



MannKind Refocuses Pipeline Resources in Response to COVID-19 Pandemic

March 17, 2020

WESTLAKE VILLAGE, Calif., March 17, 2020 (GLOBE NEWSWIRE) -- **MannKind Corporation (NASDAQ: MNKD)**, a company focused on the development and commercialization of inhaled therapeutic products, today announced that it is adjusting research and development resources that were reserved for its pipeline of investigational products for treating serious lung diseases, with the goal of prioritizing work on new compounds that may have the potential to address the morbidity and mortality associated with respiratory viral infections, such as COVID-19.

Specifically, MannKind has initiated a collaboration with Immix Biopharma, Inc. to prepare a dry powder formulation of a compound with the potential to treat acute respiratory distress syndrome, a complication of COVID-19. The immediate focus of this effort is to rapidly develop prototype powders, which will then be assessed for their potential to be used therapeutically. Other collaborations are being actively explored at this time.

MannKind is committed to joining the global effort to overcome the COVID-19 crisis. MannKind's formulation and drug development expertise as well as its excess manufacturing capacity will be deployed as necessary to help protect humankind from this global health crisis.

Formulations for Pulmonary Delivery

MannKind's Technosphere® technology is an innovative, dry-powder formulation technology that allows medication to be delivered to the lungs. MannKind has successfully prepared Technosphere formulations of anionic and cationic drugs, hydrophobic and hydrophilic drugs, proteins, peptides and small molecules. Technosphere powders are based on a proprietary excipient, fumaryl diketopiperazine (FDKP), which is a pH-sensitive organic molecule that self-assembles into small particles under acidic conditions. Active pharmaceutical ingredients can be loaded onto these particles, which are then dried to powder form. The resulting powder has a consistent and narrow range of particle sizes with good aerodynamic properties that enable efficient delivery deep into the lungs. Technosphere powders dissolve quickly when the particles contact the moist lung surface with its neutral pH, releasing the drug molecules to diffuse across a thin layer of cells into the arterial circulation, bypassing the liver to provide excellent systemic exposure.

Drug Delivery Devices

MannKind has also created an innovative line of breath-powered, dry powder inhalers. Its inhalers are easy to use, cost-effective and can be produced in both a reusable (chronic treatment) and a single-use (acute treatment) format. Both the reusable and single-use inhaler formats use the same internal air-flow design. Being breath-powered, our inhalers require only the patient's inhalation effort to deliver the powder. The inhalers are engineered to produce an aggressive airstream that de-agglomerates the powder while keeping the powder moving relatively slowly. This slow-moving powder effectively navigates the patient's airways to reach the deep lung with minimal deposition at the back of the throat. MannKind's inhalers show very little change in performance (i.e., efficient cartridge emptying) over a wide range of inhalation efforts.

Manufacturing Capability

MannKind's 328,000 square foot R&D and manufacturing facility is located in Danbury, Connecticut and has a full range of development and manufacturing capabilities, including analytical, chemical, formulation, filling and packaging. The facility houses two 61 square meter lyophilizers and has sufficient filling capacity to produce more than 300 million cartridges of inhaled drug annually. The quality management systems of the facility have been certified to be in conformance with the ISO 13485 and MD-SAP standards and was inspected most recently by the U.S. Food and Drug Administration in June 2018, at which time there were no inspectional observations.

About Immix Biopharma

Immix Biopharma, Inc. is a privately-held, biopharmaceutical firm focused on developing safe and effective therapies for cancer patients. The company was founded by Vladimir Torchilin, Ph.D., D.Sc., Director of the Center for Pharmaceutical Biotechnology and Nanomedicine at Northeastern University; physician-scientist and clinical researcher Ilya Rachman, MD, PhD, MBA; and Sean D. Senn, JD, MSc., MBA, a senior biotechnology patent attorney. Immix is focused on harnessing scientific advances in order to engineer transformative and effective cancer treatments. For more information visit www.immixbio.com.

About MannKind

MannKind Corporation (NASDAQ:MNKD) focuses on the development and commercialization of inhaled therapeutic products for patients with diseases such as diabetes and pulmonary arterial hypertension. MannKind is currently commercializing Afrezza® (insulin human) Inhalation Powder, the Company's first FDA-approved product and the only inhaled ultra rapid-acting mealtime insulin in the United States, where it is available by prescription from pharmacies nationwide. MannKind is headquartered in Westlake Village, California, and has a state-of-the art manufacturing facility in Danbury, Connecticut. The Company also employs field sales and medical representatives across the U.S. For further information, visit www.mannkindcorp.com.

Forward-Looking Statements

This press release contains forward-looking statements that involve risks and uncertainties. Words such as "believes," "anticipates," "plans," "expects," "intends," "will," "goal," "potential" and similar expressions are intended to identify forward-looking statements. These forward-looking statements are based upon MannKind's current expectations. Actual results and the timing of events could differ materially from those anticipated in such forward-looking statements as a result of various risks and uncertainties detailed in MannKind's filings with the SEC. For a discussion of these and other factors, please refer to MannKind's annual report on Form 10-K for the year ended December 31, 2019 as well as MannKind's other filings with the SEC. You are cautioned not to place undue reliance on these forward-looking statements, which speak only as of the date of this press release. All forward-looking statements are qualified in their entirety by this cautionary statement, and MannKind undertakes no obligation to revise or update any forward-looking statements to reflect events or circumstances after the date of this press release.

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