Biogen Continues to Advance Innovation in SMA with New Data in Adults and Infants to Be Presented at MDA Clinical and Scientific Conference

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- Adults with later-onset spinal muscular atrophy (SMA) who are not being treated show increased rates of hospital admissions, clinical interventions and mortality, indicating an unmet medical need
- Infants with pre-symptomatic SMA treated with SPINRAZA® (nusinersen) achieve motor milestones that are more consistent with normal development, with 100 percent sitting independently as reported in the NURTURE study
- Additional data show that neurofilament, a protein that helps brain neurons maintain their structure, could be a biomarker for SMA and may predict improvement in motor function and disease activity

CAMBRIDGE, Mass., April 12, 2019 (GLOBE NEWSWIRE) -- Biogen (Nasdaq: BIIB) today announced it will present new data illustrating the rapidly progressive nature of spinal muscular atrophy (SMA) in adults, adolescents and older children at the Muscular Dystrophy Association (MDA) Clinical and Scientific Conference in Orlando, Florida (April 13-17, 2019). Other Biogen presentations will highlight the benefits of pre-symptomatic treatment with data from the NURTURE study, part of the SPINRAZA® (nusinersen) global clinical trial program, and findings on the role of neurofilament as a potential biomarker for predicting motor function in SMA.

"The data show that, if left untreated, people with all types of SMA continue to experience increased health challenges, and that slowing the progression of the disease, even for those with less severe forms, is critical to their ongoing health," said Wildon Farwell, M.D., senior medical director, clinical development at Biogen. "With more than 6,600 individuals treated with SPINRAZA across the post-marketing setting, expanded access program and clinical trials and over six years of clinical data, we continue to expand our in-depth knowledge of the disease and to gain real-world experience on long-term safety and efficacy. We plan to continue advancing research to help shape care for individuals with SMA today and in the future."

Biogen's presentations on SMA and SPINRAZA include:

- Mortality Among a Large, Age-Diverse Population of Patients With Spinal Muscular Atrophy (SMA): A U.S. Epidemiologic Study – *Poster 98 – Tuesday, April 16, 6:00 pm-8:00 pm ET*
- Characteristics of Spinal Muscular Atrophy (SMA) Patients in the neuroMuscular ObserVational Research (MOVR) Data Hub – *Poster 100 – Tuesday, April 16, 6:00 pm-8:00 pm ET*
- Phosphorylated Neurofilament Heavy Chain (pNF-H) and Motor Function Achievement in Nusinersen-Treated Individuals With Spinal Muscular Atrophy (SMA) – *Poster 172 – Tuesday, April 16, 6:00 pm-8:00 pm ET*
- Nusinersen in Infants Who Initiate Treatment in a Presymptomatic Stage of Spinal Muscular Atrophy: Interim Results From the Phase 2 NURTURE Study – *Poster 174 – Tuesday, April 16, 6:00 pm-8:00 pm ET* {Encore presentation}
- Symptoms and Complications Among Later Childhood, Adolescent and Adult Spinal Muscular Atrophy Patients: A Natural History Study within U.S. Hospitals – *Poster Number 206 – Tuesday, April 16, 6:00 pm-8:00 pm ET*

About SPINRAZA® (nusinersen)[1-4]
SPINRAZA is the first and only approved medicine for the treatment of spinal muscular atrophy (SMA) and is currently available in more than 40 countries. As of December 31, 2018, over 6,600 individuals with SMA are being treated with SPINRAZA worldwide, based on patients across the post-marketing setting, Expanded Access Program (EAP) and clinical trial participants.

SPINRAZA is an antisense oligonucleotide (ASO) developed using Ionis' proprietary antisense technology that is designed to treat the root cause of SMA. SPINRAZA alters the splicing of SMN2 pre-mRNA in order to increase production of full-length SMN protein. ASOs are short synthetic strings of nucleotides designed to selectively bind to target RNA and regulate gene expression. Through use of this technology, SPINRAZA has been shown to increase the amount of full-length SMN protein in individuals with SMA. SPINRAZA is administered via intrathecal injection, which delivers therapies directly into the cerebrospinal fluid (CSF) around the spinal cord, where motor neurons degenerate in individuals with SMA due to insufficient levels of SMN protein.

In the clinical trial program, SPINRAZA demonstrated a favorable benefit-risk profile. The most common adverse reactions that occurred in the SPINRAZA group were respiratory infection and constipation. Serious adverse reactions of atelectasis were more frequent in SPINRAZA-treated patients. Coagulation abnormalities and thrombocytopenia, including acute severe thrombocytopenia, have been observed after administration of some ASOs. Individuals may be at increased risk of bleeding complications. Renal toxicity has been observed after administration of some ASOs. SPINRAZA is present in and excreted by the kidney.

Biogen licensed the global rights to develop, manufacture and commercialize SPINRAZA from Ionis Pharmaceuticals, Inc. (Nasdaq: IONS), a leader in antisense therapeutics. Biogen and Ionis conducted an innovative clinical development program, the largest of its kind in SMA, that moved SPINRAZA from its first dose in humans in 2011 to its first regulatory approval in five years.

About the SPINRAZA Clinical Program

NURTURE is an ongoing, open-label study of infants up to six weeks of age at time of first dose, who were genetically diagnosed with SMA and had not experienced any symptoms by the time of first dose. Data presented at the World Muscle Society in October 2018 demonstrated unprecedented efficacy in treating patients pre-symptomatically. In that analysis, all NURTURE study participants were alive and did not require permanent ventilation, in contrast to natural history of SMA. Study participants achieved motor milestones with 100 percent sitting independently and 88 percent able to walk. All NURTURE study participants were 14 months or older at the time of the analysis. Participants included infants with two copies of the SMN2 gene (n=15) who are likely to develop a fatal, early-onset form of SMA known as Type 1, and infants with three copies of the SMN2 gene (n=10) who typically develop SMA Type 2 or 3. People living with SMA Types 2 and 3 may never be able to walk or will lose that ability over time. No new safety concerns were identified.

