Poseida Highlights Strong Progress on Its Genetic Medicine Programs at the American Society for Gene and Cell Therapy 27th Annual Meeting

Early non-human primate (NHP) data for P-KLKB1-101 demonstrate successful liver gene editing approaching human therapeutic range with a favorable safety and tolerability profile

Preclinical P-FVIII-101 data highlight sustained Hemophilia A correction following a single dose and support potential for repeat dosing and precise tuning of Factor VIII levels

Promising early data further validate Company's fully non-viral delivery platform and transposon technologies

SAN DIEGO, May 9, 2024 /PRNewswire/ -- Poseida Therapeutics, Inc. (Nasdaq: PSTX), a clinical-stage allogeneic cell therapy and genetic medicines company advancing differentiated non-viral treatments for patients with cancer and rare diseases, today highlights new preclinical data supporting the potential of its fully non-viral lead genetic medicines programs and related platform technologies. The data was included in three oral and three poster presentations at the American Society of Gene and Cell Therapy (ASGCT) 2024 Annual Meeting, being held in Baltimore, MD and virtually on May 7-11, 2024.

"Poseida's unique and proprietary toolkit, which enables non-viral gene insertion, high-fidelity gene editing, and associated delivery and manufacturing technologies, has been the driving force behind our emerging genetic medicines programs and our clinical stage allogeneic CAR-T pipeline," said Blair Madison, Ph.D., Chief Scientific Officer, Gene Therapy at Poseida Therapeutics. "Starting with our recent R&D Day, and continuing with ASGCT, we have showcased the maturity and power of our tools specific to enabling a fully non-viral and potentially tunable approach to in vivo genetic medicine. We believe this could provide our medicines with a superior profile featuring a minimized risk of off-target effects that can be customized to each patient, when appropriate. Taken together, these data give us confidence as we continue to validate our non-viral approach, seeking to achieve durable correction in patients suffering from rare diseases such as Hereditary Angioedema and Hemophilia A."

Oral Presentations

Title: *Highly Specific Non-Viral Gene Editing with P-KLKB1-101 for Hereditary Angioedema*
Presenting Author: Blair Madison, Ph.D., Poseida Therapeutics, Inc.
Session Title: Correction of Genetic Disorders of the Blood and Immune System
Presentation Date/Time: Thursday, May 9, 2024, 1:30 - 1:45 PM ET
Location: Room 314-317
Abstract Number: 170

Hereditary Angioedema (HAE) is a rare inherited disorder characterized by recurrent episodes of fluid accumulation outside of blood vessels, causing rapid swelling of tissues. HAE patients have significant unmet need for a durable, effective, and convenient treatment option that eliminates recurrent attacks. P-KLKB1-101 is a fully non-viral investigational gene editing therapy designed to enable high fidelity editing at pre-kallikrein, or KLKB1, for targeted correction of HAE. It utilizes the Cas-CLOVER™ nuclease to achieve clean site-specific gene editing that is engineered for high specificity. In pre-clinical studies, P-KLKB1-101 demonstrates excellent efficiency editing liver cells with off-target edits <0.1% over a wide range of lipid nanoparticle (LNP) concentrations. Poseida's gene editing delivery technologies, including novel ionizable lipid and LNP, enable a highly controlled dose response. Interim non-human primate (NHP) data demonstrate favorable tolerability and liver editing approaching the desired therapeutic range. Development of P-KLKB1-101 is ongoing, including continuation of dose-finding studies in NHPs, CMC manufacturing, scale-up, and additional preparations for IND-enabling studies.

Title: *Sustained FVIII Expression with a Tolerable, Titratable, Fully Non-Viral Gene Therapy for Hemophilia A*
Presenting Author: Brian Truong, Ph.D., Poseida Therapeutics, Inc.
Session Title: Liver Genetic Diseases
Presentation Date/Time: Thursday, May 9, 2024, 5:00 - 5:15 PM ET
Location: Room 324-326
Abstract Number: 210

P-FVIII-101 is a fully non-viral gene insertion-based therapy for the treatment of Hemophilia A, an X-linked bleeding disorder caused by a deficiency in coagulation Factor VIII (FVIII). It utilizes Poseida's proprietary transposon technology combined with nanoparticle delivery to achieve site-specific gene insertion into DNA. Data demonstrate that a single dose of P-FVIII-101 achieves Hemophilia A disease correction with sustained FVIII expression observed over the 13-month duration of the mouse study. The pre-clinical data also support the potential for repeat dosing, enabled by the fully non-viral approach. P-FVIII-101 can also be combined with Poseida's new proprietary modulator switch, which allows inducible down-regulation to enable patient-specific fine tuning of FVIII levels, which is seen as an important product attribute by the hemophilia community.

