

November 9, 2022



Trevena Announces Completion of Phase 1 Study for TRV045, Novel S1P Receptor Modulator

TRV045 demonstrated a favorable tolerability profile with no reported SAEs and no lymphopenia

Nonclinical study showed anti-inflammatory signaling, suggesting a potential disease-modifying effect of TRV045 in the treatment of epilepsy, based on astrocyte cell culture study

PK profile supports anticipated once daily dosing

CHESTERBROOK, Pa., Nov. 09, 2022 (GLOBE NEWSWIRE) -- **Trevena, Inc. (Nasdaq: TRVN)**, a biopharmaceutical company focused on the development and commercialization of novel medicines for patients with central nervous system (CNS) disorders, today announced positive clinical data for TRV045, its selective sphingosine-1-phosphate subtype 1 (S1P₁) receptor modulator. The 3-part randomized, double-blind, placebo-controlled Phase 1 study evaluated safety, tolerability and PK in healthy volunteers. TRV045 is being developed as a potential treatment for diabetic neuropathic pain (DNP). Through a collaboration with the National Institutes of Health, the Company is also exploring TRV045 as a potential treatment for epilepsy.

“We’re pleased to report positive Phase 1 data on our novel S1P₁ receptor modulator, TRV045, which are consistent with its distinct mechanism of action,” said Carrie Bourdow, President and CEO of Trevena. “Planning is underway to initiate a targeted proof-of-concept study early next year, which would provide near-term data to further validate TRV045’s potential in CNS areas of interest, including epilepsy and non-opioid chronic pain.”

Overview of the TRV045 Phase 1 Clinical Program

This study was a three-part study design, examining the PK profile, safety and tolerability of orally administered TRV045 in healthy volunteers.

Part 1 – Single Ascending Dose: This study phase investigated the PK profile, safety and tolerability of single ascending doses of TRV045 or placebo. Doses were administered to 53 healthy subjects in 6 separate study cohorts, with TRV045 dosed at 5, 15, 30, 90, and 200mg.

Part 2 – Food Effect: This study phase investigated the PK profile, safety and tolerability of TRV045 administered with a high-fat meal in 3 study cohorts. The effect of food on the absorption and exposure to TRV045 was studied in 27 subjects at doses of 30, 200 and 300mg.

Part 3 – Multiple Dosing: This study phase investigated the PK profile, safety and tolerability among a single cohort of subjects receiving multiple doses of TRV045 or placebo. A single cohort of 9 subjects were given 250mg of TRV045 daily for seven days.

Topline results from the Phase 1 study are summarized below:

- **Well Tolerated.** TRV045 was well tolerated, with no serious adverse events. Among non-serious spontaneous adverse events, the only adverse event assessed by study investigators as probably or definitely related to drug was headache in 4 subjects across all three parts of the study.
- **Attractive PK.** The PK profile of TRV045 showed a half-life consistent with anticipated once-daily dosing.
- **Suitable Target Exposure.** Based on the PK exposure, the calculated free plasma concentrations of TRV045 exceeded the targeted efficacy range based on nonclinical measures of in vitro and in vivo pharmacodynamics.
- **Differentiated From Currently Marketed S1P Drugs.** A targeted set of laboratory measures were studied to characterize the tolerability of TRV045, including total lymphocyte counts, ECGs, and ophthalmologic examinations, as these adverse events have been associated with existing S1P-targeted compounds. No lymphopenia, cardiac, pulmonary or ophthalmologic adverse events were reported in the Phase 1 study for TRV045.

Astrocyte Cell Culture Study

Trevena conducted an additional nonclinical study that showed TRV045 has a potential anti-inflammatory effect on astrocytes. This suggests TRV045 may play a role as a disease-modifying treatment in epilepsy.

In this study, primary astrocytes derived from mouse brains were isolated and studied in cell culture. Astrocytes are highly prevalent glial cells that are well recognized mediators of inflammation in the CNS. Concentrations of seventeen different cytokines and chemokines produced by astrocytes were studied. The results demonstrated that TRV045 modulated these cytokines and chemokines, with a statistically significant dampening of the inflammatory response of these cells.

We believe these data are potentially significant because inflammatory signals from astrocytes and other brain cells appear to play an important role in development of seizures and the emergence of epilepsy. As a result, we believe TRV045 may have the potential to exert disease-modifying effects in the treatment of epilepsy in humans.

About Epilepsy

Epilepsy, one of the most common neurological diseases in the world, is a chronic disorder characterized by recurrent seizures. Epilepsy is defined as having two or more unprovoked seizures separated by at least 24 hours or after one seizure with a high risk of more.

