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, 2023

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.)**

100 Technology Square
Sixth Floor
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, 2023, AVROBIO, Inc. (the "Company") issued a press release titled "AVROBIO Announces Positive Data from Phase 1/2 Clinical Trial of Investigational Gene Therapy for Cystinosis at the ASGCT 26th Annual Meeting." A copy of the press release is furnished as Exhibit 99.1 to this Current Report on Form 8-K.

On May 18, 2023, the Company updated its corporate presentation for use in meetings with investors, analysts and others. A copy of the slide presentation is filed as Exhibit 99.2 to this Current Report on Form 8-K.

The information in Item 7.01 of this Current Report on Form 8-K, including Exhibits 99.1 and 99.2 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, 2023.
99.2	AVROBIO, Inc. slide presentation, dated May 18, 2023.
104	The cover page from this Current Report on Form 8-K, formatted in Inline XBRL.

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, 2023

By: /s/ Erik Ostrowski
Erik Ostrowski
President, Interim Chief Executive Officer, Chief Financial Officer and Treasurer

Exhibit 99.1

AVROBIO Announces Positive Data from Phase 1/2 Clinical Trial of Investigational Gene Therapy for Cystinosis at the ASGCT 26th Annual Meeting

All patients remain off oral cysteamine up to 36 months post gene therapy

Sustained engraftment and durable reduction in leukocyte cystine levels across all patients

Received positive regulatory feedback from US and UK agencies

CAMBRIDGE, Mass.—(BUSINESS WIRE)—May 18, 2023—AVROBIO, Inc. (Nasdaq: AVRO), a leading clinical-stage gene therapy company working to free people from a lifetime of genetic disease, today announced follow-up data demonstrating a durable treatment effect across key measures out to 36 months from a collaborator-sponsored Phase 1/2 clinical trial[1] evaluating an investigational gene therapy for the treatment of cystinosis. These data are being presented at the 26th Annual Meeting of the American Society of Gene and Cell Therapy (ASGCT) in Los Angeles, California, on May 18, 2023.

Cystinosis is a rare, progressive disease with a high treatment burden and unmet need. The fully enrolled Phase 1/2 clinical trial is monitoring long-term safety and efficacy in six adult patients affected by the most severe and common form of cystinosis who previously had been treated with the standard of care (SOC), cysteamine. The patients' own hematopoietic stem cells (HSCs) were genetically modified to express a functional version of cystinosin, the protein that is deficient in people living with cystinosis. Preliminary data suggest that post-gene therapy, functional cystinosin is produced throughout the body as evidenced by clinical measures in multiple tissues, including the eyes, skin and gastrointestinal mucosa, as well as by neurocognitive tests suggestive of activity in the central nervous system. No adverse events (AEs) related to the drug product or serious adverse events have been reported to date.

"These data show that genetically modifying a patient's own HSCs has the potential to restore functional cystinosin and systemically reduce the accumulation of cystine, laying the foundation for a registration-enabling clinical trial," said AVROBIO Chief Medical Officer Essra Ridha, M.D., MRCP, FFPM. "We are excited about moving this investigational gene therapy closer to patients."

In addition to the data presented, the Company also announced positive and productive meetings with the U.K. Medicines and Healthcare products Regulatory Agency (MHRA) and U.S. Food and Drug Administration (FDA) designed to align on regulatory paths and obtain feedback on this program.

Data show investigational HSC gene therapy durably and systemically impacts neurocognitive measures and reduces cystine levels in the blood, and crystal accumulation in the skin and gastrointestinal mucosa

[1]The collaborator-sponsored Phase 1/2 clinical trial for cystinosis is funded in part by grants to UCSD from the California Institute for Regenerative Medicine (CIRM), Cystinosis Research Foundation (CRF) and National Institutes of Health (NIH).

Follow-up data suggest that after receiving HSC gene therapy, patients can produce functional cystinosin protein throughout the body. As a result, leukocyte cystine levels in the blood have decreased below baseline in all six patients, and stabilized up to 36 months out from treatment. Skin and gastrointestinal mucosa biopsies reveal a decline in tissue cystine crystals below baseline in the first four patients, who have been observed for at least 12 months, with two patients observed up to 24 months.