Development of P-FVIII-101 is ongoing with final optimization of the nanoparticle delivery modality to be validated in NHPs.

Title: *A Durable Gene Therapy with a Robust AAV-LNP Delivery System Allowing for a Reduced AAV Dose*
Presenting Author: Jack Rychak, Ph.D., Poseida Therapeutics, Inc.
Session Title: AAV Vectors - Preclinical and Proof-of-Concept: Technology Focus
Presentation Date/Time: Friday, May 10, 2024, 1:45 - 2:00 PM ET
Location: Ballroom 2
Abstract Number: 248

This presentation highlights data from studies exploring the feasibility of combining existing adeno-associated virus delivery vectors (AAVs) with Poseida's piggyBac DNA insertion system. This approach is intended to achieve stable integration of a transgene into a large percentage of

hepatocytes for maximal therapeutic benefit, which cannot be readily achieved using an AAV or episomal approach. Pre-clinical data demonstrate exceptional efficacy in mouse models of severe Ornithine Transcarbamylase Deficiency (OTCD). Additionally, robust potency is observed in mouse models of Phenylketonuria (PKU), using low AAV doses, and enabled by the integration of a therapeutic transgene with the SPB transposase. These data highlight the utility of the hybrid platform for enabling effective treatment with lower AAV doses, even in the growing liver early in life. With Poseida's current internal focus on fully non-viral approaches, as announced at the Company's recent R&D Day, the Company may opportunistically consider partnering transactions with respect to its P-PAH-101 and P-OTC-101 programs.

Poster Presentations

Title: *Advanced Gene Editing with an Enhanced Site-Specific Nuclease for Knock-Out and Knock-In Applications*
Presenting Author: Oscar Alvarez, Ph.D., Poseida Therapeutics, Inc.
Session Title: Wednesday Posters: Gene Targeting and Gene Correction New Technologies
Session Date/Time: Wednesday, May 8, 2024, 12:00 PM ET
Location: Exhibit Hall
Abstract Number: 717

Poseida's Cas-CLOVER nuclease system represents a key advancement in gene editing technology with high-fidelity performance that significantly exceeds that of traditional nucleases. Poseida developed its Cas-CLOVER system by incorporating an S44P mutation which confers a two to three-fold improvement in on-target Cas-CLOVER editing efficiency, while fully preserving fidelity and with no increase in off-target editing. The enhanced Cas-CLOVER system exhibits remarkable capabilities for site-specific insertion of genes, as evidenced by the successful integration of a therapeutic transgene in mouse liver cells and associated phenotypical disease rescue in a PKU mouse model.

The Company plans to evaluate homology-independent targeting using its rapidly advancing fully non-viral DNA delivery technology for the precise insertion of genes and related gene expression regulators to specific sites in the genome.

Title: *Optimizing Lipid Nanoparticle Formulations for Enhanced Non-Viral Gene Therapy: Overcoming DNA Delivery Challenges and Achieving High-Efficiency Transgene Integration*
Presenting Author: George Wang, Ph.D., Poseida Therapeutics, Inc.
Session Title: Thursday Posters: Other Nonviral Delivery
Session Date/Time: Thursday, May 9, 2024, 12:00 PM ET
Location: Exhibit Hall
Abstract Number: 1239

This study demonstrates the optimization of DNA delivery to hepatocytes, in vivo, and genomic integration using Poseida's piggyBac DNA insertion system. Poseida has synthesized and evaluated novel terpene-based lipids exhibiting unique DNA encapsulation and delivery properties in vivo. Poseida also identified a class of amphipathic small molecules called Poseida Delivery Excipients (PDEs) with unique capabilities for enhancing DNA delivery. Data demonstrated that inclusion of these PDEs in LNPs improved the insertion of targeted genes and decreased pro-inflammatory cytokine release. LNPs comprising novel ionizable lipids and PDEs also significantly enhanced genomic insertion of therapeutically relevant transgenes in vivo. These unique combinations of LNPs and PDEs could further enhance the potential of Poseida's non-viral DNA platform technology and piggyBac DNA insertion system for treating serious genetic disorders.

