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MEDIA UPDATE • MEDIA UPDATE • MEDIA UPDATE

AveXis presents updated STRONG data at WMS demonstrating a higher mean increase in Hammersmith Functional Motor Scale-Expanded (HFMSE) scores among older SMA Type 2 patients following one-time intrathecal administration of AVXS-101

- *Older patients (≥ 2 years and < 5 years) achieved a mean increase of 5.9 points from baseline in HFMSE scores, nearly double the clinically meaningful threshold (at a mean duration of follow-up time of 9.3 months)*
- *Untreated SMA Type 2 patients historically experience declining HFMSE scores over time, will never walk without support and often need a wheelchair.[1] More than 30% of patients with SMA Type 2 will die by age 25[2]*

Basel, October 5, 2019 – AveXis, a Novartis company, today announced new interim data from the Phase 1/2 STRONG study for intrathecal (IT) administration of AVXS-101, demonstrating older patients (≥ 2 years and < 5 years) with spinal muscular atrophy (SMA) Type 2 achieved a mean increase of 5.9 points from baseline in HFMSE scores, nearly double the clinically meaningful threshold, at a mean duration of follow-up time of 9.3 months. This is up from a mean increase of 4.2 points from baseline in HFMSE scores presented in May 2019 at the American Academy of Neurology Annual Meeting. Half of the older patients with SMA Type 2 experienced a clinically meaningful response in motor function gains starting at one month post-treatment, defined as a ≥ 3-point increase from baseline in HFMSE scores. HFMSE is a well-recognized functional scale used clinically and in clinical trials to measure physical abilities and motor function in non-ambulatory and ambulatory individuals with SMA Type 2 and 3.[6] These data were presented at the 24th World Muscle Society (WMS) annual congress.

“Given the natural history of this devastating and rare genetic disease, many children will never stand or walk independently without therapeutic intervention. Today’s results – although early – are extremely encouraging for families who hope to see their children with SMA Type 2 experience meaningful improvement in motor function and important milestones, like standing and walking, following a one-time intrathecal administration of AVXS-101,” said Douglas M. Sproule, MD, vice president, SMA Therapeutic Head, AveXis. “These data presented at the congress, along with long-term follow-up data from the STR1VE and SPR1NT studies, support a continually advancing body of evidence on the clinical impact gene therapy treatment may have for those fighting this devastating and rare genetic disease, regardless of type or severity.”

Phase 1/2 STRONG Data as of May 31, 2019
STRONG is an ongoing, open-label, dose-comparison, multi-center trial designed to evaluate the efficacy, safety and tolerability of one-time IT administration of AVXS-101 in patients with SMA Type 2 who have three copies of the *SMN2* gene, and who are able to sit but cannot stand or walk at the time of study entry. Patients were divided into two groups based on age at time of treatment: patients who are ≥6 months but < 2 years and patients who are ≥ 2 years

but < 5 years. As of the data cut-off, 31 patients are enrolled and have been treated with one of three doses: Dose A (6.0 x 10^{13} vg), Dose B (1.2 x 10^{14} vg) and Dose C (2.4 x 10^{14} vg). Data from Dose C were not presented at WMS. Three of 36 (8.3%) of patients screened were excluded due to elevated titers of anti-AAV9 antibodies.

In patients ≥ 6 months to < 2 years old:

- The primary efficacy endpoint is the ability to stand without support for ≥ 3 seconds
- The secondary efficacy endpoint is the ability to walk independently for ≥ 5 steps, according to the Bayley-III Gross Motor Milestone Scale
- Since treatment, 18 motor milestones were achieved among the 16 patients who received Dose A or Dose B, including two patients who gained the ability to stand independently, one of whom went on to walk alone

In patients ≥ 2 years to < 5 years old:

- The primary efficacy endpoint is change in HFMSE score from baseline
- The secondary efficacy endpoint is the ability to walk independently for ≥ 5 steps according to the Bayley-III Gross Motor Milestone Scale
- Patients showed a clinically meaningful improvement in motor function, having a mean 5.9-point increase from baseline in HFMSE scores at their most recent visit, at a mean duration of follow-up time of 9.3 months
    - In a responder analysis, half of patients (6/12) had a ≥ 3-point increase, which was observed starting at one month post-treatment
- Since treatment, four motor milestones have been achieved among 12 patients in the Dose B group, including one patient who gained the ability to walk with assistance

All patients in STRONG study experienced at least one treatment emergent adverse event (TEAE) and 13 patients (43%) were reported to have a TEAE considered by the investigator to be related to treatment. Serious TEAEs were reported in 13% (n=4) of patients. A total of seven serious TEAEs were reported in four patients (n=1 each): influenza, pneumonia, respiratory syncytial virus infection, elevated ALT, elevated AST, blood alkaline phosphatase increased, and respiratory failure. Elevated ALT and AST (in one patient) were considered probably related to treatment. None of the serious TEAEs resulted in discontinuation from the study and no deaths were reported.

About AVXS-101 Intrathecal Administration

Investigational IT administration of AVXS-101 is currently being evaluated in patients with SMA Type 2 in a Phase 1/2 clinical trial.

About Spinal Muscular Atrophy (SMA)

SMA is a severe neuromuscular disease characterized by the loss of motor neurons leading to progressive muscle weakness and paralysis. SMA is caused by a genetic defect in the *SMN1* gene that codes SMN, a protein necessary for survival of motor neurons.[3,4] The incidence of SMA is approximately 1 in 10,000 live births and it is the leading genetic cause of infant mortality.[1,4] The most severe form of SMA is Type 1, a lethal genetic disorder characterized by rapid motor neuron loss and associated muscle deterioration, resulting in mortality or the need for permanent ventilation support by 24 months of age for more than 90% of patients if left untreated.[5] Patients with SMA Type 2 typically have 3-4 copies of SMN2, will never walk without support and often need a wheelchair.1 More than 30% of patients with SMA Type 2 will die by age 25.[2]

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About AveXis
AveXis, a Novartis company, is the world’s leading gene therapy company, redefining the possibilities for patients and families affected by life-threatening genetic diseases through our innovative gene therapy platform. Founded in 2013 and headquartered in Bannockburn, IL, the goal of AveXis’ cutting-edge science is to address the underlying, genetic root cause of diseases. AveXis pioneered foundational research, establishing AAV9 as an ideal vector for gene transfer in diseases affecting the central nervous system, laying the groundwork to build a best-in-class, transformational gene therapy pipeline. AveXis received its first U.S. Food and Drug Administration approval in May 2019 for the treatment of spinal muscular atrophy (SMA). AveXis is also developing therapies for other genetic diseases, including Rett syndrome and a genetic form of amyotrophic lateral sclerosis (ALS) SOD1. For additional information, please visit www.avexis.com.

About Novartis
Novartis is reimagining medicine to improve and extend people’s lives. As a leading global medicines company, we use innovative science and digital technologies to create transformative treatments in areas of great medical need. In our quest to find new medicines, we consistently rank among the world’s top companies investing in research and development. Novartis products reach more than 750 million people globally and we are finding innovative ways to expand access to our latest treatments. About 108,000 people of more than 140 nationalities work at Novartis around the world. Find out more at www.novartis.com.

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