Idera Pharmaceuticals Present New Data That Show Toll-like Receptor Antagonists Inhibit Inflammasome Activation and Suppress Induction of Interleukin 1 Beta in Autoimmune Disease Models

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Top-line data from Phase 2 study of IMO-3100 in psoriasis anticipated by year end

CAMBRIDGE, Mass.--(BUSINESS WIRE)--Oct. 30, 2012-- Idera Pharmaceuticals, Inc. (NASDAQ: IDRA) today announced new data from preclinical studies showing that selective inhibition of Toll-like Receptors (TLRs) 7, 8, and 9, which play a key role in inflammation and immunity, also resulted in inhibition of inflammasome activation and induction of Interleukin 1 beta (IL-1β), a pro-inflammatory cytokine that has been shown to be involved in Behçet's disease, non-infectious uveitis, cardiovascular disease, and other auto-inflammatory diseases. The data were presented during the 8th Annual Meeting of the Oligonucleotide Therapeutics Society being held October 28-31, 2012 in Boston.

“We are pleased that in the preclinical studies, in addition to controlling the induction of multiple cytokines such as TNF-α, IL-12, IL-6, and IL-17 and the consequent downstream signaling, our approach to blocking TLR-mediated pathways also led to decreased production of inflammasome components and suppression of IL-1β in disease models,” said Dr. Timothy Sullivan, VP of Development Programs at Idera. “These new data provide further support for our focus on autoimmune diseases, where the inflammasome plays a fundamental role in inflammatory and immune responses. Our clinical development program in autoimmune diseases includes an ongoing Phase 2 study of IMO-3100 in psoriasis, with top-line data expected before the end of 2012, and a planned Phase 1 clinical study of IMO-8400, a candidate initially targeted for the treatment of lupus.”

In a mouse model of IL-23-induced psoriasis, the inflammasome components NLRP3 and AIM2 were up-regulated and IL-1β was increased compared to control animals. Treatment with an antagonist of TLRs 7, 8, and 9 led to suppression of NLRP3, AIM2, and IL-1β in these animals. In mouse models of NZBW/F1 lupus-prone mice and collagen antibody-induced arthritis, NLRP3 was up-regulated and IL-1β was induced compared to control animals. Treatment with an antagonist of TLRs 7, 8, and 9 led to the suppression of NLRP3 and IL-1β in these animals.

About the Inflammasome and Interleukin 1 beta

Activation of the inflammasome, an intracellular complex that regulates the release of proinflammatory cytokines such as IL-1β in response to exogenous pathogens and endogenous danger signals, is influenced by specific TLR signaling. Inflammasome is a multi-protein complex, and its components include NLRP3 and AIM2 for recognition of cellular nucleic acids. Evidence from studies involving human genetics, human ex vivo mononuclear cell responses, and in vivo and in vitro murine models confirms the importance of the inflammasome and interleukin-1β in the pathogenesis of several inflammatory diseases.

Since the discovery and cloning of IL-1β, this critical proinflammatory mediator implicated in many diseases has been a focus of the pharmaceutical industry. The first successful biologic in this class was a recombinant form of the IL-1 receptor antagonist (RA), a natural inhibitor of IL-1β-mediated inflammation. At least three additional IL-1-targeted biologics have been developed, including a recombinant protein with high affinity for IL-1β and two humanized monoclonal antibodies. [Curr Allergy Asthma Rep. 2010 July; 10(4): 229–235.]

About TLRs and Idera's Pipeline

Toll-like Receptors (TLRs) play a key role in inflammation and immunity. Of the 10 human TLRs identified to date, Idera is developing compounds targeted to TLRs 3, 7, 8, and 9, which are expressed in different cells and serve unique functions. Using its chemistry-based approach, Idera has created novel drug candidates that modulate immune responses through either activation or inhibition of specific TLRs. Inhibition of specific TLRs may be useful in treating autoimmune disorders, such as systemic lupus erythematosus (SLE), psoriasis, and rheumatoid arthritis, by blocking the induction of multiple cytokines and signaling pathways. Idera's lead clinical candidates for application in autoimmune diseases are IMO-3100, an antagonist of TLR7 and TLR9, and IMO-8400, an antagonist of TLRs 7, 8, and 9.

A characteristic of autoimmune diseases such as SLE and psoriasis is the production of immune complexes with self-nucleic acids. These abnormal immune complexes activate TLRs 7, 8, and 9 and induce multiple cytokines that cause further damage to the body's own tissues and organs, thereby releasing more self-nucleic acids. Thus, a pathologic amplification cycle is established, promoting disease maintenance and progression. In preclinical models of several autoimmune diseases, IMO-3100 and IMO-8400 inhibited TLR-mediated immune responses, broke the cycle of disease maintenance and progression through decreases in Th1, Th17 and inflammasome pathways, and led to improvements in multiple measures of disease.

About Idera Pharmaceuticals, Inc.

Idera Pharmaceuticals applies its proprietary Toll-like receptor (TLR) drug discovery platform which has created immunomodulatory drug candidates and has a clinical development program in autoimmune diseases. Additionally, Idera has a collaboration with Merck & Co. for the use of TLR-targeted candidates as vaccine adjuvants. The Company is also advancing its gene-silencing oligonucleotide (GSO) technology for the purpose of inhibiting the expression of disease-promoting genes. For more information, visit http://www.iderapharma.com.

Idera Forward Looking Statements

This press release contains forward-looking statements concerning Idera Pharmaceuticals, Inc. that involve a number of risks and uncertainties. For this purpose, any statements contained herein that are not statements of historical fact may be deemed to be forward-looking statements. Without limiting the foregoing, the words "believes," "anticipates," "plans," "expects," "estimates," "intends," "should," "could," "will," "may," and similar expressions are intended to identify forward-looking statements. There are a number of important factors that could cause Idera's actual results to differ materially from those indicated by such forward-looking statements, including whether Idera’s cash resources will be sufficient to fund the Company’s continuing operations and the further development of the Company’s autoimmune disease program; whether results obtained in preclinical studies and early clinical trials, such as the results from the preclinical studies referred to in this release, will be indicative of results obtained in future clinical trials; whether products based on Idera's technology will advance into or through the clinical trial process on a timely basis or at all and receive

approval from the United States Food and Drug Administration or equivalent foreign regulatory agencies; whether, if the Company's products receive approval, they will be successfully distributed and marketed; whether the Company will be able to license any of its TLR target candidates on a timely basis or at all; whether the Company's collaboration with Merck & Co, Inc., will be successful; whether the patents and patent applications owned or licensed by the Company will protect the Company's technology and prevent others from infringing it; and such other important factors as are set forth under the caption "Risk Factors" in Idera's Quarterly Report on Form 10-Q for the quarter ended June 30, 2012 which important factors are incorporated herein by reference. Idera disclaims any intention or obligation to update any forward-looking statements.

Source: Idera Pharmaceuticals, Inc.

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