Patients with cystinosis typically do not see an improvement in visual spatial or visual motor function over time in standardized tests evaluating the ability of the brain to interpret and translate visual information into an exact motor response. The first four patients treated with gene therapy have shown an improvement or stabilization of scores on the Beery – Buktenica Developmental Test of visual motor integration, up to 36 months out, suggesting a potential impact on the neuropathology of the disease.

These data represent an extension of trends that have previously been measured, confirming the durability of the treatment effect up to 36 months.

Safety and tolerability profile remains strong
Preliminary data from this trial suggest that this HSC gene therapy is well tolerated, with no AEs related to the drug product to date. All AEs were related to myeloablative conditioning, stem cell mobilization, the underlying disease, co-morbid or pre-existing conditions. The majority of AEs were mild or moderate and resolved without clinical sequelae.

An oral presentation by Dr. Cherqui on these data, “Phase 1/2 Clinical Trial of Autologous Hematopoietic Stem and Progenitor Cell Gene Therapy for Cystinosis,” will occur today at 3:45 PM PT in the session Metabolic, Storage, Endocrine, Liver and Gastrointestinal Disease II of the ASGCT Annual Meeting. Further details on the Phase 1/2 trial (NCT03897361) are available on clinicaltrials.gov.

About cystinosis
Cystinosis is a rare, progressive disease marked by the accumulation of cystine in cellular organelles known as lysosomes. This buildup causes progressive organ damage and debilitating corneal damage, swallowing dysfunction, chronic kidney disease leading to end-stage renal disease and muscle wasting leading to a shortened lifespan. Currently, more than 90% of treated cystinosis patients require a renal transplant in the second or third decade of life. The current standard of care for cystinosis is cysteamine, a treatment regimen that can require dozens of pills per day, does not prevent overall disease progression and carries side effects, such as breath and body odor and gastrointestinal complications, which may be difficult to tolerate.

About AVROBIO

Our vision is to bring personalized gene therapy to the world. We target the root cause of genetic disease by introducing a functional copy of the affected gene into patients' own hematopoietic stem cells (HSCs), with the goal of durably expressing the therapeutic protein throughout the body, including the central nervous system. Our first-in-class pipeline includes clinical programs for Gaucher disease, cystinosis and Hunter syndrome, as well as a preclinical program for Pompe disease. Our proprietary plato® gene therapy platform is scalable for planned global commercialization. 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 product candidates, including our AVR-RD-04 investigational gene therapy for the treatment of cystinosis, regulatory pathways, 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 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, including AVR-RD-04 for the treatment of cystinosis, 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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Exhibit 99.2


What if
ONE
GENE
can change your
entire world?
ASGCT 2023 cystinosis update
AVROBIO

Disclaimer

This presentation has been prepared by AVROBIO, Inc. ("AVROBIO") for informational purposes only and not for any other purpose. Certain information contained in this presentation and statements made orally during this presentation relate to or are based on studies, publications, surveys, and other data obtained from third-party sources and AVROBIO's own internal estimates and research. Although AVROBIO believes these third-party sources to be reliable as of the date of this presentation, they have not been independently verified, and AVROBIO makes no representation as to the adequacy, fairness, accuracy. or completeness of any information obtained from third-party sources. Although AVROBIO believes its internal research is reliable, such research has not been verified by any independent source.

This presentation may contain forward-looking 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," "continue," "could," "designed to," "estimates," "expects," "forecasts," "goal," "intends," "may," "plans," "possible," "potential," "predicts," "projects," "seeks," "strives," "should," and "will," as well as 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 current and prospective product candidates, including our AVR-RD-04 investigational gene therapy for the treatment of cystinosis; regulatory pathways; our plans and expectations with respect to the development of our clinical and preclinical product candidates, the timing of anticipated clinical and regulatory updates; the timing of patient recruitment and enrollment activities, clinical trial results and product approvals; the anticipated benefits of our gene therapy platform including the potential impact on our commercialization activities, timing and likelihood of success; the expected benefits and results of our manufacturing technology, including the implementation of our plato® platform in our clinical trials and gene therapy programs; and the expected safety profile of our investigational gene therapies. Any such statements in this presentation that are not statements of historical fact may be deemed to be forward-looking statements.

