred ten percent (110.0%) of the Dollar Equivalent of the aggregate face amount of all Letters of Credit denominated in a Foreign Currency remaining undrawn (plus, in each case, all interest, fees, and costs due or to become due in connection therewith (as estimated by Bank in its good faith business judgment)), to secure all of the Obligations relating to such Letters of Credit, as collateral security for the repayment of any future drawings under such Letters of Credit, and Borrower shall forthwith deposit and pay such amounts, and (ii) pay in advance all letter of credit fees scheduled to be paid or payable over the remaining term of any Letters of Credit;

(d) terminate any FX Contracts;

(e) verify the amount of, demand payment of and performance under, and collect any Accounts and General Intangibles, settle or adjust disputes and claims directly with Account Debtors for amounts on terms and in any order that Bank considers advisable, and notify any Person owing Borrower money of Bank's security interest in such funds;

(f) make any payments and do any acts it considers necessary or reasonable to protect the Collateral and/or its security interest in the Collateral. Borrower shall assemble the Collateral if Bank requests and make it available as Bank designates at a location reasonably convenient to Bank and Borrower. Bank may peaceably enter premises where the Collateral is located, take and maintain possession of any part of the Collateral, and pay, purchase, contest, or compromise any Lien which appears to be prior or superior to its security interest and pay all expenses incurred. Borrower grants Bank a license to enter and occupy any of its premises, without charge by Borrower, to exercise any of Bank's rights or remedies;

(g) apply to the Obligations (i) any balances and deposits of Borrower it holds, or (ii) any amount held by Bank owing to or for the credit or the account of Borrower;

(h) ship, reclaim, recover, store, finish, maintain, repair, prepare for sale, advertise for sale, and sell the Collateral. Bank is hereby granted a non-exclusive, royalty-free license or other right to use, without charge, Borrower's labels, Patents, Copyrights, mask works, rights of use of any name, trade secrets, trade names, Trademarks, and advertising matter, or any similar property as it pertains to the Collateral, in completing production of, advertising for sale, and selling any Collateral and, in connection with Bank's exercise of its rights under this Section, Borrower's rights under all licenses and all franchise agreements inure to Bank's benefit;

(i) place a "hold" on any account maintained with Bank and/or deliver a notice of exclusive control, any entitlement order, or other directions or instructions pursuant to any Control Agreement or similar agreements providing control of any Collateral;

(j) demand and receive possession of Borrower's Books; and

(k) exercise all rights and remedies available to Bank under the Loan Documents or at law or equity, including all remedies provided under the Code (including disposal of the Collateral pursuant to the terms thereof).

9.2 Power of Attorney. Borrower hereby irrevocably appoints Bank as its lawful attorney-in-fact, exercisable upon the occurrence and during the continuance of an Event of Default, to: (a) endorse Borrower's name on any checks or other forms of payment or security; (b) sign Borrower's name on any invoice or bill of lading for any Account or drafts against Account Debtors; (c) settle and adjust disputes and claims about the Accounts directly with Account Debtors, for amounts and on terms Bank determines reasonable; (d) make, settle, and adjust all claims under Borrower's insurance policies; (e) pay, contest or settle any Lien, charge, encumbrance, security interest, and adverse claim in or to the Collateral, or any judgment based thereon, or otherwise take any action to terminate or discharge the same; and (f) transfer the Collateral into the name of Bank or a third party as the Code permits. Borrower hereby appoints Bank as its lawful attorney-in-fact to sign Borrower's name on any documents necessary to perfect or continue the perfection of Bank's security interest in the Collateral regardless of whether an Event of Default has occurred until all Obligations (other than inchoate indemnity obligations) have been satisfied in full and Bank is under no further obligation to make Credit Extensions hereunder. Bank's foregoing appointment as Borrower's attorney in fact, and all of Bank's rights and powers, coupled with an interest, are irrevocable until all Obligations (other than inchoate indemnity obligations) have been fully repaid and performed and Bank's obligation to provide Credit Extensions terminates.

9.3 Protective Payments. If Borrower fails to obtain the insurance called for by Section 6.5 or fails to pay any premium thereon or fails to pay any other amount which Borrower is obligated to pay under this Agreement or any other Loan Document or which may be required to preserve the Collateral, Bank may obtain such insurance or make such payment, and all amounts so paid by Bank are Bank Expenses and immediately due and payable, bearing interest at the then highest rate applicable to the Obligations, and secured by the Collateral. Bank will make reasonable efforts to provide Borrower with notice of Bank obtaining such insurance at the time it is obtained or within a reasonable time thereafter. No payments by Bank are deemed an agreement to make similar payments in the future or Bank's waiver of any Event of Default.

9.4 Application of Payments and Proceeds Upon Default. If an Event of Default has occurred and is continuing, Bank shall have the right to apply in any order any funds in its possession, whether from Borrower account balances, payments, proceeds realized as the result of any collection of Accounts or other disposition of the Collateral, or otherwise, to the Obligations. Bank shall pay any surplus to Borrower by credit to the Designated Deposit Account or to other Persons legally entitled thereto; Borrower shall remain liable to Bank for any deficiency. If Bank, directly or indirectly, enters into a deferred payment or other credit transaction with any purchaser at any sale of Collateral, Bank shall have the option, exercisable at any time, of either reducing the Obligations by the principal amount of the purchase price or deferring the reduction of the Obligations until the actual receipt by Bank of cash therefor.

9.5 Bank's Liability for Collateral. So long as Bank complies with applicable law and reasonable banking practices regarding the safekeeping of the Collateral in the possession or under the control of Bank, Bank shall not be liable or responsible for: (a) the safekeeping of the Collateral; (b) any loss or damage to the Collateral; (c) any diminution in the value of the Collateral; or (d) any act or default of any carrier, warehouseman, bailee, or other Person. Borrower bears all risk of loss, damage or destruction of the Collateral.

9.6 No Waiver; Remedies Cumulative. Bank's failure, at any time or times, to require strict performance by Borrower of any provision of this Agreement or any other Loan Document shall not waive, affect, or diminish any right of Bank thereafter to demand strict performance and compliance herewith or therewith. No waiver hereunder shall be effective unless signed by the party granting the waiver and then is only effective for the specific instance and purpose for which it is given. Bank's rights and remedies under this Agreement and the other Loan Documents are cumulative. Bank has all rights and remedies provided under the Code, by law, or in equity. Bank's exercise of one right or remedy is not an election and shall not preclude Bank from exercising any other remedy under this Agreement or other remedy available at law or in equity, and Bank's waiver of any Event of Default is not a continuing waiver. Bank's delay in exercising any remedy is not a waiver, election, or acquiescence.

9.7 Demand Waiver. Borrower waives demand, notice of default or dishonor, notice of payment and nonpayment, notice of any default, nonpayment at maturity, release, compromise, settlement, extension, or renewal of accounts, documents, instruments, chattel paper, and guarantees held by Bank on which Borrower is liable.

