



Ionis Closes Strategic Collaboration with Biogen to Develop Drugs for a Broad Range of Neurological Diseases

June 5, 2018

CARLSBAD, Calif., June 5, 2018 /PRNewswire/ -- Ionis Pharmaceuticals, Inc. (Nasdaq: IONS) announced today that it closed its expanded strategic collaboration with Biogen (Nasdaq: BIIB) to discover and develop novel antisense drugs for a broad range of neurological diseases following receipt of clearance under the Hart-Scott-Rodino (HSR) Antitrust Improvements Act of 1976. Biogen paid Ionis \$1 billion in cash, which included \$625 million for the purchase of 11,501,153 shares of Ionis common stock at a price of \$54.34 per share and a \$375 million upfront payment.



ABOUT THE IONIS/BIOGEN COLLABORATION

On April 20, 2018, Ionis and Biogen announced they would expand their strategic collaboration to develop novel antisense drugs for a broad range of neurological diseases through a new ten-year collaboration. This collaboration capitalizes on Ionis' leadership in RNA-targeted therapies as well as Ionis and Biogen's joint expertise in neuroscience research and drug development. It builds upon a productive collaboration that produced SPINRAZA[®] (nusinersen), the first and only approved treatment for patients with spinal muscular atrophy.

The companies plan to advance programs for a broad range of neurological diseases for which few treatment options exist today. Disease areas include dementia, neuromuscular diseases, movement disorders, ophthalmology, diseases of the inner ear, and neuropsychiatry.

Ionis will be responsible for the identification of antisense drug candidates based on selected targets, while Biogen will have the option to license therapies arising out of this collaboration and will be responsible for and pay for non-clinical studies, clinical development, manufacturing, and commercialization. In addition, Biogen may pay milestone payments, license fees and royalties on net sales.

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 45 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. TEGSEDI (inotersen) and WAYLIVRA (volanesorsen) are two antisense drugs that Ionis discovered and successfully advanced through Phase 3 studies. TEGSEDI is under regulatory review for marketing approval in the U.S., EU and Canada for the treatment of patients with hereditary ATTR, or hATTR, amyloidosis. WAYLIVRA is under regulatory review for marketing approval in the U.S., EU and Canada for the treatment of patients with familial chylomicronemia syndrome, or FCS. WAYLIVRA is also in a Phase 3 study in patients with familial partial lipodystrophy, or FPL. Akcea, an affiliate of Ionis focused on developing and commercializing drugs to treat patients with serious and rare diseases, will commercialize TEGSEDI and WAYLIVRA, if approved. 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 Ionis' collaboration with Biogen. 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, 2017, and its most recent Form 10-Q quarterly filing, 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 Akcea Therapeutics, Inc. TEGSEDI™ is a trademark of Akcea Therapeutics, Inc. WAYLIVRA™ is a trademark of Akcea Therapeutics, Inc. SPINRAZA® is a registered trademark of Biogen.

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