AVI BioPharma Announces Clinical Development Initiative for Muscular Dystrophy

12/7/06

Publication of Preclinical Studies Demonstrate Efficacy in Disease

Models

PORTLAND, Ore.--(BUSINESS WIRE)--Dec. 7, 2006--AVI BioPharma, Inc. (Nasdaq: AVII) today announced the initiation of a clinical program for the treatment of Duchenne Muscular Dystrophy (DMD) using its ESPRIT (Exon Skipping Pre-RNA Interference Technology) exon-skipping technology. The clinical program is based on positive preclinical data amassed over the past two years, including collaborator studies published in the October 2006 issue of Neuromuscular Disorders and the February 2006 issue of Nature Medicine. This new technology application is designed to delete disease-causing gene sequences in patients with certain genetic diseases, including DMD.

"AVI introduced this new approach to treating genetic disorders in fall 2005," said Denis R. Burger, Ph.D., chief executive officer of AVI. "ESPRIT therapeutics enable the body to bypass defective genetic information at the RNA processing level, providing a new and very potent tool for altering many disease mechanisms."

AVI's clinical program will start in collaboration with the United Kingdom-based MDEX Consortium, which was established and funded to conduct clinical trials in DMD. In this proof-of-principle, controlled, dose-escalating trial, up to nine young boys with DMD will receive a single, intramuscular administration of AVI-4658, which targets exon 51. After four to six weeks, the muscle will be biopsied and examined for molecular evidence of dystrophin production, representing a positive end point. Positive results will support the expansion of AVI-4658 clinical development to systemic administration. In collaborative preclinical studies in the mdx mouse model, dystrophin was produced for at least 16 weeks following initial systemic dosing.

The principal investigator for this study is professor Francesco Muntoni, Department of Paediatrics, Hammersmith Hospital Campus, Imperial College, London. The coordinating investigator of the project is professor Dominic Wells, MA, VetMB, Ph.D., MRCVS, Department of Cellular and Molecular Neuroscience, Imperial College Faculty of Medicine, London. Imperial College will serve as the sponsor for the trial, with AVI BioPharma serving as its clinical development collaborator. The study received a favorable review by the U.K.'s Gene Therapy Advisory Committee (GTAC) in September 2006.

In addition, AVI plans to file an Investigational New Drug (IND) application with the Food and Drug Administration (FDA) in 2007 for a company-sponsored, multicenter DMD clinical study in the United States. This trial will eventually expand beyond exon 51 to other exons implicated in DMD.

As part of this initiative, AVI is planning to host a clinical investigator meeting in the first quarter of 2007. DMD-experienced clinical investigators who are interested in participating should contact Peter O'Hanley, Ph.D., M.D., senior vice president, Clinical Development and Regulatory Affairs, AVI, for more information.

Finally, AVI is exploring sponsorship and support for future DMD clinical trials in Australia and elsewhere with its collaborators.

Published Preclinical Results

The first published use of AVI's ESPRIT therapeutics was conducted in collaboration with professor Steve Wilton, head of the experimental molecular medicine group at the Australian Neuromuscular Research Institute in Western Australia. Targeting the defective DMD dystrophin gene transcript with an ESPRIT compound, Wilton was able to force the cell to snip out the disease-causing mutation in that region. Using this approach, a functional dystrophin protein was made from a DMD gene that would previously have only made a nonfunctional protein.

These results were reported in the February issue of the journal Nature Medicine in an article titled "Systemic delivery of morpholino oligonucleotide restores dystrophin expression body wide and improves dystrophin pathology." Wilton used the mdx mouse model of muscular dystrophy to show that the early stop signal in exon 23 can be efficiently skipped in the modified mRNA so significant amounts of dystrophin are produced and correctly localized. The efficient delivery of these compounds generated promising results with near-normal dystrophin being produced and persisting for months from a single treatment.

