



## Biogen Idec and Isis Pharmaceuticals Announce Global Collaboration for Antisense Program Targeting Myotonic Dystrophy

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-- *Biogen Idec has Option to Develop and Commercialize Promising Compound for Most Common Form of Muscular Dystrophy* --

-- *Isis Expands its Rare Disease Franchise to Include Myotonic Dystrophy Type 1* --

WESTON, Mass. & CARLSBAD, Calif.--(BUSINESS WIRE)--Jun. 29, 2012-- [Biogen Idec](#) (NASDAQ: BIIB) and [Isis Pharmaceuticals, Inc.](#) (NASDAQ: ISIS) today announced that they have entered into an exclusive, worldwide option and collaboration agreement under which the companies will develop and commercialize a novel antisense drug for the treatment of myotonic dystrophy type 1 (DM1), which is also known as Steinert disease.

DM1, the most common form of muscular dystrophy in adults, is a genetic neuromuscular disease characterized by progressive muscle atrophy, weakness and disabling muscle spasms. It is caused by a genetic defect in the dystrophin myotonia-protein kinase (DMPK) gene in which a sequence of three [nucleotides](#) repeats extensively, creating an abnormally long toxic RNA, which accumulates in the cell and prevents the production of proteins needed for normal cellular function. Isis' DM1 antisense program is being developed to correct the underlying genetic defect that causes DM1.

Isis will receive an upfront payment of \$12 million and is responsible for the discovery of a lead antisense drug candidate targeting DMPK for the treatment of DM1. Isis is eligible to receive up to \$59 million in milestone payments associated with the clinical development of the DMPK-targeting drug prior to licensing. Biogen Idec has the option to license the drug from Isis up through the completion of the Phase 2 trial. Isis could receive up to another \$200 million in a license fee and regulatory milestone payments. In addition, Isis will receive double-digit royalties on sales of the drug. Isis will be responsible for global development of the drug through the completion of Phase 2 clinical trials, with Biogen Idec providing advice on the clinical trial design and regulatory strategy. If Biogen Idec exercises its option, it will assume global development, regulatory and commercialization responsibilities.

"Myotonic dystrophy is a debilitating neuromuscular disease that often affects entire families," said Steven H. Holtzman, Executive Vice President of Corporate Development at Biogen Idec. "The unmet need is great, and there are currently no therapies to slow or stop progression of the disease. Myotonic dystrophy has an identifiable genetic cause, the program fits with our mission to bring innovative therapies to patients with serious neurologic diseases, and Isis' antisense compound has the potential to make a real difference. This collaboration, which is our second with Isis, reflects the tremendous respect we have for their scientific leadership and expertise in antisense technology."

"Biogen Idec is a world leader in neurodegenerative diseases," said B. Lynne Parshall, J.D., Chief Operating Officer, Chief Financial Officer and Secretary from Isis. "This collaboration allows us to expand our pipeline of drugs for rare and severe diseases with Biogen Idec's additional resources and support. It also complements our new alliance with Biogen Idec for our Phase 1 program in spinal muscular atrophy, or SMA. As with SMA, we are using our antisense technology in a unique manner to treat another devastating disease. Biogen Idec is an ideal partner for these programs with its expertise in neurodegenerative disease and global reach to help bring these therapies successfully to patients who have no treatment options."

"DM1 is a progressive disease that leads to the gradual loss of muscle function," said Charles A. Thornton, M.D., School of Medicine at University of Rochester Medical Center. "In the later stages it causes problems with breathing and walking. DM1 usually affects several people in a family, cutting across the generations to affect infants, young adults, and older members of a family at the same time. Genetic testing can aid in identifying people at risk of developing DM1, but there are no treatments available to delay the onset of symptoms or slow down the progression. Because the disease-causing substance in DM1 is a toxic RNA, the disease is a good target for Isis' antisense approach to selectively target the toxic RNA within the cell, removing it and restoring normal cell function."

This collaboration follows on a worldwide option and collaboration agreement between [Biogen Idec](#) and Isis, which was announced in January, to develop and commercialize Isis' antisense investigational drug, ISIS-SMNR<sub>X</sub>, for the treatment of spinal muscular atrophy (SMA).

