Sangamo BioSciences Presents Data Demonstrating 'In Vivo' Protection Against HIV Infection by CCR5-ZFN Therapeutic

Preclinical Animal Data Demonstrates Selective Survival Advantage of ZFN-Treated Immune Cells after HIV Infection

RICHMOND, Calif., Sept 18, 2007 /PRNewswire-FirstCall via COMTEX News Network/ --

Sangamo BioSciences, Inc. (Nasdaq: SGMO) announced today the presentation of data demonstrating that human CD4 T-cells can be made permanently resistant to HIV infection by treatment with zinc finger DNA-binding protein nucleases (ZFN(TM)) and preferentially survive and expand in an animal after HIV infection. The presentation, entitled, "Establishment of HIV Resistant CD4 T-Cells by Engineered Zinc Finger Protein Nucleases" is taking place today at the 47th Annual Interscience Conference on Antimicrobial Agents and Chemotherapy (ICAAC) in Chicago.

"The positive results being presented at ICAAC continue to strengthen our belief that CCR5-ZFNs are an important and promising class of anti-HIV compounds and may represent a "next generation" of HIV-entry blocking agents," said Carl June, M.D., Director of Translational Research at the Abramson Family Cancer Research Institute at the University of Pennsylvania School of Medicine, and a co-author of the study. "I look forward to working with Sangamo to bring this program into the clinic as quickly as possible."

Sangamo's ZFNs are designed to permanently modify the DNA sequence encoding CCR5, a co-receptor that enables HIV to enter and infect cells of the immune system. Individuals carrying a naturally occurring mutation of their CCR5 gene, a variant known as CCR5-delta32, have been shown to be resistant to HIV infection.

"The data presented today are very significant," commented Dale Ando, M.D., Sangamo's vice president of therapeutic development and chief medical officer. "Most importantly, we have demonstrated that a single treatment with our CCR5-specific ZFNs generates a population of HIV-resistant T-cells similar to the situation in individuals carrying the natural CCR5-delta32 mutation. We have shown that these ZFN-modified cells are made permanently resistant to HIV. Furthermore, the cells selectively survive and expand in an animal after HIV infection providing a reservoir of healthy and uninfectable immune cells. In a patient, such cells could be available to fight both opportunistic infections and HIV itself. In addition, we have reported on the successful ZFN-modification of clinical-scale quantities of human CD4 T-cells. The modified cells exhibited the expected properties of normal CD4 T-cells minus a functional CCR5 receptor. This demonstrates that ZFN-modified human CD4 T-cells can be produced in the quantities required for the translation of this program into the clinic which is our immediate goal for this ZFP Therapeutic."

Several major pharmaceutical companies have initiated programs to develop small molecule or antibody approaches to block the binding of HIV to CCR5. However, a small molecule or antibody approach requires the constant presence of a sufficiently high concentration of drug to block therapeutically relevant numbers of the CCR5 protein, which is present in thousands of copies on the surface of each T-cell and other tissues in the body. One such drug was recently approved by the US Food and Drug Administration with a "black box" warning, the strongest for prescription drugs, concerning the risk of liver toxicity and the possibility of heart attacks.

Sangamo's ZFN technology represents a means of potentially circumventing these limitations or risks by specifically modifying only CD4 T-cells, the principal target of HIV pathology, in a one-time exposure of the cells to ZFNs. This results in permanent modification of the CCR5 protein so that HIV cannot enter and infect the cells. This approach could potentially enable the generation of a reservoir of protected CD4 T-cells that are available to fight the opportunistic infections that are characteristic of AIDS as well as the AIDS virus itself.

