UNITED STATES
SECURITIES AND EXCHANGE COMMISSION
Washington, D.C. 20549

FORM 8-K

CURRENT REPORT
Pursuant to Section 13 or 15(d)
of the Securities Exchange Act of 1934

Date of Report (Date of earliest event reported): May 18, 2022

AVROBIO, INC.
(Exact name of registrant as specified in its charter)

Delaware	**001-38537**	**81-0710585**
(State or other jurisdiction of incorporation)	**(Commission File Number)**	**(I.R.S. Employer Identification No.)**

One Kendall Square
Building 300, Suite 201
Cambridge, MA 02139
(Address of principal executive offices, including zip code)

(617) 914-8420
(Registrant's telephone number, including area code)

Not Applicable
(Former Name or Former Address, if Changed Since Last Report)

Check the appropriate box below if the Form 8-K filing is intended to simultaneously satisfy the filing obligation of the registrant under any of the following provisions:

☐ Written communications pursuant to Rule 425 under the Securities Act (17 CFR 230.425)

☐ Soliciting material pursuant to Rule 14a-12 under the Exchange Act (17 CFR 240.14a-12)

☐ Pre-commencement communications pursuant to Rule 14d-2(b) under the Exchange Act (17 CFR 240.14d-2(b))

☐ Pre-commencement communications pursuant to Rule 13e-4(c) under the Exchange Act (17 CFR 240.13e-4(c))

Securities registered pursuant to Section 12(b) of the Act:

Title of each class	Trading symbol(s)	Name of each exchange on which registered
Common Stock, $0.0001 par value per share	**AVRO**	**Nasdaq Global Select Market**

Indicate by check mark whether the registrant is an emerging growth company as defined in Rule 405 of the Securities Act of 1933 (§ 230.405 of this chapter) or Rule 12b-2 of the Securities Exchange Act of 1934 (§ 240.12b-2 of this chapter).

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. ☐

Item 7.01 Regulation FD Disclosure.

On May 18, 2022, AVROBIO, Inc. (the "Company") issued a press release titled "AVROBIO Announces Preclinical Gene Therapy Data for Pompe Disease at American Society of Gene and Cell Therapy (ASGCT) annual meeting." A copy of the press release is furnished as Exhibit 99.1 to this Current Report on Form 8-K.

The information in Item 7.01 of this Current Report on Form 8-K, including Exhibit 99.1 attached hereto, shall not be deemed "filed" for purposes of the Securities Exchange Act of 1934, as amended (the "Exchange Act"), or otherwise subject to the liabilities of that section, nor shall it be deemed incorporated by reference in any filing under the Securities Act of 1933, as amended, or the Exchange Act, except as expressly set forth by specific reference in such a filing.

Item 9.01. Financial Statements and Exhibits.

(d) Exhibits

99.1	AVROBIO, Inc. press release, dated May 18, 2022.
104	The cover page from this Current Report on Form 8-K, formatted in Inline XBR

SIGNATURES

Pursuant to the requirements of the Securities Exchange Act of 1934, the registrant has duly caused this report to be signed on its behalf by the undersigned hereunto duly authorized.

AVROBIO, INC.

Date: May 18, 2022

By: /s/ Geoff MacKay
Geoff MacKay
President and Chief Executive Officer

Exhibit 99.1

AVROBIO Announces Preclinical Gene Therapy Data for Pompe Disease at American Society of Gene and Cell Therapy (ASGCT) annual meeting

Genetically modified hematopoietic stem cells lead to supraphysiological levels of therapeutic protein in a mouse model of Pompe disease sustained at eight months after administration

Substantial reduction in glycogen observed across cardiac and skeletal muscles, as well as CNS

Data support plans to initiate clinical trial in 2023

Cambridge, Mass. – May 18, 2022 – AVROBIO, Inc. (Nasdaq: AVRO), a leading clinical-stage gene therapy company with a shared purpose to free people from a lifetime of genetic disease, today announced preclinical data demonstrating the efficacy and safety of AVR-RD-03 gene therapy in a mouse model of infantile onset Pompe disease. The results, which will be presented today during the "Disease models and Clinical Applications: Musculo-skeletal Diseases" poster session at the American Society of Gene and Cell Therapy (ASGCT) annual meeting in Washington, D.C., demonstrate that a gene therapy using hematopoietic stem cells (HSC) significantly reduced toxic accumulation of glycogen in a mouse model of Pompe disease, including in cardiac and skeletal muscle as well as the central nervous system (CNS). Eight months post infusion, substrate levels in multiple treated tissues were nearly indistinguishable from normal mice.