AVI recently published additional data with its Australian collaborators in Neuromuscular Disorders, 2006 October;16(9-10):583-90. The article, "Induced dystrophin exon skipping in human muscle explants," described a study in which researchers induced exon skipping in muscle explants derived from both normal and DMD human tissue. Previously, the exon-skipping approach had been limited to studies using animal models or cultured human muscle cells. These studies are closer to clinical trial conditions than previous studies and provide the final preclinical data before beginning clinical trials in patients.

"Antisense oligomers can alter gene expression by snipping out the disease-causing mutation of a gene transcript during the splicing step of gene expression to convert DMD to the much less disabling Becker muscular dystrophy," said Wilton. "AVI's morpholino antisense oligomers appear to be the most efficient chemistry approach for exon skipping."

About ESPRIT Technology

In normal genetic function, gene transcription produces a full-length pre-RNA that is then processed to a much shorter and functional messenger RNA. The mRNA is the template for creating a protein. During pre-RNA processing, packets of useful genetic information, called exons, are snipped out of the full-length RNA and spliced together to make the functional mRNA template. AVI's proprietary third-generation NEUGENE(R) chemistry can be used to target splice-joining sites in the pre-RNA, thus forcing the cell machinery to skip over targeted exons, providing altered mRNA, which in turn produces altered proteins. When the skipped exon contains a disease-causing mutation, the altered protein may restore function and potentially

overcome the devastating clinical consequences of the mutation.

About Muscular Dystrophy

Muscular dystrophy (MD) is the common name for several progressive hereditary diseases that cause muscles to weaken and degenerate. Each type has its own hereditary pattern, age of onset and rate of muscle loss. Different genetic alterations cause different types of muscular dystrophies. It is estimated that between 50,000 and 250,000 individuals are affected annually. This number seems to be growing each year due to improved technology for earlier diagnosis.

Within our gene makeup, there is an important muscle protein called dystrophin, which is encoded by the largest gene found to date. Dystrophin acts as the shock absorber that provides strength and stability to muscle cells during contraction. Dystrophin is also believed to carry signals between the inside and outside of muscle fibers. Without dystrophin, muscles are not able to operate properly and will eventually suffer progressive damage.

The dystrophin gene is carried on the X chromosome. Young men are therefore more susceptible to dystrophin damage because they have only one X chromosome. When a boy is diagnosed with DMD, his body is not able to produce any functional dystrophin. In Becker MD, a shortened but functional version of dystrophin is generated.

About AVI BioPharma

AVI BioPharma develops therapeutic products for the treatment of life-threatening diseases using third-generation NEUGENE antisense drugs. AVI's lead NEUGENE antisense compound is designed to target cell proliferation disorders, including cardiovascular restenosis, cancer and polycystic kidney disease. In addition to targeting specific genes in the body, AVI's antiviral program uses NEUGENE antisense compounds to combat disease by targeting single-stranded RNA viruses, including West Nile virus, hepatitis C virus, dengue virus, Ebola virus and influenza A virus. AVI has introduced a NEUGENE-based exon-skipping technology called ESPRIT therapy. More information about AVI is available on the company's Web site at http://www.avibio.com.

"Safe Harbor" Statement under the Private Securities Litigation Reform Act of 1995: The statements that are not historical facts contained in this release are forward-looking statements that involve risks and uncertainties, including, but not limited to, the results of research and development efforts, the results of preclinical and clinical testing, the effect of regulation by the FDA and other agencies, the impact of competitive products, product development, commercialization and technological difficulties, and other risks detailed in the company's Securities and Exchange Commission filings.

CONTACT: AVI BioPharma, Inc.
Michael Hubbard, 503-227-0554
hubbard@avibio.com
or
Investor Contacts:
Lippert/Heilshorn & Associates Inc.
Jody Cain or Brandi Floberg, 310-691-7100
jcain@lhai.com or bfloberg@lhai.com
or
Press Contact:
Waggener Edstrom Worldwide
Bioscience and Healthcare Practice
Jenny Moede, 503-443-7000
jmoede@waggeneredstrom.com

SOURCE: AVI BioPharma, Inc.