Data Reported in the ICAAC Presentation

The reported results demonstrate that a one-time exposure to CCR5-specific ZFNs resulted in the generation of an HIV-resistant population of human primary T-cells that permanently expressed disrupted CCR5 proteins. These ZFN-modified CD4 T-cells expanded stably in HIV-infected cultures for several weeks and appeared to behave identically to untreated T-cells except that they were resistant to infection by HIV. ZFN treated primary CD4 T-cells and transformed CD4 cell lines resisted infection with R5-tropic HIV, resulting in enrichment of ZFN-generated CCR5-disrupted cells in the population upon long-term exposure to virus (>70 days). Importantly, in the presence of HIV, ZFN-modified CD4 T-cells also preferentially expanded in a

mouse model. The modified cells were infused into mice that lack a normal immune system and thus do not reject human cells. After 33 days, the mice were sacrificed and analyzed for the presence of ZFN-modified cells. Researchers determined that ZFN-modified cells engrafted normally in the mouse and that the proportion of modified cells present at the end of the experiment was greater than two to three fold higher in mice in the presence of HIV infection (which was statistically significant p=0.008). These data suggest that, in the presence of HIV, the ZFN-modified cells have a selective advantage and evade HIV infection and destruction.

In addition, researchers demonstrated successful ZFN-modification of clinical-scale quantities of human CD4 T-cells and that these modified cells exhibited the expected properties of normal T-cells. This demonstrates that ZFN-modified human CD4 T-cells could be produced in quantities required for the translation of this program into the clinic.

About HIV/AIDS and CCR5

HIV stands for Human Immunodeficiency Virus. HIV infection kills or impairs cells of the immune system, progressively destroying the body's ability to fight infections and certain cancers resulting in AIDS (Acquired Immune Deficiency Syndrome). Individuals diagnosed with AIDS are susceptible to life-threatening diseases called opportunistic infections, which are caused by microbes that usually do not cause illness in healthy people. According to Worldaidsday.org, over 3 million people were infected with HIV in 2005. There are now over 40 million people living with HIV and AIDS worldwide.

CCR5 is the chemokine receptor that HIV uses as a co-receptor to gain entry into immune cells. CCR5 is perhaps the most important of the known co-receptors for HIV, since the most commonly transmitted strains of HIV are strains that bind to CCR5 -- so-called "R5" strains. A small fraction of the population carries a mutation in their CCR5 gene, called the delta32 mutation. This mutated version of the gene produces malformed CCR5 proteins, which cannot be used by HIV as a co-receptor. Individuals that have mutant delta32 versions of both of their CCR5 genes are resistant to infection by R5 HIV strains.

About Sangamo

Sangamo BioSciences, Inc. is focused on the research and development of novel DNA-binding proteins for therapeutic gene regulation and modification. The most advanced ZFP Therapeutic(TM) development program is currently in Phase 2 clinical trials for evaluation of safety and clinical effect in patients with diabetic neuropathy. Phase 1 clinical trials are ongoing to evaluate a ZFP Therapeutic for peripheral artery disease. Other therapeutic development programs are focused on cancer and HIV/AIDS, neuropathic pain, nerve regeneration, Parkinson's disease and monogenic diseases. Sangamo's core competencies enable the engineering of a class of DNA-binding proteins known as zinc finger DNA-binding proteins (ZFPs). By engineering ZFPs that recognize a specific DNA sequence Sangamo has created ZFP transcription factors (ZFP TF(TM)) that can control gene expression and, consequently, cell function. Sangamo is also developing sequence-specific ZFP Nucleases (ZFN(TM)) for gene modification. Sangamo has established strategic partnerships with companies outside of the human therapeutic space including Dow AgroSciences, Sigma-Aldrich Corporation and several companies applying its ZFP Technology to enhance the production of protein pharmaceuticals. For more information about Sangamo, visit the company's web site at http://www.sangamo.com.

This press release may contain forward-looking statements based on Sangamo's current expectations. These forward-looking statements include, without limitation, references to the research and development of novel ZFP TFs and ZFNs as ZFP Therapeutics, applications of Sangamo's ZFP TF technology platform, strategic partnerships with collaborators and clinical trials of ZFP Therapeutics. Actual results may differ materially from these forward-looking statements due to a number of factors, including technological challenges, uncertainties relating to the initiation and completion of stages of ZFP Therapeutic clinical trials, Sangamo's ability to develop commercially viable products and technological developments by our competitors. See the company's SEC filings, and in particular, the risk factors described in the company's Annual Report on Form 10-K and its most recent 10-Q. Sangamo BioSciences, Inc. assumes no obligation to update the forward-looking information contained in this press release.

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