Any forward-looking statements in this presentation are based on our 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 our product candidates will not be successfully developed or commercialized; the risk that regulatory agencies may disagree with our anticipated development approach for any one or more of our product candidates; the risk of cessation or delay of any ongoing or planned clinical trials of AVROBIO or our collaborators; the risk that we may not successfully recruit or enroll a sufficient number of patients for our clinical trials; the risk that we 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, including our use of busulfan as a conditioning agent, 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 our 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 and availability of additional financing including the risk that failure to obtain additional funding may force us to delay, limit or terminate our product development efforts or other operations; risks relating to our identification and pursuit of any strategic opportunities with respect to one or more of our programs, our technology or our plato platform; risks relating to clinical trial and business interruptions resulting from the ongoing COVID-19 pandemic or similar public health crises, including that such interruptions may materially delay our development timeline 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 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.

Note regarding trademarks: plato® is a registered trademark of AVROBIO. Other trademarks referenced in this presentation are the property of their respective owners.

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ASGCT 2023 cystinosis update

Summary of key points

- Continued positive trends across multiple biomarkers and neurocognitive measures seen in Phase 1/2 collaborator-sponsored trial
- All patients remain off oral cysteamine, up to 36 months post-gene therapy
- Safety and tolerability profile remains strong
- Positive interactions with U.K. Medicines and Healthcare products Regulatory Agency (MHRA) and U.S. Food and Drug Administration (FDA) in Q1 2023

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Cystinosis Phase 1/2 dosing complete

Phase 1/2

Collaborator-sponsored
University of California, San Diego

Objectives	Patients
• Safety and tolerability • Hypothesis generation of clinical efficacy endpoints	• 6 patients • Adults and adolescents • Cohorts 1-2 >18 years; Cohort 3 >14 years • Male and female • Oral and ophthalmic cysteamine

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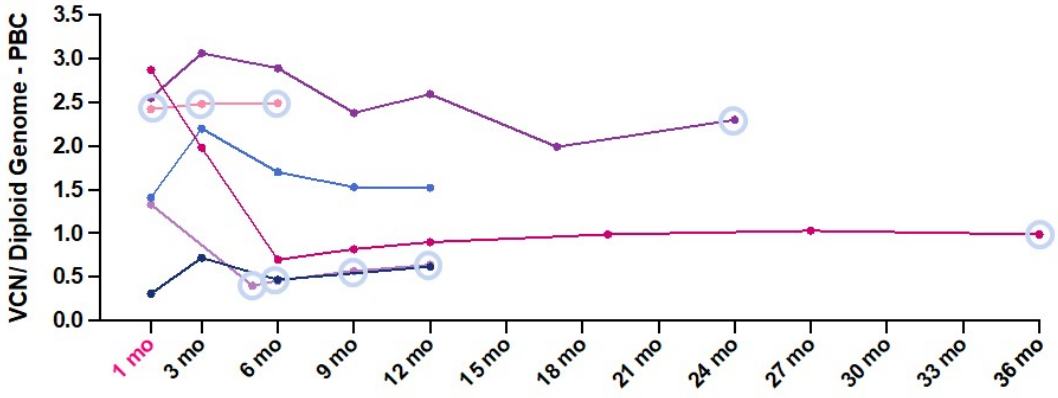
Clinical trial funded in part by grants to UCSD from the California Institute for Regenerative Medicine (CIRM), Cystinosis Research Foundation (CRF) and National Institutes of Health (NIH)

VCN trending as expected, indicating sustained engraftment

NEW DATA POINT

Drug Product	VCN/dg
Patient 1	2.1
Patient 2	1.3
Patient 3	1.6
Patient 4	0.6
Patient 5	2.5
Patient 6	2.9*