10. NOTICES

All notices, consents, requests, approvals, demands, or other communication by any party to this Agreement or any other Loan Document must be in writing and shall be deemed to have been validly served, given, or delivered: (a) upon the earlier of actual receipt and three (3) Business Days after deposit in the U.S. mail, first class, registered or certified mail return receipt requested, with proper postage prepaid; (b) upon transmission, when sent by electronic mail or facsimile transmission; (c) one (1) Business Day after deposit with a reputable overnight courier with all charges prepaid; or (d) when delivered, if hand-delivered by messenger, all of which shall be addressed to the party to be notified and sent to the address, facsimile number, or email address indicated below. Bank or Borrower may change its mailing or electronic mail address or facsimile number by giving the other party written notice thereof in accordance with the terms of this Section 10.

If to Borrower:	AvroBio, Inc. 700 Technology Square, Suite 101 Cambridge, Massachusetts 02139 Attn: Chief Executive Officer Email: geoff.mackay@avrobio.com
with a copy to:	Goodwin Procter LLP 100 Northern Avenue Boston, Massachusetts 02210 Attn: Mark D. Smith Fax: (617) 801-8835 Email: marksmith@goodwinlaw.com
If to Bank:	Silicon Valley Bank 275 Grove Street, Suite 2-200 Newton, Massachusetts 02466 Attn: Ryan Roller Email: RRoller@svb.com
with a copy to:	Riemer & Braunstein LLP Three Center Plaza Boston, Massachusetts 02108 Attn: David A. Ephraim, Esquire Fax: (617) 880-3456 Email: DEphraim@riemerlaw.com

11. CHOICE OF LAW, VENUE AND JURY TRIAL WAIVER

Except as otherwise expressly provided in any of the Loan Documents, Massachusetts law governs the Loan Documents without regard to principles of conflicts of law. Borrower and Bank each submit to the exclusive jurisdiction of the State and Federal courts in Boston, Massachusetts; provided, however, that nothing in this Agreement shall be deemed to operate to preclude Bank from bringing suit or taking other legal action in any other jurisdiction to realize on the Collateral or any other security for the Obligations, or to enforce a judgment or other court order in favor of Bank. Borrower expressly submits and consents in advance to such jurisdiction in any action or suit commenced in any such court, and Borrower hereby waives any objection that it may have based upon lack of personal jurisdiction, improper venue, or forum non conveniens and hereby consents to the granting of such legal or equitable relief as is deemed appropriate by such court. Borrower hereby waives personal service of the summons, complaints, and other process issued in such action or suit and agrees that service of such summons, complaints, and other process may be made by registered or certified mail addressed to Borrower at the address set forth in, or subsequently provided by Borrower in accordance with, Section 10 of this Agreement and that service so made shall be deemed completed upon the earlier to occur of Borrower's actual receipt thereof or three (3) days after deposit in the U.S. mails, proper postage prepaid.

TO THE FULLEST EXTENT PERMITTED BY APPLICABLE LAW, BORROWER AND BANK EACH WAIVE THEIR RIGHT TO A JURY TRIAL OF ANY CLAIM OR CAUSE OF ACTION ARISING OUT OF OR BASED UPON THIS AGREEMENT, THE LOAN DOCUMENTS OR ANY CONTEMPLATED TRANSACTION, INCLUDING CONTRACT, TORT, BREACH OF DUTY AND ALL OTHER CLAIMS. THIS WAIVER IS A MATERIAL INDUCEMENT FOR BOTH PARTIES TO ENTER INTO THIS AGREEMENT. EACH PARTY HAS REVIEWED THIS WAIVER WITH ITS COUNSEL.

This Section 11 shall survive the termination of this Agreement.

12. GENERAL PROVISIONS

12.1 Termination Prior to Term Loan Maturity Date; Survival. All covenants, representations and warranties made in this Agreement continue in full force until this Agreement has terminated pursuant to its terms and all Obligations (other than inchoate indemnity obligations, and any other obligations which, by their terms, are to survive termination of this Agreement) have been satisfied. So long as Borrower has satisfied the Obligations (other than inchoate indemnity obligations, any other obligations which, by their terms, are to survive the termination of this Agreement, and any Obligations under Bank Services Agreements that are cash collateralized in accordance with Section 4.1 of this Agreement), this Agreement may be terminated prior to the Term Loan Maturity Date by Borrower, effective three (3) Business Days after written notice of termination is given to Bank. Those obligations that are expressly specified in this Agreement as surviving this Agreement's termination shall continue to survive notwithstanding this Agreement's termination.

12.2 Successors and Assigns. This Agreement binds and is for the benefit of the successors and permitted assigns of each party. Borrower may not assign this Agreement or any rights or obligations under it without Bank's prior written consent (which may be granted or withheld in Bank's discretion). Bank has the right, without the consent of or notice to Borrower, to sell, transfer, assign, negotiate, or grant participation in all or any part of, or any interest in, Bank's obligations, rights, and benefits under this Agreement and the other Loan Documents (other than the Warrant, as to which assignment, transfer and other such actions are governed by the terms thereof).

12.3 Indemnification. Borrower agrees to indemnify, defend and hold Bank and its directors, officers, employees, agents, attorneys, or any other Person affiliated with or representing Bank (each, an "**Indemnified Person**") harmless against: (i) all obligations, demands, claims, and liabilities (collectively, "**Claims**") claimed or asserted by any other party in connection with the transactions contemplated by the Loan Documents; and (ii) all losses or expenses (including Bank Expenses) in any way suffered, incurred, or paid by such Indemnified Person as a result of, following from, consequential to, or arising from transactions between Bank and Borrower (including reasonable attorneys' fees and expenses), except for Claims and/or losses directly caused by such Indemnified Person's gross negligence or willful misconduct.

This Section 12.3 shall survive until all statutes of limitation with respect to the Claims, losses, and expenses for which indemnity is given shall have run.

12.4 Time of Essence. Time is of the essence for the performance of all Obligations in this Agreement.

12.5 Severability of Provisions. Each provision of this Agreement is severable from every other provision in determining the enforceability of any provision.

12.6 Correction of Loan Documents. Bank may correct patent errors and fill in any blanks in the Loan Documents consistent with the agreement of the parties so long as Bank provides Borrower with written notice of such correction and allows Borrower at least ten (10) days to object to such correction.

12.7 Amendments in Writing; Waiver; Integration. No purported amendment or modification of any Loan Document, or waiver, discharge or termination of any obligation under any Loan Document, shall be enforceable or admissible unless, and only to the extent, expressly set forth in a writing signed by the party against which enforcement or admission is sought. Without limiting the generality of the foregoing, no oral promise or statement, nor any action, inaction, delay, failure to require performance or course of conduct shall operate as, or evidence, an amendment, supplement or waiver or have any other effect on any Loan Document. Any waiver granted shall be limited to the specific circumstance expressly described in it, and shall not apply to any subsequent or other circumstance, whether similar or dissimilar, or give rise to, or evidence, any obligation or commitment to grant any further waiver. The Loan Documents represent the entire agreement about this subject matter and supersede prior negotiations or agreements. All prior agreements, understandings, representations, warranties, and negotiations between the parties about the subject matter of the Loan Documents merge into the Loan Documents.

