



Ionis Pharmaceuticals Announces the Initiation of a Clinical Study of its First Orally Delivered Antisense Drug for the Treatment of Gastrointestinal Disorders

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- Ionis Earns \$5 Million Milestone Payment from Janssen

CARLSBAD, Calif., Dec. 21, 2017 /PRNewswire/ -- Ionis Pharmaceuticals, Inc. (NASDAQ: IONS) today announced that it has earned a \$5 million milestone payment associated with initiation and enrollment in a newly initiated Phase 1 clinical study of IONIS-JBI1-2.5_{Rx}, an orally delivered antisense drug designed to treat patients with a gastrointestinal (GI) immune disorder by reducing the production of an undisclosed target locally in the GI tract. Janssen Biotech, Inc. (Janssen), which is responsible for global development, regulatory and commercialization activities, is conducting the Phase 1 study.



"This study represents an important milestone for us and our antisense technology because IONIS-JBI1-2.5_{Rx} is our first orally delivered antisense drug for the treatment of GI disorders to advance into the clinic. We are pleased with the success of our collaboration with Janssen. In under two years, we have advanced a drug into clinical trials and identified and initiated IND-enabling studies for a second drug development candidate, IONIS-JBI2-2.5_{Rx}. Our collaboration with Janssen combines Ionis' broad applicability of our antisense technology with their expertise in GI autoimmune disorders and therapeutic formulation," said C. Frank Bennett, senior vice president of research at Ionis Pharmaceuticals.

Under its global collaboration agreement with Janssen, Ionis is eligible to receive nearly \$585 million in development, regulatory and sales milestone payments and license fees. In addition, Ionis will receive tiered royalties that on average are double-digits on sales from any product that is successfully commercialized.

ABOUT IONIS PHARMACEUTICALS, INC.

Ionis is the leading company in RNA-targeted drug discovery and development focused on developing drugs for patients who have the highest unmet medical needs, such as those patients with severe and rare diseases. Using its proprietary antisense technology, Ionis has created a large pipeline of first-in-class or best-in-class drugs, with over three dozen drugs in development. SPINRAZA® (nusinersen) has been approved in global markets for the treatment of spinal muscular atrophy (SMA). Biogen is responsible for commercializing SPINRAZA. Drugs that have successfully completed Phase 3 studies include inotersen, an antisense drug Ionis is developing to treat patients with hereditary TTR amyloidosis (hATTR), and volanesorsen, an antisense drug discovered by Ionis and co-developed by Ionis and Akcea Therapeutics to treat patients with either familial chylomicronemia syndrome or familial partial lipodystrophy. Akcea, an affiliate of Ionis, is a biopharmaceutical company focused on developing and commercializing drugs to treat patients with serious cardiometabolic diseases caused by lipid disorders. If approved, volanesorsen will be commercialized through Ionis' affiliate, Akcea. Inotersen filings for marketing approval have been submitted in the U.S. and EU. Volanesorsen filings for marketing approval have been submitted in the U.S., EU, and Canada. Ionis' patents provide strong and extensive protection for its drugs and technology. Additional information about Ionis is available at www.ionispharma.com.

IONIS' FORWARD-LOOKING STATEMENT

This press release includes forward-looking statements regarding the therapeutic and commercial potential regarding Ionis' alliance with Janssen, Ionis research, development and commercial opportunities in developing antisense drugs to treat autoimmune disease in the gastrointestinal tract. Any statement describing Ionis' goals, expectations, financial or other projections, intentions or beliefs is a forward-looking statement and should be considered an at-risk statement. Such statements are subject to certain risks and uncertainties, particularly those inherent in the process of discovering, developing and commercializing drugs that are safe and effective for use as human therapeutics, and in the endeavor of building a business around such drugs. Ionis' forward-looking statements also involve assumptions that, if they never materialize or prove correct, could cause its results to

differ materially from those expressed or implied by such forward-looking statements. Although Ionis' forward-looking statements reflect the good faith judgment of its management, these statements are based only on facts and factors currently known by Ionis. As a result, you are cautioned not to rely on these forward-looking statements. These and other risks concerning Ionis' programs are described in additional detail in Ionis' annual report on Form 10-K for the year ended December 31, 2016, and its most recent quarterly report on Form 10-Q, which are on file with the SEC. Copies of these and other documents are available from the Company.

In this press release, unless the context requires otherwise, "Ionis," "Company," "we," "our," and "us" refers to Ionis Pharmaceuticals and its subsidiaries.

Ionis Pharmaceuticals™ is a trademark of Ionis Pharmaceuticals, Inc. Akcea Therapeutics™ is a trademark of Ionis Pharmaceuticals, Inc. SPINRAZA® is a registered trademark of Biogen.

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