### About DM1

DM1 is a genetic neuromuscular disease characterized by disabling muscle spasms and progressive muscle wasting and weakness. DM1 also affects many other organs within the body and patients with DM1 can experience insulin insensitivity, cataracts and infertility. DM1 is estimated to affect approximately 150,000 patients in the US, Europe and Japan. It is passed from parent to child with each subsequent generation experiencing more severe disease earlier in life. The chance of a child inheriting DM1 is 50 percent if one parent carries the genetic defect. DM1 is caused by a defect in the DMPK gene that produces an increase in the number of triplet repeats, CTG, within the gene. This DNA expansion produces an abnormally large RNA that accumulates in cells, including muscle cells, and prevents production of proteins essential for normal cellular function. The severity and age of onset of DM1 correlates with the number of triplet repeats, which increases from one generation to the next. There are no disease-modifying therapies for patients with DM1 and current treatments are intended to manage symptoms and minimize disability.

### About Antisense and RNase H

An antisense mechanism is a process when a nucleic acid binds to a target RNA forming a duplex molecule. The formation of this duplex molecule prevents the RNA from functioning normally and producing a specific protein. Using antisense, Isis' drugs can reduce the production of disease-causing proteins that are largely inaccessible to traditional drug discovery approaches. The majority of Isis' antisense drugs in development activate a cellular enzyme called RNase H. Upon activation, RNase H seeks out and destroys the duplex mRNA, inhibiting a cell's production of a specific protein. Treating DM1 offers a unique opportunity for antisense. The genetic defect in the DMPK gene creates a toxic RNA rather than a disease-causing protein. The toxic RNA accumulates within the nucleus of the cell and prevents the production of proteins essential for normal cellular function. RNase H activation occurs within the cell nucleus and therefore Isis' antisense drugs present a specific therapeutic strategy for treating DM1. In preclinical studies, Isis' antisense drugs have demonstrated potent and selective reduction of toxic DMPK RNA.

### **About Biogen Idec**

Through cutting-edge science and medicine, Biogen Idec discovers, develops and delivers to patients worldwide innovative therapies for the treatment of neurodegenerative diseases, hemophilia and autoimmune disorders. Founded in 1978, Biogen Idec is the world's oldest independent biotechnology company. Patients worldwide benefit from its leading multiple sclerosis therapies, and the company generates nearly \$5 billion in annual revenues. For product labeling, press releases and additional information about the company, please visit <http://www.biogenidec.com>.

### **About Isis Pharmaceuticals**

Isis is exploiting its leadership position in antisense technology to discover and develop novel drugs for its product pipeline and for its partners. Isis' broad pipeline consists of 25 drugs to treat a wide variety of diseases with an emphasis on cardiovascular, metabolic, severe and rare diseases, and cancer. Isis' partner, Genzyme, plans to commercialize Isis' lead product, KYNAMRO™, following regulatory approval, which is expected in 2012. Isis' patents provide strong and extensive protection for its drugs and technology. Additional information about Isis is available at [www.isispharm.com](http://www.isispharm.com).

### **Biogen Idec Safe Harbor Statement**

This press release contains forward-looking statements, including statements about product development and commercialization. These forward-looking statements may be accompanied by such words as "anticipate," "believe," "estimate," "expect," "forecast," "intend," "may," "plan," "will" and other words and terms of similar meaning. You should not place undue reliance on these statements. Drug development and commercialization involve a high degree of risk. Factors which could cause actual results to differ materially from current expectations include the risk that adverse safety events may occur, regulatory authorities may require additional information or may fail to approve any potential new therapy, product reimbursement may be limited or unavailable, there may be problems with manufacturing processes, intellectual property rights may not be adequately protected, and the other risks and uncertainties that are described in the Risk Factors section of Biogen Idec Inc.'s most recent annual or quarterly report and in other reports Biogen Idec Inc. has filed with the SEC. These statements are based on current beliefs and expectations and speak only as of the date of this press release. Biogen Idec Inc. does not undertake any obligation to publicly update any forward-looking statements.

### **Isis Safe Harbor Statement**

This press release includes forward-looking statements regarding Isis' strategic alliance with Biogen Idec, and the discovery, development, activity, therapeutic potential, safety and commercialization of an antisense drug targeting DMPK for the treatment of DM1. Any statement describing Isis' goals, expectations, financial or other projections, intentions or beliefs, including the planned commercialization of KYNAMRO™, 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. Isis' 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 Isis' forward-looking statements reflect the good faith judgment of its management, these statements are based only on facts and factors currently known by Isis. As a result, you are cautioned not to rely on these forward-looking statements. These and other risks concerning Isis' programs are described in additional detail in Isis' annual report on Form 10-K for the year ended December 31, 2011 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.

Isis Pharmaceuticals® is a registered trademark of Isis Pharmaceuticals, Inc. KYNAMRO™ is a trademark of Genzyme Corporation.

Source: Biogen Idec

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