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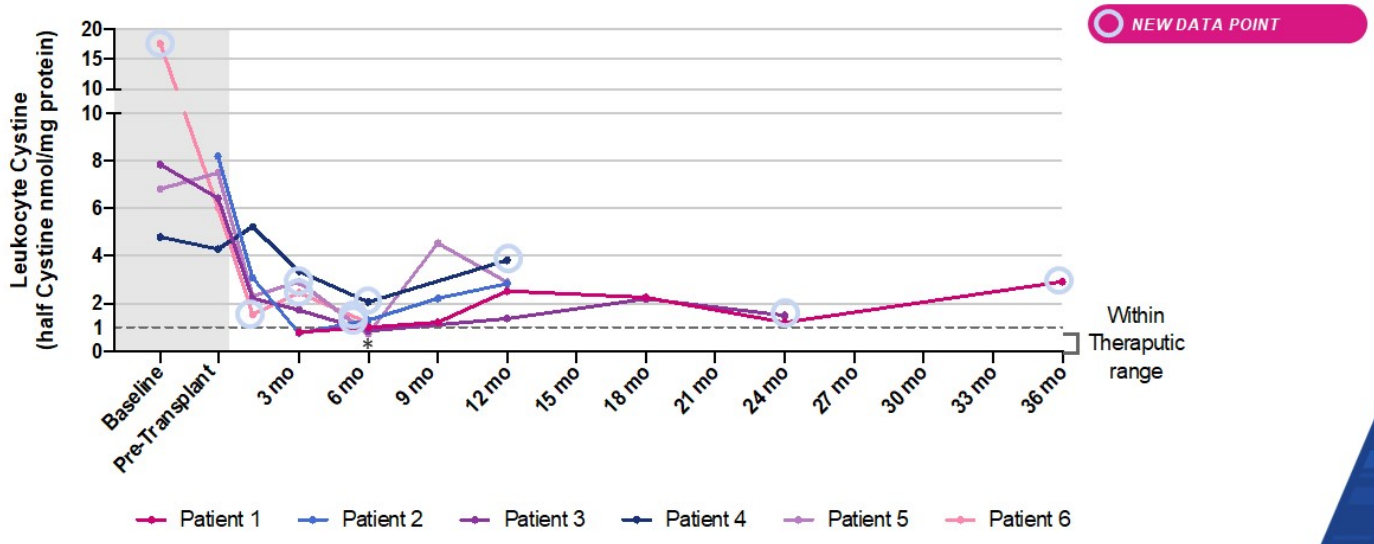
VCN: Vector Copy Number; PBCs: Peripheral Blood Cells; dg: Diploid Genome
*Average of 2 drug products
Note: Patient 2 was lost to follow-up after 12 months

Sustained leukocyte cystine level reduction



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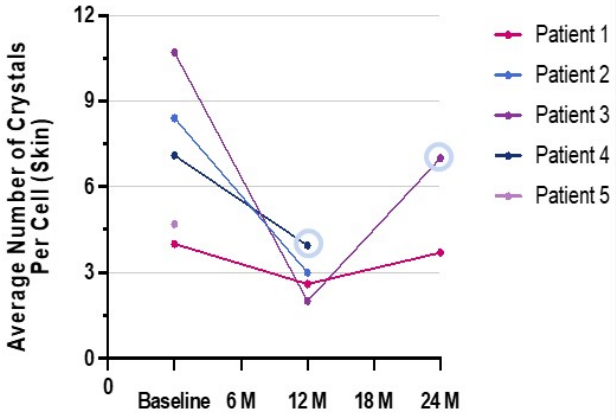
Therapeutic range is <1.0 Half Cystine (nmol/mg protein). Measure of 1 is level of healthy heterozygote.; For Patient 1, Leukocyte Cystine Quantification was initiated at approximately week 20 ; *Patient 1: Hemolyzed sample which may potentially lead to lower results; mo=month; Note: Patient 2 was lost to follow-up after 12 months

