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New Preclinical Breast Cancer Study Shows Peregrine's PS-Targeting Antibodies Can Reverse Tumor-Induced Immune Suppression

New Data Presented at AACR Annual Meeting Explain Key Tumor-Fighting Mechanism of PS-Targeting Antibodies

WASHINGTON, D.C. and TUSTIN, CA, Apr 19, 2010 (MARKETWIRE via COMTEX News Network) -- Peregrine Pharmaceuticals, Inc. (NASDAQ: PPHM), a clinical-stage biopharmaceutical company developing innovative monoclonal antibodies for the treatment of cancer and viral infections, today reported data from a new preclinical study demonstrating that the company's phosphatidylserine (PS)-targeting antibodies reversed immune suppression by tumors and conferred tumor-specific immunity in models of breast cancer. These data are being presented today at the AACR 101st Annual Meeting 2010 in Washington, D.C. Peregrine's lead PS-targeting antibody bavituximab is currently in Phase II clinical trials in advanced breast cancer and non-small cell lung cancer, with additional data expected by mid-year 2010.

"The results from this study add to the growing body of research indicating that tumor cells use exposed PS to evade recognition by the immune system and that PS-targeting antibodies can play a pivotal role in reactivating the immune system to mount an anti-tumor response," said Dr. Philip Thorpe, professor of pharmacology at the University of Texas Southwestern Medical Center, a scientific advisor to Peregrine and co-author of this study. "This study shows that the immunosuppressive effects of PS exposed on apoptotic tumor cells can be reversed by PS-targeting antibodies, specifically by reversing the suppression of dendritic cell (DC) maturation caused by the exposed PS. This finding is important since reactivation of the immune system after the primary tumor has been removed is a critical line of defense in fighting cancer recurrence. Additionally, we showed that PS-targeting antibodies have the ability to confer tumor-specific immunity, which could lead to the future development of new cancer vaccine regimens."

New PS-Antibody Study(1) Mature DCs play an important role in initiating long-term adaptive or "memory" immune responses. Previous studies demonstrated that DCs that ingest apoptotic, or dying, tumor cells expressing PS fail to mature in response to external signals. This new in vitro study was designed to determine if masking PS on these apoptotic tumor cells with Peregrine's PS-targeting antibody (2aG4) can reverse PS's inhibitory effect on DCs.

Researchers found that masking PS on tumor cells with a PS-targeting antibody reversed these inhibitory effects as measured by a number of immune system responses, including increased phagocytosis, increased maturation and expression of immunostimulatory molecules (CD40, CD80, CD86 and MHC II), decreased production of anti-inflammatory cytokines (TGFbeta and IL-10), and increased production of inflammatory cytokines (TNFalpha, CCL5, IL-1beta and IL-6).

In an important extension of the study, researchers demonstrated that immunizing mice with breast tumor cells treated with the PS-targeting antibody enhanced the immunogenicity of the tumor cells, rendering the animals resistant to re-challenge with similar tumor cells. The authors concluded that these results showing tumor-specific immunity and DC maturation mediated by a PS-targeting antibody could lead to the future development of cancer vaccine regimens.

"Together with our investigators, we continue to discover new immunomodulatory effects of our PS-targeting antibodies, contributing to our understanding of their broad spectrum potential in cancer and viral diseases," commented Steven W. King, president and CEO of Peregrine. "We look forward to supporting additional research on our PS-targeting antibody bavituximab, as well as our brain cancer therapy Cotara(R), through our new investigator-sponsored trials program for research professionals who share our enthusiasm for the clinical potential of these novel therapeutic agents."

About PS-Targeting Antibodies Peregrine's lead phosphatidylserine (PS)-targeting antibody is bavituximab, a first-in-class monoclonal antibody that targets the cellular membrane phospholipid PS. Usually located inside cells, PS becomes exposed on the outside of cells that line tumor blood vessels and on certain viruses and the cells they infect, creating a specific target for treatments while sparing healthy cells that do not express PS. Bavituximab induces immune cell-mediated destruction of cells with exposed PS and is also believed to restore the immune system's ability to recognize and respond by blocking PS-mediated immunosuppression. Initial results from Phase II cancer trials of bavituximab in combination with chemotherapy have been encouraging, with objective tumor response rates that compare favorably to historical results with chemotherapy alone.

(1) Xianming Huang, Dan Ye, Philip Thorpe. UT Southwestern Medical Ctr., Dallas, TX. Phosphatidylserine on dying tumor cells suppresses dendritic cell activation and inhibits tumor immunity: reversal with PS-targeting antibody. In: Proceedings of the

101st Annual Meeting of the American Association for Cancer Research (AACR); 2010 Apr 17-21; Washington, D.C. Abstract 1919.

The AACR conference is being held April 17-21, 2010 in Washington, D.C. For more information, visit www.aacr.org.

About Peregrine Pharmaceuticals Peregrine Pharmaceuticals, Inc. is a biopharmaceutical company with a portfolio of innovative monoclonal antibodies in clinical trials for the treatment of cancer and serious viral infections. The company is pursuing three separate clinical programs in cancer and hepatitis C virus infection with its lead product candidates bavituximab and Cotara(R). Peregrine also has in-house cGMP manufacturing capabilities through its wholly owned subsidiary Avid Bioservices, Inc. (www.avidbio.com), which provides development and biomanufacturing services for both Peregrine and outside customers. Additional information about Peregrine can be found at www.peregrineinc.com.

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