12.8 Counterparts. This Agreement may be executed in any number of counterparts and by different parties on separate counterparts, each of which, when executed and delivered, is an original, and all taken together, constitute one Agreement.

12.9 Confidentiality. In handling any confidential information, Bank shall exercise the same degree of care that it exercises for its own proprietary information, but disclosure of information may be made: (a) to Bank's Subsidiaries or Affiliates (such Subsidiaries and Affiliates, together with Bank, collectively, "**Bank Entities**"); (b) to prospective transferees or purchasers of any interest in the Credit Extensions (provided, however, Bank shall use its best efforts to obtain any prospective transferee's or purchaser's agreement to the terms of this provision); (c) as required by law, regulation, subpoena, or other order; (d) to Bank's regulators or as otherwise required in connection with Bank's examination or audit; (e) as Bank considers appropriate in exercising remedies under the Loan Documents; and (f) to third-party service providers of Bank so long as such service providers have executed a confidentiality agreement with Bank with terms no less restrictive than those contained herein. Confidential information does not include information that is either: (i) in the public domain or in Bank's possession when disclosed to Bank, or becomes part of the public domain (other than as a result of its disclosure by Bank in violation of this Agreement) after disclosure to Bank; or (ii) disclosed to Bank by a third party, if Bank does not know that the third party is prohibited from disclosing the information.

Bank Entities may use anonymous forms of confidential information for aggregate datasets, for analyses or reporting, and for any other uses not expressly prohibited in writing by Borrower. The provisions of the immediately preceding sentence shall survive termination of this Agreement.

12.10 Right of Set Off. Borrower hereby grants to Bank, a lien, security interest and right of set off as security for all Obligations to Bank, whether now existing or hereafter arising upon and against all deposits, credits, collateral and property, now or hereafter in the possession, custody, safekeeping or control of Bank or any entity under the control of Bank (including a Bank subsidiary) or in transit to any of them. At any time after the occurrence and during the continuance of an Event of Default, without demand or notice, Bank may set off the same or any part thereof and apply the same to any Obligations of Borrower then due regardless of the adequacy of any other collateral securing the Obligations. ANY AND ALL RIGHTS TO REQUIRE BANK TO EXERCISE ITS RIGHTS OR REMEDIES WITH RESPECT TO ANY OTHER COLLATERAL WHICH SECURES THE OBLIGATIONS, PRIOR TO EXERCISING ITS RIGHT OF SETOFF WITH RESPECT TO SUCH DEPOSITS, CREDITS OR OTHER PROPERTY OF BORROWER ARE HEREBY KNOWINGLY, VOLUNTARILY AND IRREVOCABLY WAIVED.

12.11 Electronic Execution of Documents. The words "execution," "signed," "signature" and words of like import in any Loan Document shall be deemed to include electronic signatures or the keeping of records in electronic form, each of which shall be of the same legal effect, validity and enforceability as a manually executed signature or the use of a paper-based recordkeeping systems, as the case may be, to the extent and as provided for in any applicable law, including, without limitation, any state law based on the Uniform Electronic Transactions Act.

12.12 Captions. The headings used in this Agreement are for convenience only and shall not affect the interpretation of this Agreement.

12.13 Construction of Agreement. The parties mutually acknowledge that they and their attorneys have participated in the preparation and negotiation of this Agreement. In cases of uncertainty this Agreement shall be construed without regard to which of the parties caused the uncertainty to exist.

12.14 Relationship. The relationship of the parties to this Agreement is determined solely by the provisions of this Agreement. The parties do not intend to create any agency, partnership, joint venture, trust, fiduciary or other relationship with duties or incidents different from those of parties to an arm's-length contract.

12.15 Third Parties. Nothing in this Agreement, whether express or implied, is intended to: (a) confer any benefits, rights or remedies under or by reason of this Agreement on any persons other than the express parties to it and their respective permitted successors and assigns; (b) relieve or discharge the obligation or liability of any person not an express party to this Agreement; or (c) give any person not an express party to this Agreement any right of subrogation or action against any party to this Agreement.

13. DEFINITIONS

13.1 Definitions. As used in the Loan Documents, the word "shall" is mandatory, the word "may" is permissive, the word "or" is not exclusive, the words "includes" and "including" are not limiting, the singular includes the plural, and numbers denoting amounts that are set off in brackets are negative. As used in this Agreement, the following capitalized terms have the following meanings:

"**Account**" is any "account" as defined in the Code with such additions to such term as may hereafter be made, and includes, without limitation, all accounts receivable and other sums owing to Borrower.

"**Account Debtor**" is any "account debtor" as defined in the Code with such additions to such term as may hereafter be made.

"**Affiliate**" is, with respect to any Person, each other Person that owns or controls directly or indirectly the Person, any Person that controls or is controlled by or is under common control with the Person, and each of that Person's senior executive officers, directors, partners and, for any Person that is a limited liability company, that Person's managers and members.

"**Agreement**" is defined in the preamble hereof.

"**Amortization Date**" means November 1, 2018; provided that upon the Funding Date of the initial Tranche 3 Advance, the Amortization Date shall mean May, 1, 2019.

"**Australian Subsidiary**" is AvroBio, Inc., an Australian corporation.

"**Bank**" is defined in the preamble hereof.

"**Bank Entities**" is defined in Section 12.9.

"**Bank Expenses**" are all audit fees and expenses, costs, and expenses (including reasonable attorneys' fees and expenses) for preparing, amending, negotiating, administering, defending and enforcing the Loan Documents (including, without limitation, those incurred in connection with appeals or Insolvency Proceedings) or otherwise incurred with respect to Borrower.

"**Bank Services**" are any products, credit services, and/or financial accommodations previously, now, or hereafter provided to Borrower or any of its Subsidiaries by Bank or any Bank Affiliate, including, without limitation, any letters of credit, cash management services (including, without limitation, merchant services, direct deposit of payroll, business credit cards, and check cashing services), interest rate swap arrangements, and foreign exchange services as any such products or services may be identified in Bank's various agreements related thereto (each, a "**Bank Services Agreement**").

"**Bank Services Agreement**" is defined in the definition of "Bank Services".

"**Board**" is Borrower's board of directors.

"**Borrower**" is defined in the preamble hereof.

"**Borrower's Books**" are all Borrower's books and records including ledgers, federal and state tax returns, records regarding Borrower's assets or liabilities, the Collateral, business operations or financial condition, and all computer programs or storage or any equipment containing such information.