AVR-RD-03, AVROBIO's gene therapy for Pompe disease, includes a proprietary Glycosylation-Independent Lysosomal Targeting (GILT)-tag which consists of a short peptide sequence linked to the therapeutic protein and is designed to enhance uptake in targeted tissues.

"Pompe disease is a progressive, life-limiting neuromuscular disorder caused by the accumulation of lysosomal glycogen in cardiac and skeletal muscle as well as the CNS. As glycogen accumulates, patients experience severe and progressive myopathy, leading to muscle weakness, loss of motor function and ultimately cardiorespiratory failure," said AVROBIO Chief Medical Officer, Essra Ridha, M.D., MRCP, FFPM. "We believe there is an urgent need for new treatment options that can address the systemic impact of Pompe disease and our preclinical data suggest that one dose of HSC-based gene therapy can potentially normalize glycogen levels in key tissues and halt or potentially reverse the head-to-toe impact of Pompe disease."

Data collected from six gene therapy study groups in mice show:

- Stable engraftment up to eight months after gene therapy, with median vector copy numbers (VCN) between 1.9 and 3.6 per diploid genome (*n=9-13 per group*) in bone marrow among all study groups.
- Significant GAA enzyme activity measured in the bone marrow eight months after gene therapy. The supraphysiological GAA enzyme activity levels in bone marrow ranged from a median 300 to 534 nmol/h/mg (*p value* <0.005, *n=9-13 per group*), compared to ± 4-6 nmol/h/mg in normal mice.
- Glucose levels in mice infused with genetically modified HSCs were similar to those of controls. Significant reductions of glycogen observed in key tissues, including:

- >99% reduction of glycogen in the heart, with reversal of cardiac hypertrophy (thickening of the heart muscle) and normalization of the left ventricular mass index, observed seven months post gene therapy
- >97% reduction of glycogen in the diaphragm and >85% reduction in the quadriceps. Significant improvements in gait and wire hang functions after gene therapy were also observed seven months post gene therapy
- Additionally, glycogen was reduced >95% in the brain and >99% in the spinal cord, improving locomotor function and demonstrating that modified HSCs crossed the blood-brain barrier where their offspring produced functional protein

- Importantly, the data show a typical lentiviral vector (the vector used by AVROBIO to deliver the therapeutic gene to the HSC) preference to integrate into genes, with no indications of proto-oncogene selection or clonal dominance, reinforcing the safety of the vector.

Additionally, new data from a separate study show that human HSCs were efficiently transduced, producing robust quantities of transgene product and GAA enzyme activity.

“These data show a substantial reduction of substrate in key tissues, muscle and CNS, reduced tissue pathology and correction on a functional level, which are all very relevant for potential future translation into Pompe patients,” said Niek P. van Til, Ph.D., assistant professor, Child Neurology, Amsterdam University Medical Centers and consultant to AVROBIO, who led the research and will present it at ASGCT this afternoon.

AVROBIO plans to engage with regulatory agencies on the clinical development strategy for AVR-RD-03 in 2022 and plans to initiate a clinical trial in 2023, subject to regulatory alignment.

About Pompe disease

Pompe disease is a lysosomal disorder caused by a mutation in the *GAA* gene. The lack of the enzyme encoded by GAA results in a toxic buildup of glycogen throughout the body and central nervous system, causing a wide range of symptoms including progressive weakness and loss of motor function. Pompe disease ranges from a rapidly fatal infantile form with significant impacts on heart function to a more slowly progressive, late-onset form primarily affecting skeletal muscle.

Pompe disease affects about 1 in 58,000 Americans and is treated with enzyme replacement therapy, or ERT, which is typically given as a biweekly infusion for life. ERT slows but does not halt the overall progression of disease and does not cross the blood-brain barrier to address neurological pathologies. Even with treatment, people with Pompe disease continue to be burdened by their disease and experience debilitating symptoms that reduce their quality of life.