Skin and gastrointestinal mucosa cystine crystal reduction

Average intracytoplasmic crystals per cell

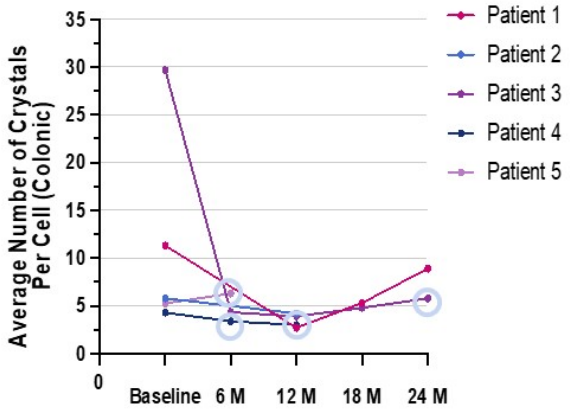
Skin Biopsy



Note: Patient 2 was lost to follow-up after 12 months

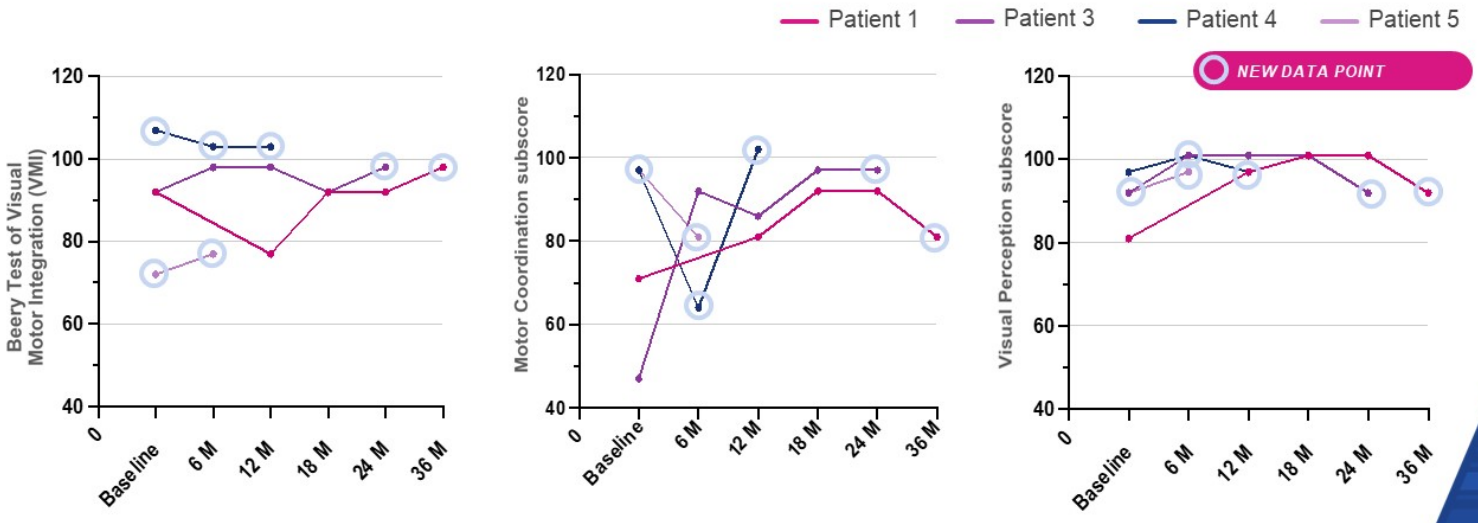
Rectal Biopsy

NEW DATA POINT



Improvement or stabilization in motor coordination and visual perception

CYSTINOSIS PHASE 1/2: PATIENTS 1-5



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The Beery – Buktenica Developmental Test of Visual Motor Integration (Beery VMI) [6th edition] is a standardized test evaluating the ability of the brain to interpret and translate visual information into an exact motor response; Patient 2 did not complete the examination

All patients continue to be oral cysteamine-independent

NEW DATA POINT

CYSTINOSIS PHASE 1/2: PATIENTS 1-6

Patient #1 out 3 years

	Patient	Months off cysteamine pills and eye drops post Ctns-rd-04 infusion	Current status
Cysteamine Pills	Patient 1	36	OFF
	Patient 2	12	Lost to follow-up
	Patient 3	24	OFF
	Patient 4	18	OFF
	Patient 5	12	OFF
	Patient 6	6	OFF
Cysteamine Eye Drops	Patient 1	36	OFF
	Patient 2	12	Lost to follow-up
	Patient 3	24	OFF
	Patient 4	Was not on cysteamine eye drops prior to infusion	OFF
	Patient 5	12	OFF
	Patient 6	6	OFF