"**Borrowing Resolutions**" are, with respect to any Person, those resolutions adopted by such Person's board of directors (and, if required under the terms of such Person's Operating Documents, stockholders) and delivered by such Person to Bank approving the Loan Documents to which such Person is a party and the transactions contemplated thereby, together with a certificate executed by its secretary on behalf of such Person certifying (a) such Person has the authority to execute, deliver, and perform its obligations under each of the Loan Documents to which it is a party, (b) that set forth as a part of or attached as an exhibit to such certificate is a true,

correct, and complete copy of the resolutions then in full force and effect authorizing and ratifying the execution, delivery, and performance by such Person of the Loan Documents to which it is a party, (c) the name(s) of the Person(s) authorized to execute the Loan Documents, including any Credit Extension request, on behalf of such Person, together with a sample of the true signature(s) of such Person(s), and (d) that Bank may conclusively rely on such certificate unless and until such Person shall have delivered to Bank a further certificate canceling or amending such prior certificate.

"**Business Day**" is any day that is not a Saturday, Sunday or a day on which Bank is closed.

"**Canadian Subsidiary**" is AvroBio, Inc., a Canadian corporation.

"**Cash Equivalents**" means (a) marketable direct obligations issued or unconditionally guaranteed by the United States or any agency or any State thereof having maturities of not more than one (1) year from the date of acquisition; (b) commercial paper maturing no more than one (1) year after its creation and having the highest rating from either Standard & Poor's Ratings Group or Moody's Investors Service, Inc.; (c) Bank's certificates of deposit issued maturing no more than one (1) year after issue; and (d) money market funds at least ninety-five percent (95.0%) of the assets of which constitute Cash Equivalents of the kinds described in clauses (a) through (c) of this definition.

"**Change in Control**" means (a) at any time, any "person" or "group" (as such terms are used in Sections 13(d) and 14(d) of the Exchange Act) shall become, or obtain rights (whether by means of warrants, options or otherwise) to become, the "beneficial owner" (as defined in Rules 13(d)-3 and 13(d)-5 under the Exchange Act), directly or indirectly, of forty percent (40.0%) or more of the ordinary voting power for the election of directors of Borrower (determined on a fully diluted basis) other than by the sale of Borrower's equity securities in a public offering or to venture capital or private equity investors so long as Borrower identifies to Bank the venture capital or private equity investors at least seven (7) Business Days prior to the closing of the transaction and provides to Bank a description of the material terms of the transaction; (b) during any period of twelve (12) consecutive months, a majority of the members of the board of directors or other equivalent governing body of Borrower cease to be composed of individuals (i) who were members of that board or equivalent governing body on the first day of such period, (ii) whose election or nomination to that board or equivalent governing body was approved by individuals referred to in clause (i) above constituting at the time of such election or nomination at least a majority of that board or equivalent governing body or (iii) whose election or nomination to that board or other equivalent governing body was approved by individuals referred to in clauses (i) and (ii) above constituting at the time of such election or nomination at least a majority of that board or equivalent governing body; or (c) at any time, Borrower shall cease to own and control, of record and beneficially, directly or indirectly, one hundred percent (100.0%) of each class of outstanding capital stock of each Subsidiary of Borrower free and clear of all Liens (except Liens created by this Agreement).

"**Claims**" is defined in Section 12.3.

"**Code**" is the Uniform Commercial Code, as the same may, from time to time, be enacted and in effect in the Commonwealth of Massachusetts; provided, that, to the extent that the Code is used to define any term herein or in any Loan Document and such term is defined differently in different Articles or Divisions of the Code, the definition of such term contained in Article or Division 9 shall govern; provided further, that in the event that, by reason of mandatory provisions of law, any or all of the attachment, perfection, or priority of, or remedies with respect to, Bank's Lien on any Collateral is governed by the Uniform Commercial Code in effect in a jurisdiction other than the Commonwealth of Massachusetts, the term "**Code**" shall mean the Uniform Commercial Code as enacted and in effect in such other jurisdiction solely for purposes of the provisions thereof relating to such attachment, perfection, priority, or remedies and for purposes of definitions relating to such provisions.

"**Collateral**" is any and all properties, rights and assets of Borrower described on Exhibit A.

"**Collateral Account**" is any Deposit Account, Securities Account, or Commodity Account.

"**Commodity Account**" is any "commodity account" as defined in the Code with such additions to such term as may hereafter be made.

"**Compliance Certificate**" is that certain certificate in the form attached hereto as Exhibit B.

"**Contingent Obligation**" is, for any Person, any direct or indirect liability, contingent or not, of that Person for (a) any indebtedness, lease, dividend, letter of credit or other obligation of another such as an obligation, in each case, directly or indirectly guaranteed, endorsed, co-made, discounted or sold with recourse by that Person, or for which that Person is directly or indirectly liable; (b) any obligations for undrawn letters of credit for the account of that Person; and (c) all obligations from any interest rate, currency or commodity swap agreement, interest rate cap or collar agreement, or other agreement or arrangement designated to protect a Person against fluctuation in interest rates, currency exchange rates or commodity prices; but "Contingent Obligation" does not include endorsements in the ordinary course of business. The amount of a Contingent Obligation is the stated or determined amount of the primary obligation for which the Contingent Obligation is made or, if not determinable, the maximum reasonably anticipated liability for it determined by the Person in good faith; but the amount may not exceed the maximum of the obligations under any guarantee or other support arrangement.

"**Control Agreement**" is any control agreement entered into among the depository institution at which Borrower maintains a Deposit Account or the securities intermediary or commodity intermediary at which Borrower maintains a Securities Account or a Commodity Account, Borrower, and Bank pursuant to which Bank obtains control (within the meaning of the Code) over such Deposit Account, Securities Account, or Commodity Account.

"**Copyrights**" are any and all copyright rights, copyright applications, copyright registrations and like protections in each work of authorship and derivative work thereof, whether published or unpublished and whether or not the same also constitutes a trade secret.

"**Credit Extension**" is any Term Loan Advance, or any other extension of credit by Bank for Borrower's benefit.

"**Default Rate**" is defined in Section 2.2(b).

"**Deposit Account**" is any "deposit account" as defined in the Code with such additions to such term as may hereafter be made.

"**Designated Deposit Account**" is the multicurrency account denominated in Dollars, account number XXXXXXX738, maintained by Borrower with Bank.

"**Dollars**," "**dollars**" or use of the sign "**$**" means only lawful money of the United States and not any other currency, regardless of whether that currency uses the "$" sign to denote its currency or may be readily converted into lawful money of the United States.

"**Dollar Equivalent**" is, at any time, (a) with respect to any amount denominated in Dollars, such amount, and (b) with respect to any amount denominated in a Foreign Currency, the equivalent amount therefor in Dollars as determined by Bank at such time on the basis of the then-prevailing rate of exchange in San Francisco, California, for sales of the Foreign Currency for transfer to the country issuing such Foreign Currency.

"**Effective Date**" is defined in the preamble hereof.

"**Equipment**" is all "equipment" as defined in the Code with such additions to such term as may hereafter be made, and includes without limitation all machinery, fixtures, goods, vehicles (including motor vehicles and trailers), and any interest in any of the foregoing.

"**ERISA**" is the Employee Retirement Income Security Act of 1974, and its regulations.