About AVROBIO

Our vision is to bring personalized gene therapy to the world. We aim to prevent, halt or reverse disease throughout the body with a single dose of gene therapy designed to drive durable expression of therapeutic protein, even in hard-to-reach tissues and organs including brain, muscle and bone. AVROBIO’s pipeline is powered by our industry-leading plato® gene therapy platform, our foundation designed to deliver gene therapy worldwide. It includes clinical programs in cystinosis and Gaucher disease type 1, as well as preclinical programs in Gaucher disease type 3, Hunter syndrome and Pompe disease. We are headquartered in Cambridge, Mass. For additional information, visit avrobio.com, and follow us on Twitter and LinkedIn.

Forward-Looking Statements

This press release contains forward-looking statements, including statements made pursuant to the safe harbor provisions of the Private Securities Litigation Reform Act of 1995. These statements may be identified by words and phrases such as “aims,” “anticipates,” “believes,” “could,” “designed to,” “estimates,” “expects,” “forecasts,” “goal,” “intends,” “may,” “plans,” “possible,” “potential,” “seeks,” “will,” and variations of these words and phrases or similar expressions that are intended to identify forward-looking statements. These forward-looking statements include, without limitation, statements regarding our business strategy for and the potential therapeutic benefits of our preclinical and clinical product candidates, including AVR-RD-03 for the treatment of Pompe disease, including systemic and CNS manifestations, preclinical trial results and the potential therapeutic benefits of our optimized lentiviral vector with proprietary GILT-tag technology for the treatment of Pompe disease, the design, commencement, enrollment and timing of planned clinical trials, preclinical or clinical trial results, product approvals and regulatory pathways, our plans and expectations with respect to interactions with regulatory agencies, anticipated benefits of our gene therapy platform including potential impact on our commercialization activities, timing and likelihood of success, the expected benefits and results of our implementation of the plato platform in our clinical trials and gene therapy programs, and the expected safety profile of our preclinical and investigational gene therapies. Any such statements in this press release that are not statements of historical fact may be deemed to be forward-looking statements. Results in preclinical or early-stage clinical trials may not be indicative of results from later stage or larger scale clinical trials and do not ensure regulatory approval. You should not place undue reliance on these statements, or the scientific data presented.

Any forward-looking statements in this press release are based on AVROBIO’s current expectations, estimates and projections about our industry as well as management’s current beliefs and expectations of future events only as of today and are subject to a number of risks and uncertainties that could cause actual results to differ materially and adversely from those set forth in or implied by such forward-looking statements. These risks and uncertainties include, but are not limited to, the risk that any one or more of AVROBIO’s product candidates will not be successfully developed or commercialized, the risk of cessation or delay of any ongoing or planned clinical trials of AVROBIO or our collaborators, the risk that AVROBIO may not successfully recruit or enroll a sufficient number of patients for our clinical trials, the risk that AVROBIO may not realize the intended benefits of our gene therapy platform, including the features of our plato® platform, the risk that our product candidates or procedures in connection with the administration thereof will not have the safety or efficacy profile that we anticipate, the risk that prior results, such as signals of safety, activity or durability of effect, observed from preclinical or clinical trials, will not be replicated or will not continue in ongoing or future studies or trials involving AVROBIO’s product candidates, the risk that we will be unable to obtain and maintain regulatory approval for our product candidates, the risk that the size and growth potential of the market for our product candidates will not materialize as expected, risks associated with our dependence on third-party suppliers and manufacturers, risks regarding the accuracy of our estimates of expenses and future revenue, risks relating to our capital requirements and needs for additional financing, risks relating to clinical trial and business interruptions resulting from the COVID-19 outbreak or similar public health crises, including that such interruptions may materially delay our enrollment and development timelines and/or increase our development costs or that data collection efforts may be impaired or otherwise impacted by such crises, and risks relating to our ability to obtain and maintain intellectual property protection for our product candidates. For a discussion of these and other risks and uncertainties, and other important factors, any of which could cause AVROBIO’s actual results to differ materially and adversely from those contained in the forward-looking statements, see the section entitled “Risk Factors” in AVROBIO’s most recent Quarterly Report, as well as discussions of potential risks, uncertainties and other important factors in AVROBIO’s subsequent filings with the Securities and Exchange Commission. AVROBIO explicitly disclaims any obligation to update any forward-looking statements except to the extent required by law.

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