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New Study in Clinical Cancer Research Shows Therapeutic Promise of Peregrine's Bavituximab With Radiation in a Lethal Brain Cancer Model

- Treatment in Combination with Radiation Doubled Survival Time and Produced Long-Term Cures in Lethal Brain Cancer Model -
- Confirms PS-Targeting Antibodies Have a Dual Mechanism of Action that Both Destroys Tumor Blood Vessels and Initiates a Robust Immune Response to the Tumor -
- New Studies Demonstrate Therapeutic Potential of Bavituximab in Brain Cancer In Addition to Ongoing Phase II Trials in Advanced Breast and Lung Cancers -

TUSTIN, Calif., Nov 10, 2009 /PRNewswire-FirstCall via COMTEX News Network/ --

Peregrine Pharmaceuticals, Inc. (Nasdaq: PPHMD) today announced that a newly published study shows that a phosphatidylserine (PS)-targeting antibody similar to the company's lead product candidate bavituximab demonstrated potent anti-tumor activity when combined with radiation in a model of aggressive brain cancer, doubling the survival time of test animals and producing long-term cures. The study also provides further evidence that the anti-cancer activity of bavituximab and other PS-targeting antibodies reflects multiple novel mechanisms. Bavituximab is currently in Phase II clinical trials for the treatment of advanced breast cancer and advanced lung cancer. The new study is available in the current on-line edition of *Clinical Cancer Research*(1).

"This important new study provides additional scientific evidence that PS-targeting antibodies, including bavituximab, employ multiple novel mechanisms to mobilize the immune system to combat cancer and that these mechanisms are enhanced by concurrent radiation therapy," said Steven W. King, president and CEO of Peregrine. "The potent anti-tumor effects observed in this study, which used an extremely challenging preclinical model of brain cancer, are very impressive. These results provide a strong rationale for conducting future clinical trials of bavituximab in combination with radiation for the treatment of glioblastoma and other brain cancers."

The new study was designed to assess whether treatment with an antibody equivalent of bavituximab combined with radiotherapy can suppress tumor growth in a model of glioblastoma, the deadliest form of brain cancer. It used an especially aggressive tumor line that behaves very much like glioblastoma when injected into the brains of test animals. Results showed that the combination of a bavituximab equivalent and radiotherapy more than doubled the median survival time of test animals and 13% were rendered disease free, an unexpected outcome with this type of tumor. The combination treatment was significantly superior to either radiotherapy or treatment with the bavituximab equivalent alone.

The study authors also assessed the mechanisms of the observed anti-tumor effects. Analysis showed that radiation induced PS exposure on tumor blood vessels and enhanced the ability of the bavituximab equivalent to mobilize immune system monocyte and macrophage cells to attack the tumor blood vessels. In addition, the authors showed that the bavituximab equivalent enhanced the ability of the immune system to generate cytotoxic T cells specific to the brain cancer cells used in the studies. These immune cells were able to prevent the growth of cancer cells that had infiltrated throughout the normal brain. Treated animals that became cancer-free were immune when subsequently re-challenged with these normally deadly brain tumor cells.

Dr. Philip Thorpe, professor of pharmacology at UT Southwestern Medical Center and an author of the new study commented, "Scientists have long been perplexed about the fact that many tumors seem to be able to evade the immune system, making themselves invisible to immune recognition and attack. The studies reported in this new paper confirm our prior observations that tumor cells conceal themselves by flipping PS from inside the cells to their outer surface. This exposed PS sends what is essentially an "all clear" signal to the immune system, allowing the tumor to continue to grow and spread. PS-targeting antibodies such as bavituximab mask the exposed PS and enable the immune cells to recognize the cancer cells as foreign, mobilizing immune system defenses to attack the tumor and inhibit its growth. Bavituximab has already demonstrated encouraging anti-tumor activity in multiple human clinical trials, and we believe the novel mechanisms elucidated in these new studies indicate that it may also prove to be an effective new agent against glioblastoma."

Bavituximab is being tested in combination with chemotherapy in Phase II trials in advanced lung cancer and advanced breast cancer. Interim results in these trials have been encouraging, with objective tumor response rates that compare favorably to

chemotherapy alone.

(1) *Antiphosphatidylserine Antibody Combined with Irradiation Damages Tumor Blood Vessels and Induces Tumor Immunity in a Rat Model of Glioblastoma*, Jin He, Yi Yin, Troy A. Luster, Linda Watkins, and Philip E. Thorpe, Clin Cancer *Res*1078-0432. CCR-09-1499; Published OnlineFirst November 3, 2009, doi:10.1158/1078-0432.CCR-09-1499

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 HCV infection with its lead product candidates bavituximab and Cotara(R). Peregrine also has in-house 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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