"**Event of Default**" is defined in Section 8.

"**Exchange Act**" is the Securities Exchange Act of 1934, as amended.

"**Final Payment**" is a payment (in addition to and not a substitution for the regular monthly payments of principal plus accrued interest) equal to the original principal amount of the Term Loan Advances extended by Bank to Borrower multiplied by the Final Payment Percentage, due on the earliest to occur of (a) the Term Loan Maturity Date, (b) the acceleration of the Term Loan Advances by Bank pursuant to Section 9.1(a), (c) the prepayment of the Term Loan Advances by Borrower pursuant to Section 2.1.1(d) or 2.1.1(e), (d) the repayment in full of all obligations under the Term Loan Advances, or (e) the termination of this Agreement.

"**Final Payment Percentage**" is, for each Term Loan Advance, six and three-quarters of one percent (6.75%).

"**Foreign Currency**" means lawful money of a country other than the United States.

"**Funding Date**" is any date on which a Credit Extension is made to or for the account of Borrower which shall be a Business Day.

"**FX Contract**" is any foreign exchange contract by and between Borrower and Bank under which Borrower commits to purchase from or sell to Bank a specific amount of Foreign Currency on a specified date.

"**GAAP**" is generally accepted accounting principles set forth in the opinions and pronouncements of the Accounting Principles Board of the American Institute of Certified Public Accountants and statements and pronouncements of the Financial Accounting Standards Board or in such other statements by such other Person as may be approved by a significant segment of the accounting profession, which are applicable to the circumstances as of the date of determination.

"**General Intangibles**" is all "general intangibles" as defined in the Code in effect on the date hereof with such additions to such term as may hereafter be made, and includes without limitation, all Intellectual Property, claims, income and other tax refunds, security and other deposits, payment intangibles, contract rights, options to purchase or sell real or personal property, rights in all litigation presently or hereafter pending (whether in contract, tort or otherwise), insurance policies (including without limitation key man, property damage, and business interruption insurance), payments of insurance and rights to payment of any kind.

"**Governmental Approval**" is any consent, authorization, approval, order, license, franchise, permit, certificate, accreditation, registration, filing or notice, of, issued by, from or to, or other act by or in respect of, any Governmental Authority.

"Governmental Authority" is any nation or government, any state or other political subdivision thereof, any agency, authority, instrumentality, regulatory body, court, central bank or other entity exercising executive, legislative, judicial, taxing, regulatory or administrative functions of or pertaining to government, any securities exchange and any self-regulatory organization.

"**Indebtedness**" is (a) indebtedness for borrowed money or the deferred price of property or services, such as reimbursement and other obligations for surety bonds and letters of credit, (b) obligations evidenced by notes, bonds, debentures or similar instruments, (c) capital lease obligations, and (d) Contingent Obligations.

"**Indemnified Person**" is defined in Section 12.3.

"**Insolvency Proceeding**" is any proceeding by or against any Person under the United States Bankruptcy Code, or any other bankruptcy or insolvency law, including assignments for the benefit of creditors, compositions, extensions generally with its creditors, or proceedings seeking reorganization, arrangement, or other relief.

"**Intellectual Property**" means, with respect to any Person, all of such Person's right, title, and interest in and to the following:

(a) its Copyrights, Trademarks and Patents;

(b) any and all trade secrets and trade secret rights, including, without limitation, any rights to unpatented inventions, know-how, and operating manuals;

(c) any and all source code;

(d) any and all design rights which may be available to such Person;

(e) any and all claims for damages by way of past, present and future infringement of any of the foregoing, with the right, but not the obligation, to sue for and collect such damages for said use or infringement of the Intellectual Property rights identified above; and

(f) all amendments, renewals and extensions of any of the Copyrights, Trademarks or Patents.

"**Inventory**" is all "inventory" as defined in the Code in effect on the date hereof with such additions to such term as may hereafter be made, and includes without limitation all merchandise, raw materials, parts, supplies, packing and shipping materials, work in process and finished products, including without limitation such inventory as is temporarily out of Borrower's custody or possession or in transit and including any returned goods and any documents of title representing any of the above.

"**Investment**" is any beneficial ownership interest in any Person (including stock, partnership interest or other securities), and any loan, advance or capital contribution to any Person.

"**Key Person**" is Borrower's Chief Executive Officer, who is Geoff MacKay as of the Effective Date.

"**Letter of Credit**" is a standby or commercial letter of credit issued by Bank upon request of Borrower based upon an application, guarantee, indemnity, or similar agreement.

"**Lien**" is a claim, mortgage, deed of trust, levy, charge, pledge, security interest or other encumbrance of any kind, whether voluntarily incurred or arising by operation of law or otherwise against any property.

"**Loan Documents**" are, collectively, this Agreement and any schedules, exhibits, certificates, notices, and any other documents related to this Agreement, the Warrant, the Stock Pledge Agreement, the Perfection Certificate, any Control Agreement, any Bank Services Agreement, any subordination agreement, any note, or notes or guaranties executed by Borrower, and any other present or future agreement by Borrower with or for the benefit of Bank in connection with this Agreement or Bank Services, all as amended, restated, or otherwise modified.

"**Material Adverse Change**" is (a) a material impairment in the perfection or priority of Bank's Lien in the Collateral or in the value of such Collateral; (b) a material adverse change in the business, operations, or condition (financial or otherwise) of Borrower; or (c) a material impairment of the prospect of repayment of any portion of the Obligations.

"**Monthly Financial Statements**" is defined in Section 6.2(a).

"**Obligations**" are Borrower's obligations to pay when due any debts, principal, interest, fees, Bank Expenses, the Prepayment Premium, the Final Payment and other amounts Borrower owes Bank now or later, whether under this Agreement, the other Loan Documents (other than the Warrant), or otherwise, including, without limitation, interest accruing after Insolvency Proceedings begin and debts, liabilities, or obligations of Borrower assigned to Bank, and to perform Borrower's duties under the Loan Documents (other than the Warrant).

"**Operating Documents**" are, for any Person, such Person's formation documents, as certified by the Secretary of State (or equivalent agency) of such Person's jurisdiction of organization on a date that is no earlier than thirty (30) days prior to the Effective Date, and, (a) if such Person is a corporation, its bylaws in current form,

(b) if such Person is a limited liability company, its limited liability company agreement (or similar agreement), and (c) if such Person is a partnership, its partnership agreement (or similar agreement), each of the foregoing with all current amendments or modifications thereto.

"**Patents**" means all patents, patent applications and like protections including without limitation improvements, divisions, continuations, renewals, reissues, extensions and continuations-in-part of the same.

"**Payment/Advance Form**" is that certain form attached hereto as Exhibit C.

"**Payment Date**" is the first (1st) calendar day of the month.

"**Perfection Certificate**" is defined in Section 5.1.