The ENDEAR study was a thirteen-month, international, phase 3, multicenter, double-blind, sham-controlled study of 121 patients with infantile-onset SMA (most likely to develop Type 1). Results from the pivotal study, which were published in the New England Journal of Medicine, evaluated the efficacy and safety in patients that onset of signs and symptoms of SMA before six months of age. Patients treated with SPINRAZA in the ENDEAR study achieved clinically meaningful improvement in achievement of motor milestones compared to untreated study participants with 51 percent vs. 0 percent demonstrating Hammersmith Infant Neurological Examination section 2 (HINE-2) motor milestone response, an assessment which evaluates eight motor-milestone categories, based on the defined criteria.

CHERISH was a fifteen-month, phase 3, randomized, double-blind, sham-controlled study investigating SPINRAZA in 126 non-ambulatory patients with later-onset SMA (most likely to develop SMA Type 2 or 3). Patients included had onset of signs and symptoms at greater than 6 months of age, and an age of 2 to 12 years at screening. The final analysis of CHERISH data found that children receiving SPINRAZA experienced a highly statistically significant and clinically meaningful improvement in motor function compared to those who did not receive treatment with a treatment difference of 4.9 points on the Hammersmith Functional Motor Scale Expanded.

About SMA[5]
SMA is a rare, genetic, neuromuscular disease that is characterized by loss of motor neurons in the spinal cord and lower brain stem, resulting in severe and progressive muscle atrophy and weakness. About 1 in 10,000 live births have a diagnosis of SMA. Ultimately, individuals with SMA can lose the ability to walk and have difficulty performing the basic functions of life, such as breathing and swallowing, which results in significant healthcare intervention and caregiver assistance. Left untreated, the majority of infants with the most severe form of the disease (Type 1) do not live beyond their second birthday without respiratory intervention. People with childhood or adult onset SMA (Type 2 or 3) produce greater amounts of SMN protein resulting in less severe, but still life-altering forms of the disease.[2]

Due to a deletion of, or mutation in, the SMN1 gene, people with SMA do not produce enough survival motor neuron (SMN) protein, which is critical for the maintenance of motor neurons. The severity of SMA correlates with the amount of SMN protein an individual has. People with Type 1 SMA, the form that requires the most intensive and supportive care, produce very little SMN protein and do not achieve the ability to sit without support or typically live beyond two years without respiratory support. People with Type 2 and Type 3 SMA produce greater amounts of SMN protein and have less severe, but still life-altering forms of SMA.[2]

About Biogen
At Biogen, our mission is clear: we are pioneers in neuroscience. Biogen discovers, develops and delivers worldwide innovative therapies for people living with serious neurological and neurodegenerative diseases. One of the world's first global biotechnology companies, Biogen was founded in 1978 by Charles Weissmann, Heinz Schaller, Kenneth Murray and Nobel Prize winners Walter Gilbert and Phillip Sharp, and today has the leading portfolio of medicines to treat multiple sclerosis, has introduced the first and only approved treatment for spinal muscular atrophy and is focused on advancing neuroscience research programs in Alzheimer's disease and dementia, MS and neuroimmunology, movement disorders, neuromuscular disorders, acute neurology, neurocognitive disorders, pain and ophthalmology. Biogen also manufactures and commercializes biosimilars of advanced biologics.

We routinely post information that may be important to investors on our website at www.biogen.com. To learn more, please visit www.biogen.com and follow us on social media – Twitter, LinkedIn, Facebook, YouTube.

Biogen Safe Harbor
This news release contains forward-looking statements, including statements made pursuant to the safe harbor provisions of the Private Securities Litigation Reform Act of 1995, about the potential benefits, safety and efficacy of SPINRAZA; the results of certain real-world data; our research and development program for the treatment of SMA; the identification and treatment of SMA; and risks and uncertainties associated with drug development and commercialization. These statements may be identified by words such as "aim," "anticipate," "believe," "could," "estimate," "expect," "forecast," "goal," "intend," "may," "plan," "possible," "potential," "will," "would" and other words and terms of similar meaning. Drug development and commercialization involve a high degree of risk, and only a small number of research and development programs result in commercialization of a product. Results in early stage clinical trials may not be indicative of full results or results from later stage or larger scale clinical trials and do not ensure regulatory approval. You should not place undue reliance on these statements or the scientific data presented.

These statements involve risks and uncertainties that could cause actual results to differ materially from those reflected in such statements, including without limitation the occurrence of adverse safety events and/or unexpected concerns that may arise from additional data or analysis; risks of unexpected costs or delays; failure to protect and enforce our data, intellectual property and other proprietary rights and uncertainties relating to intellectual property claims and challenges; product liability claims; and third party collaboration risks. The foregoing sets forth many, but not all, of the factors that could cause actual results to differ from our expectations in any forward-looking statement. Investors should consider this cautionary statement, as well as the risk factors identified in our most recent annual or quarterly report and in other reports we have filed with the Securities and Exchange Commission. These statements are based on our current beliefs and expectations and speak only as of the date of this news release. We do not undertake any obligation to publicly update any forward-looking statements, whether as a result of new information, future developments or otherwise.

Reference:
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