Title: *Novel Biodegradable Lipid Nanoparticles (LNP) for Co-Encapsulation of Complex Nucleic Acid Payloads for In Vivo Genome Editing*
Presenting Author: Alicia Davis, Ph.D., Poseida Therapeutics
Session Title: Friday Posters: Other Nonviral Delivery
Session Date/Time: Friday, May 10, 2024, 12:00 PM ET
Location: Exhibit Hall
Abstract Number: 1737

This presentation highlights the development of an LNP capable of robustly co-encapsulating and delivering Poseida's Cas-CLOVER nuclease system to the liver, while avoiding unintended uptake. Poseida has identified and characterized a novel class of biodegradable ionizable lipids for in vivo mRNA delivery. The Company has identified lipid S, which demonstrated potent mRNA delivery potency and improved clearance from the liver. These studies demonstrate Poseida's discovery chemistry and formulation capabilities to generate high-performing LNPs for the efficient delivery of next-generation genetic medicine platforms such as Cas-CLOVER.

About P-KLKB1-101

P-KLKB1-101 is an investigational liver-directed non-viral gene editing approach designed using Cas-CLOVER™ Site-Specific Gene Editing System, Poseida's proprietary high-fidelity nuclease, for site-specific gene editing of the KLKB1 gene, for the treatment of Hereditary Angioedema (HAE). HAE is a rare, inherited disorder that results in the swelling of the skin, intestinal tract, and airways, which can be both debilitating and life-threatening. Preclinical data demonstrate therapeutically relevant reduction of pre-kallikrein levels in both mouse and NHP models.

About P-FVIII-101

P-FVIII-101 is an investigational liver-directed gene insertion program combining Poseida's non-viral transposon platform and nanoparticle delivery technologies for the in vivo treatment of Hemophilia A. Hemophilia A is a hereditary bleeding disorder caused by a deficiency in Factor VIII production with a high unmet need, resulting in excessive bleeding occurring either spontaneously or due to trauma and leading to pain and permanent joint damage in patients. P-FVIII-101 utilizes the piggyBac gene integration system delivered via lipid nanoparticle, which has demonstrated the potential to correct Factor VIII deficiency in juvenile and adult animal models using Poseida's fully non-viral insertion system that is capable of whole gene correction.

About Poseida Therapeutics, Inc.

Poseida Therapeutics is a clinical-stage biopharmaceutical company advancing differentiated allogeneic cell therapies and genetic medicines with the capacity to cure certain cancers and rare diseases. The Company's pipeline includes investigational allogeneic CAR-T cell therapies for both solid tumors and hematologic cancers as well as investigational in vivo genetic medicines that address patient populations with high unmet medical need.

The Company's approach is based on its proprietary genetic editing platforms, including its non-viral piggyBac® DNA Delivery System, Cas-CLOVER™ Site-Specific Gene Editing System, Booster Molecule and nanoparticle gene delivery technologies, as well as in-house GMP cell therapy manufacturing. The Company has formed strategic collaborations with Roche and Astellas to unlock the promise of cell therapies for cancer patients. Learn more at www.poseida.com and connect with Poseida on X and LinkedIn.

Forward-Looking Statements

Statements contained in this press release regarding matters that are not historical facts are "forward-looking statements" within the meaning of the Private Securities Litigation Reform Act of 1995. Such forward-looking statements include statements regarding, among other things, expected plans with respect to clinical trials, including timing of regulatory submissions and approvals and clinical data updates; anticipated timelines and milestones with respect to the Company's development programs and manufacturing activities and capabilities; the potential capabilities and benefits of the Company's technology platforms and product candidates, including the tolerability and efficacy and safety profile of such product candidates; the quote from Dr. Madison; and the Company's plans and strategy with respect to developing its technologies and product candidates. Because such statements are subject to risks and uncertainties, actual results may differ materially from those expressed or implied by such forward-looking statements. These forward-looking statements are based upon the Company's current expectations and involve assumptions that may never materialize or may prove to be incorrect. Actual results could differ materially from those anticipated in such forward-looking statements as a result of various risks and uncertainties, which include, without limitation, the Company's reliance on third parties for various aspects of its business; risks and uncertainties associated with development and regulatory approval of novel product candidates in the biopharmaceutical industry; the Company's ability to retain key scientific or management personnel; the fact that interim data from the Company's clinical trials may change as more data become available and remain subject to audit and verification procedures that could result in material differences from the final data; and the other risks described in the Company's filings with the Securities and Exchange Commission. All forward-looking statements contained in this press release speak only as of the date on which they were made. The Company undertakes no obligation to update such statements to reflect events that occur or circumstances that exist after the date on which they were made, except as required by law.

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