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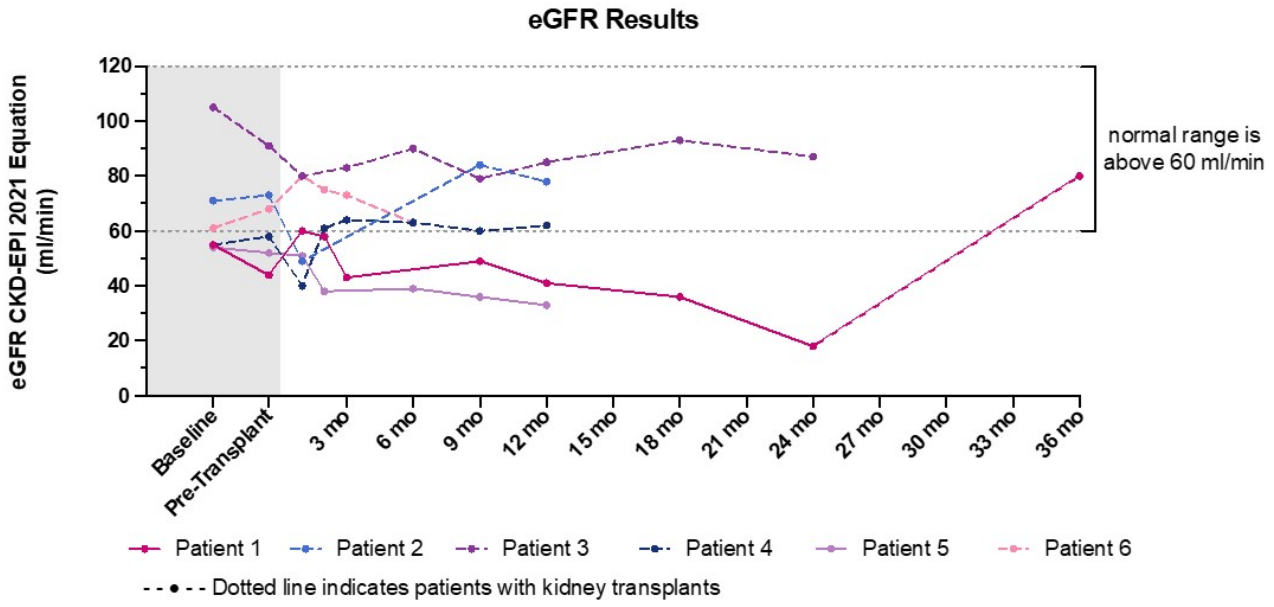
Note: Patients 2, 3 and 5 stopped cysteamine eye drops 1-month post-transplant (per protocol); Patient 1 stopped cysteamine eye drops prior to baseline; Data as of May 8, 2023. Patient 2 has elected not to return since the 12-month follow-up visit.

eGFR data reinforce need for early intervention



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eGFR: Estimated Glomerular Filtration Rate; eGFR calculated using CKD-EPI formula
Note: Patient 2 was lost to follow-up after 12 months

No adverse events related to drug product

No SAEs or AEs related to drug product

No adverse events related to drug product

No SAEs reported

Preliminary AEs reported (as of May 8, 2023)

- N=46 for patient 1; N=22 for patient 2; N=8 for patient 3; N=29 for patient 4; N=37 for patient 5; N=41 for patient 6
- Majority of AEs are mild or moderate
- 1 severe AE for subject 1
  - Appendicitis (resolved) – unrelated to study treatment or procedures
- AEs are generally consistent with myeloablative conditioning, study procedures, underlying disease or co-morbid or pre-existing conditions:

Pre-gene therapy treatment and prior to conditioning (not all events listed)

- Diarrhea, hypokalemia, hypomagnesemia, thrombocytopenia, dizziness, dehydration, vomiting, bone pain, headache

Post-treatment (not all events listed)

- Pancytopenia, deep vein thrombosis, Staphylococcus sepsis, Coronavirus infection, alopecia, rash, mucositis
- Intermittent: diarrhea, vomiting, loss of appetite, epistaxis, blurry vision, febrile neutropenia, hypomagnesemia, hypokalemia

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AE: Adverse Event; SAE: Serious Adverse Event


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