"**Permitted Indebtedness**" is:

(a) Borrower's Indebtedness to Bank under this Agreement and the other Loan Documents;

(b) Indebtedness existing on the Effective Date and shown on the Perfection Certificate;

(c) Subordinated Debt;

(d) unsecured Indebtedness to trade creditors incurred in the ordinary course of business;

(e) Indebtedness incurred as a result of endorsing negotiable instruments received in the ordinary course of business;

(f) Indebtedness secured by Liens permitted under clauses (a) and (c) of the definition of "Permitted Liens" hereunder; and

(g) extensions, refinancings, modifications, amendments and restatements of any items of Permitted Indebtedness (a) through (f) above, provided that the principal amount thereof is not increased or the terms thereof are not modified to impose more burdensome terms upon Borrower or its Subsidiary, as the case may be.

"**Permitted Investments**" are:

(a) Investments (including, without limitation, Subsidiaries) existing on the Effective Date and shown on the Perfection Certificate;

(b) Investments consisting of Cash Equivalents;

(c) Investments by Borrower to (i) Australian Subsidiary for ordinary, necessary and current operating expenses in an amount not to exceed One Million Five Hundred Thousand Dollars ($1,500,000.00) in the aggregate during any twelve (12) month period and (ii) Canadian Subsidiary for ordinary, necessary and current operating expenses in an amount not to exceed Two Hundred Fifty Thousand Dollars ($250,000.00) in the aggregate during any twelve (12) month period; so long as, in the case of (i) and (ii), an Event of Default does not exist at the time of such Investment and would not result from such Investment;

(d) Investments consisting of the endorsement of negotiable instruments for deposit or collection or similar transactions in the ordinary course of Borrower;

(e) Investments accepted in connection with Transfers permitted by Section 7.1;

(f) Investments consisting of (i) travel advances and employee relocation loans and other employee loans and advances in the ordinary course of business, and (ii) loans to employees, officers or directors relating to the purchase of equity securities of Borrower or its Subsidiaries pursuant to employee stock purchase plans or agreements approved by Borrower's Board;

(g) Investments (including debt obligations) received in connection with the bankruptcy or reorganization of customers or suppliers and in settlement of delinquent obligations of, and other disputes with, customers or suppliers arising in the ordinary course of business; and

(h) Investments consisting of notes receivable of, or prepaid royalties and other credit extensions, to customers and suppliers who are not Affiliates, in the ordinary course of business; provided that this paragraph (h) shall not apply to Investments of Borrower in any Subsidiary.

"**Permitted Liens**" are:

(a) Liens existing on the Effective Date and shown on the Perfection Certificate or arising under this Agreement and the other Loan Documents;

(b) Liens for taxes, fees, assessments or other government charges or levies, either (i) not due and payable or (ii) being contested in good faith and for which Borrower maintains adequate reserves on its Books, provided that no notice of any such Lien has been filed or recorded under the Internal Revenue Code of 1986, as amended, and the Treasury Regulations adopted thereunder;

(c) purchase money Liens (i) on Equipment acquired or held by Borrower incurred for financing the acquisition of the Equipment securing no more than Fifty Thousand Dollars ($50,000.00) in the aggregate amount outstanding, or (ii) existing on Equipment when acquired, if the Lien is confined to the property and improvements and the proceeds of the Equipment;

(d) Liens of carriers, warehousemen, suppliers or other Persons that are possessory in nature arising in the ordinary course of business so long as such Liens attach only to Inventory, securing liabilities in the aggregate amount not to exceed Twenty-Five Thousand Dollars ($25,000.00) and which are not delinquent or remain payable without penalty or which are being contested in good faith and by appropriate proceedings which proceedings have the effect of preventing the forfeiture or sale of the property subject thereto;

(e) Liens to secure payment of workers' compensation, employment insurance, old-age pensions, social security and other like obligations incurred in the ordinary course of business (other than Liens imposed by ERISA);

(f) Liens incurred in the extension, renewal or refinancing of the indebtedness secured by Liens described in (a) through (e), but any extension, renewal or replacement Lien must be limited to the property encumbered by the existing Lien and the principal amount of the indebtedness may not increase;

(g) leases or subleases of real property granted in the ordinary course of Borrower's business (or, if referring to another Person, in the ordinary course of such Person's business), and leases, subleases, non-exclusive licenses or sublicenses of personal property (other than Intellectual Property) granted in the ordinary course of Borrower's business (or, if referring to another Person, in the ordinary course of such Person's business), if the leases, subleases, licenses and sublicenses do not prohibiting granting Bank a security interest therein;

(h) non-exclusive license partnerships, and joint ventures of Intellectual Property granted to third parties in the ordinary course of business;

(i) Liens arising from attachments or judgments, orders, or decrees in circumstances not constituting an Event of Default under Sections 8.4 and 8.7; and

(j) Liens in favor of other financial institutions arising in connection with Borrower's deposit and/or securities accounts held at such institutions, provided that Bank has a first priority perfected security interest in the amounts held in such deposit and/or securities accounts.

"**Person**" is any individual, sole proprietorship, partnership, limited liability company, joint venture, company, trust, unincorporated organization, association, corporation, institution, public benefit corporation, firm, joint stock company, estate, entity or government agency.

"**Prepayment Premium**" shall be an additional fee payable to Bank in an amount equal to:

(a) for a prepayment of a Term Loan Advance made on or prior to the first (1st) anniversary of the Funding Date of such Term Loan Advance, one percent (1.0%) of the principal amount of such Term Loan Advance outstanding as of the date immediately and prior to such prepayment;

(b) for a prepayment of a Term Loan Advance made after the first (1st) anniversary of the Funding Date of such Term Loan Advance, but prior to the second (2nd) anniversary of the Funding Date of such Term Loan Advance, one-half of one percent (0.5%) of the principal amount of such Term Loan Advance outstanding as of the date immediately prior to such prepayment; and

(c) for a prepayment of a Term Loan Advance made after the second (2nd) anniversary of the Funding Date of such Term Loan Advance, zero percent (0.0%) of the principal amount of such Term Loan Advance outstanding as of the date immediately prior to such prepayment.

Notwithstanding the foregoing, provided no Event of Default has occurred and is continuing, the Prepayment Premium shall be waived by Bank if Bank closes on the refinance and redocumentation of this Agreement (in its sole and absolute discretion) prior to the Term Loan Maturity Date.

"**Prime Rate**" is the rate of interest per annum from time to time published in the money rates section of The Wall Street Journal or any successor publication thereto as the "prime rate" then in effect; ; provided that, in the event such rate of interest is less than zero, such rate shall be deemed to be zero for purposes of this Agreement and provided further that if such rate of interest, as set forth from time to time in the money rates section of The Wall Street Journal, becomes unavailable for any reason as determined by Bank, the "Prime Rate" shall mean the rate of interest per annum announced by Bank as its prime rate in effect at its principal office in the State of California (such Bank announced Prime Rate not being intended to be the lowest rate of interest charged by Bank in connection with extensions of credit to debtors).

"**Registered Organization**" is any "registered organization" as defined in the Code with such additions to such term as may hereafter be made.

