Exon Skipping Therapy Shows Promise in Prevention or Delay of Heart Disease Associated with Duchenne Muscular Dystrophy

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Publication in Cardiovascular Research Demonstrates Ability of PPMO to Prevent Cardiomyopathy in Mouse Model of DMD

For Immediate Release

Bothell, Washington — October 19, 2009 — AVI BioPharma, Inc. (Nasdaq: AVII), a developer of RNA-based drugs, today announced the publication of research demonstrating the ability of a peptide-conjugated phosphorodiamidate morpholino oligomer (PPMO) therapy to prevent the onset of cardiomyopathy in a mouse model of Duchenne muscular dystrophy (DMD). The paper "Long-Term Improvement in mdx Cardiomyopathy after Therapy with Peptide-conjugated Morpholino Oligomers" was authored by researchers at the University of North Carolina at Chapel Hill and AVI and published online, in advance of print, in the journal *Cardiovascular Research.*

"This research provides preclinical evidence that a PPMO-mediated exon skipping therapy early in the course of DMD may effectively prevent or slow down associated cardiac hypertrophy and diastolic dysfunction with significant long-term impact," said Ryszard Kole, PhD, Senior Vice President of Discovery Research at AVI BioPharma and co-author of the study.

DMD is an incurable muscle–wasting disease associated with errors in the gene that makes dystrophin. Exon skipping therapies have shown promise in increasing body-wide dystrophin for the treatment of DMD, however increasing cardiac dystrophin has remained a challenge. Cardiomyopathy (weakening of the heart muscle) is responsible for death due to heart failure in approximately 30 percent of DMD patients and is also a contributing factor in the deaths of many other DMD patients.

In the study, mice lacking dystrophin in their heart and skeletal muscles were given a PPMO that delivered a splice-switching oligonucleotide-mediated exon skipping therapy to restore dystrophin in mdx mice before the development of detectable cardiomyopathy. Results demonstrated that the PPMO successfully restored cardiac dystrophin expression, preserved cardiac sarcolemma integrity, and prevented the development of cardiac pathology that develops in such mice over time. Echocardiography and Doppler analysis demonstrated that 5-6 week treatment prevented cardiac hypertrophy and diastolic dysfunction, characteristic of DMD patients early in the disease process. PPMO therapy provided a durable cardiac improvement up to 7 months after the initiation of treatment.

AVI BioPharma is developing AVI-4658 for the treatment of DMD. This first generation PMO drug candidate is designed to skip exon 51 of the dystrophin gene, allowing for restoration of the reading frame in the dystrophin mRNA sequence. AVI is currently conducting an ongoing Phase 1b/2 dose-finding clinical trial evaluating the systemic delivery of AVI-4658 for treatment of DMD in the United Kingdom. AVI BioPharma is also developing the second generation chemistry exon skipping drugs, with a PPMO, AVI-5038, which is currently in preclinical testing for DMD to skip exon 50, prior to filing a U.S. IND and embarking on clinical studies..

About Duchenne Muscular Dystrophy (DMD)

DMD is one of the most common fatal genetic disorders to affect children around the world. Approximately one in every 3,500 boys worldwide is afflicted with Duchenne Muscular Dystrophy with 20,000 new cases reported each year. It is a devastating and incurable muscle-wasting disease associated with specific inborn errors in the gene that codes for dystrophin, a protein that plays a key structural role in muscle fiber function. Symptoms usually appear in male children by age three. Progressive muscle weakness of the legs and pelvis eventually spreads to the arms, neck, and other areas. By age 10, braces may be required for walking, and most patients are confined to a wheelchair by age 12. Eventually, this progresses to complete paralysis and increasing difficulty in breathing, requiring ventilatory support. The condition is terminal and death usually occurs before the age of 30. The outpatient cost of care for a non-ambulatory DMD boy is among the highest of any disease. There is currently no cure for DMD, but for the first time ever, there are promising therapies in or moving into clinical development.

About AVI BioPharma

AVI BioPharma is focused on the discovery and development of RNA–based drugs utilizing proprietary derivatives of its antisense chemistry (morpholino-modified phosphorodiamidate oligomers or PMOs) that can be applied to a wide range of diseases and genetic disorders through several distinct mechanisms of action. Unlike other RNA therapeutic approaches, AVI's antisense technology has been used to directly target both messenger RNA (mRNA) and its precursor (pre-mRNA), allowing for both up- and down-regulation of targeted genes and proteins. AVI's RNA–based drug programs are being evaluated for the treatment of Duchenne muscular dystrophy as well as for the treatment of cardiovascular restenosis through our partner Global Therapeutics, a Cook Group Company. AVI's antiviral programs have demonstrated promising outcomes in Ebola Zaire and Marburg Musoke virus infections and may prove applicable to other viral targets such as HCV or Dengue viruses. For more information, visit www.avibio.com.

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