A seizure is a sudden surge of electrical activity in the brain caused by complex chemical changes that occur in nerve cells. Usually, there is a balance of cells that either encourage or stop other brain cells from sending messages. A seizure occurs when there may be too much or too little electrical activity in the brain causing an imbalance. Seizures are a

symptom of many different disorders that can affect the brain. Nearly 50 million people suffer from epilepsy worldwide, including 3 million adults and 470,000 children in the U.S. 150,000 new cases of epilepsy are reported in the United States each year. According to the CDC, 56% of adults living with diagnosed epilepsy continue to have seizures.

About Diabetic Neuropathic Pain

Diabetic neuropathy is a common complication of both type 1 and type 2 diabetes, with pain in the extremities being one of the main symptoms. Other symptoms may include numbness, tingling, allodynia and hyperalgesia. Diabetic neuropathic pain is usually characterized as moderate to severe in nature and can substantially affect patients' quality of life as well as their social and psychological well-being.

Approximately 25% of people with diabetes are affected by DNP, equaling over 5 million people in the U.S. During their lifetime, approximately 50% to 70% of diabetic patients may experience symptoms of DNP.

About TRV045

TRV045 is a novel, selective sphingosine-1-phosphate subtype 1 (S1P₁) receptor modulator being developed as a potential treatment for acute and chronic neuropathic pain secondary to diabetic peripheral neuropathy. Through a collaboration with the National Institutes of Health, Trevena is also exploring TRV045 as a potential treatment for epilepsy.

S1P receptors are located throughout the body, including the central nervous system, where they are believed to play a role in modulating neurotransmission and membrane excitability.

Trevena's discovery efforts have identified a family of compounds that are highly selective for the S1P₁ receptor. TRV045 reversed thermal hyperalgesia, a measure of neuropathic pain, in nonclinical models of diabetic peripheral neuropathy and chemotherapy-induced peripheral neuropathy. TRV045 was not associated with lymphopenia and produced no changes in blood pressure, heart rate, or respiratory function at or above pharmacologically active doses in nonclinical studies. TRV045 is an investigational drug and has not been approved by the FDA.

About Trevena

Trevena, Inc. is a biopharmaceutical company focused on the development and commercialization of innovative medicines for patients with CNS disorders. The Company has one approved product in the United States, OLINVYK[®] (oliceridine) injection, indicated in adults for the management of acute pain severe enough to require an intravenous opioid analgesic and for whom alternative treatments are inadequate. The Company's novel pipeline is based on Nobel Prize winning research and includes four differentiated investigational drug candidates: TRV250 for the acute treatment of migraine, TRV734 for maintenance treatment of opioid use disorder, TRV045 for diabetic neuropathic pain and epilepsy, and TRV027 for acute respiratory distress syndrome and abnormal blood clotting in COVID-19 patients.

For more information, please visit www.Trevena.com

Forward-Looking Statements

Any statements in this press release about future expectations, plans and prospects for the Company, including statements about the Company's strategy, future operations, clinical development and trials of its therapeutic candidates, plans for potential future product candidates, commercialization of approved drug products and other statements containing the words "anticipate," "believe," "estimate," "expect," "intend," "may," "might," "plan," "objective," "predict," "project," "suggest," "target," "potential," "will," "would," "could," "should," "continue," "ongoing," or the negative of these terms or similar expressions, constitute forward-looking statements within the meaning of The Private Securities Litigation Reform Act of 1995. Actual results may differ materially from those indicated by such forward-looking statements as a result of various important factors, including: the commercialization of any approved drug product, the status, timing, costs, results and interpretation of the Company's clinical trials or any future trials of any of the Company's investigational drug candidates; the uncertainties inherent in conducting clinical trials; expectations for regulatory interactions, submissions and approvals, including the Company's assessment of the discussions with the FDA or other regulatory agencies about any and all of its programs; uncertainties related to the commercialization of OLINVYK; available funding; uncertainties related to the Company's intellectual property; uncertainties related to the ongoing COVID-19 pandemic, other matters that could affect the availability or commercial potential of the Company's therapeutic candidates; and other factors discussed in the Risk Factors set forth in the Company's Annual Report on Form 10-K and Quarterly Reports on Form 10-Q filed with the Securities and Exchange Commission (SEC) and in other filings the Company makes with the SEC from time to time. In addition, the forward-looking statements included in this press release represent the Company's views only as of the date hereof. The Company anticipates that subsequent events and developments may cause the Company's views to change. However, while the Company may elect to update these forward-looking statements at some point in the future, it specifically disclaims any obligation to do so, except as may be required by law.

For more information, please contact:

Investor Contact:

Dan Ferry
Managing Director
LifeSci Advisors, LLC
daniel@lifesciadvisors.com
(617) 430-7576

PR & Media Contact:

Sasha Bennett
Associate Vice President
Clyde Group
Sasha.Bennett@clydegroupp.com
(239) 248-3409



Source: Trevena, Inc.