"**Repayment Schedule**" is thirty (30) months; provided, however, upon the Funding Date of the initial Tranche 3 Advance, the Repayment Schedule shall mean twenty-four (24) months.

"**Requirement of Law**" is as to any Person, the organizational or governing documents of such Person, and any law (statutory or common), treaty, rule or regulation or determination of an arbitrator or a court or other Governmental Authority, in each case applicable to or binding upon such Person or any of its property or to which such Person or any of its property is subject.

"**Responsible Officer**" is any of the Chief Executive Officer, President, Chief Financial Officer and Controller of Borrower.

"**Restricted License**" is any material license or other similar agreement with respect to which Borrower is the licensee (a) that prohibits or otherwise restricts Borrower from granting a security interest in Borrower's interest in such license or agreement or any other property, or (b) for which a default under or termination of could interfere with the Bank's right to sell any Collateral.

"**SEC**" shall mean the Securities and Exchange Commission, any successor thereto, and any analogous Governmental Authority.

"**Second Closing Milestone Achievement**" means Borrower has, prior to December 31, 2017 (a) either (i) achieved data reasonably supporting proof of mechanism in the AML program (as defined in the Series A Preferred Stock Purchase Agreement) and a demonstrable adequate safety profile at a dose level at which proof of mechanism was established, or (ii) achieved data reasonably supporting proof of mechanism and adequate engraftment using a non-myeloablative conditioning regimen in the Fabry's program (as defined in the Series A Preferred Stock Purchase Agreement), (b) established a full commercial-quality and scalable long-range vector supply and manufacturing strategy, and (c) executed a license agreement with the University Health Network on the University Health Network License Terms (as defined in the Series A Preferred Stock Purchase Agreement) or other terms acceptable to the Requisite Board Members (as defined in the Series A Preferred Stock Purchase Agreement) and the Requisite Series A Preferred Holders (as defined in the Series A Preferred Stock Purchase Agreement).

"**Securities Account**" is any "securities account" as defined in the Code with such additions to such term as may hereafter be made.

"**Series A Preferred Stock Purchase Agreement**" means that certain Amended and Restated Series A Preferred Stock Purchase Agreement between Borrower and the Purchasers (as defined therein) dated as of March 30, 2017

"**Stock Pledge Agreement**" is that certain Stock Pledge Agreement dated as of the Effective Date, by and between Borrower and Bank, as the same may from time to time be amended, restated, modified or otherwise supplemented.

"**Subordinated Debt**" is indebtedness incurred by Borrower subordinated to all of Borrower's now or hereafter indebtedness to Bank (pursuant to a subordination, intercreditor, or other similar agreement in form and substance satisfactory to Bank entered into between Bank and the other creditor), on terms acceptable to Bank.

"**Subsidiary**" is, as to any Person, a corporation, partnership, limited liability company or other entity of which shares of stock or other ownership interests having ordinary voting power (other than stock or such other ownership interests having such power only by reason of the happening of a contingency) to elect a majority of the board of directors or other managers of such corporation, partnership or other entity are at the time owned, or the management of which is otherwise controlled, directly or indirectly through one or more intermediaries, or both, by such Person. Unless the context otherwise requires, each reference to a Subsidiary herein shall be a reference to a Subsidiary of Borrower.

"**Term Loan Advance**" and "**Term Loan Advances**" are defined in Section 2.1.1(a).

"**Term Loan Maturity Date**" is April 1, 2021.

"**Tranche 1 Draw Period**" is the period of time commencing upon the occurrence of the Tranche 1 Milestone Event, and continuing through the earlier to occur of (a) October 31, 2018, or (b) an Event of Default.

"**Tranche 1 Milestone Event**" means confirmation by Bank in writing that Borrower received after March 1, 2017, but on or before October 31, 2018, unrestricted and unencumbered net cash proceeds in an amount of Three Million Five Hundred Thousand Dollars ($3,500,000.00) from the issuance and sale by Borrower of its equity securities to investors reasonably acceptable to Bank.

"**Tranche 2 Draw Period**" is the period of time commencing upon the occurrence of each of the following: (a) the Tranche 1 Milestone Event and the funding of the Tranche 1 Advances, and (b) the Tranche 2 Milestone Event, and continuing through the earlier to occur of (i) October 31, 2018, or (ii) an Event of Default.

"**Tranche 2 Milestone Event**" means confirmation by Bank in writing that either (a) the Second Closing Milestone Achievement has occurred or (b) Borrower received, after the Effective Date, but on or before October 31, 2018, unrestricted and unencumbered net cash proceeds in an amount of at least Seven Million Five Hundred Thousand Dollars ($7,500,000.00) from the issuance and sale by Borrower of its equity securities to investors reasonably acceptable to Bank (excluding funds received in connection with the Tranche 1 Milestone Event).

"**Tranche 3 Draw Period**" is the period of time commencing upon the occurrence of each of the following: (a) the Tranche 1 Milestone Event and the funding of the Tranche 1 Advances, (b) the Tranche 2 Milestone Event and the funding of the Tranche 2 Advances, and (c) the Tranche 3 Milestone Event, and continuing through the earlier to occur of (i) October 31, 2018, or (ii) an Event of Default.

"**Tranche 3 Milestone Event**" means confirmation by Bank in writing, on or before October 31, 2018, that (a) Borrower received, after the Effective Date, but on or before October 31, 2018, unrestricted and unencumbered net cash proceeds in an amount of Six Million Five Hundred Thousand Dollars ($6,500,000.00) from the issuance and sale by Borrower of its equity securities to investors reasonably acceptable to Bank (excluding funds received in connection with the Tranche 1 Milestone Event and the Tranche 2 Milestone Event) and (b) Borrower received a signed and enforceable term sheet from one or more investor parties, acceptable to Bank in its sole but reasonable discretion, in favor of and accepted by Borrower, evidencing such investor's or such investors' commitment to provide financing to Borrower, which would result in the receipt by Borrower on or before March 31, 2018 of unrestricted and unencumbered net cash proceeds equal to twelve (12) months of operating expenses for the next twelve (12) successive months based on the most recent Board-approved plan of Borrower presented to and accepted by Bank.

"**Trademarks**" means any trademark and servicemark rights, whether registered or not, applications to register and registrations of the same and like protections, and the entire goodwill of the business of Borrower connected with and symbolized by such trademarks.

"**Transfer**" is defined in Section 7.1.

"**Warrant**" is that certain warrant to purchase stock between Borrower and Bank dated as of the Effective Date, as may be amended, modified, supplemented or restated from time to time.

[Signature page follows.**]**

IN WITNESS WHEREOF, the parties hereto have caused this Agreement to be executed as a sealed instrument under the laws of the Commonwealth of Massachusetts as of the Effective Date.

BORROWER:

AVROBIO, INC.

By /s/ Geoffrey MacKay
Name: Geoffrey MacKay
Title: President, CEO, Treasurer and Secretary

BANK:

SILICON VALLEY BANK

By /s/ Thomas Kelly
Name: Thomas E. Kelly
Title: Managing Director

EXHIBIT A – COLLATERAL DESCRIPTION

The Collateral consists of all of Borrower's right, title and interest in and to the following personal property:

All goods, Accounts (including health-care receivables), Equipment, Inventory, contract rights or rights to payment of money, leases, license agreements, franchise agreements, General Intangibles (except as provided below), commercial tort claims, documents, instruments (including any promissory notes), chattel paper (whether tangible or electronic), cash, deposit accounts, certificates of deposit, fixtures, letters of credit rights (whether or not the letter of credit is evidenced by a writing), securities, and all other investment property, supporting obligations, and financial assets, whether now owned or hereafter acquired, wherever located; and

all Borrower's Books relating to the foregoing, and any and all claims, rights and interests in any of the above and all substitutions for, additions, attachments, accessories, accessions and improvements to and replacements, products, proceeds and insurance proceeds of any or all of the foregoing.

Notwithstanding the foregoing, the Collateral does not include (a) with respect to stock in Australian Subsidiary and Canadian Subsidiary, more than sixty-five percent (65.0%) of the presently existing and hereafter arising issued and outstanding shares of capital stock owned by Borrower of each of Australian Subsidiary or Canadian Subsidiary which shares entitle the holder thereof to vote for directors or any other matter or (b) any Intellectual Property; provided, however, the Collateral shall include all Accounts and all proceeds of Intellectual Property. If a judicial authority (including a U.S. Bankruptcy Court) would hold that a security interest in the underlying Intellectual Property is necessary to have a security interest in such Accounts and such property that are proceeds of Intellectual Property, then the Collateral shall automatically, and effective as of the Effective Date, include the Intellectual Property to the extent necessary to permit perfection of Bank's security interest in such Accounts and such other property of Borrower that are proceeds of the Intellectual Property.

Pursuant to the terms of a certain negative pledge arrangement with Bank, Borrower has agreed not to encumber any of its Intellectual Property without Bank's prior written consent.

EXHIBIT B

COMPLIANCE CERTIFICATE

TO: SILICON VALLEY BANK
FROM: AVROBIO, INC.

Date: _____

The undersigned authorized officer of AVROBIO, INC. ("Borrower") certifies that under the terms and conditions of the Loan and Security Agreement between Borrower and Bank (the "Agreement"):

(1) Borrower is in compliance for the period ending with all required covenants except as noted below; (2) there are no Events of Default; (3) all representations and warranties in the Agreement are true and correct in all material respects on this date except as noted below; provided, however, that such materiality qualifier shall not be applicable to any representations and warranties that already are qualified or modified by materiality in the text thereof; and provided, further that those representations and warranties expressly referring to a specific date shall be true, accurate and complete in all material respects as of such date; (4) Borrower, and each of its Subsidiaries, has timely filed all required tax returns and reports, and Borrower has timely paid all foreign, federal, state and local taxes, assessments, deposits and contributions owed by Borrower except as otherwise permitted pursuant to the terms of Section 5.8 of the Agreement; and (5) no Liens have been levied or claims made against Borrower or any of its Subsidiaries relating to unpaid employee payroll or benefits of which Borrower has not previously provided written notification to Bank.

Attached are the required documents supporting the certification. The undersigned certifies that these are prepared in accordance with GAAP consistently applied from one period to the next except as explained in an accompanying letter or footnotes. The undersigned acknowledges that no borrowings may be requested at any time or date of determination that Borrower is not in compliance with any of the terms of the Agreement, and that compliance is determined not just at the date this certificate is delivered. Capitalized terms used but not otherwise defined herein shall have the meanings given them in the Agreement.

Please indicate compliance status by circling Yes/No under "Complies" column.

Reporting Covenants	Required	Complies
Monthly financial statements with Compliance Certificate	Monthly within 30 days	Yes No
Annual financial statement (CPA Audited) + CC	FYE within 180 days	Yes No
Board-Approved Projections	FYE within 60 days and contemporaneously with any material changes thereto	Yes No
10-Q, 10-K and 8-K	Within 5 days after filing with SEC	Yes No

Other Matters

Have there been any amendments of or other changes to the capitalization table of Borrower and to the Operating Documents of Borrower or any of its Subsidiaries? If yes, provide copies of any such amendments or changes with this Compliance Certificate. Yes No

The following are the exceptions with respect to the certification above: (If no exceptions exist, state "No exceptions to note.")

_____

_____

_____

_____

AVROBIO, INC. **BANK USE ONLY**

By: _____
Name: _____
Title: _____

Received by: _____
AUTHORIZED SIGNER

Date: _____

Verified: _____
AUTHORIZED SIGNER

Date: _____

Compliance Status: Yes No

EXHIBIT C – LOAN PAYMENT/ADVANCE REQUEST FORM

DEADLINE FOR SAME DAY PROCESSING IS NOON EASTERN TIME

Fax To: Date: _____

LOAN PAYMENT: AVROBIO, INC.

From Account #_____ To Account #_____

(Deposit Account #) (Loan Account #)

Principal $ _____ and/or Interest $_____

Authorized Signature: _____ Phone Number: _____

Print Name/Title: _____

LOAN ADVANCE:

Complete *Outgoing Wire Request* section below if all or a portion of the funds from this loan advance are for an outgoing wire.

From Account #_____ To Account #_____

(Loan Account #) (Deposit Account #)

Amount of Advance $_____

All Borrower's representations and warranties in the Loan and Security Agreement are true, correct and complete in all material respects on the date of the request for an advance; provided, however, that such materiality qualifier shall not be applicable to any representations and warranties that already are qualified or modified by materiality in the text thereof; and provided, further that those representations and warranties expressly referring to a specific date shall be true, accurate and complete in all material respects as of such date:

Authorized Signature: _____ Phone Number: _____

Print Name/Title: _____

OUTGOING WIRE REQUEST:

Complete only if all or a portion of funds from the loan advance above is to be wired.

Deadline for same day processing is noon, Pacific Time

Beneficiary Name: _____ Amount of Wire: $_____

Beneficiary Bank: _____ Account Number: _____

City and State: _____

Beneficiary Bank Transit (ABA) #: _____ Beneficiary Bank Code (Swift, Sort, Chip, etc.): _____

(For International Wire Only)

Intermediary Bank: _____ Transit (ABA) #: _____

For Further Credit to: _____

Special Instruction:_____

By signing below, I (we) acknowledge and agree that my (our) funds transfer request shall be processed in accordance with and subject to the terms and conditions set forth in the agreements(s) covering funds transfer service(s), which agreements(s) were previously received and executed by me (us).

Authorized Signature: _____ 2nd Signature (if required): _____

Print Name/Title: _____ Print Name/Title: _____

Telephone #:_____ Telephone #:_____

List of Subsidiaries

Subsidiary	Jurisdiction of incorporation or organization
AvroBio, Inc.	Ontario, Canada
AvroBio Australia PTY LTD	Australia