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Titan Pharmaceuticals Announces Journal of the American Medical Association Publication of Phase 3 Probuphine™ Data

JAMA Publication Highlights Positive Data; Probuphine's Innovative Implant Formulation Demonstrates Compelling Efficacy in Patients Suffering from Opioid Addiction

SOUTH SAN FRANCISCO, Calif., Oct. 12 /PRNewswire/ -- Titan Pharmaceuticals, Inc. (OTC Bulletin Board: TTNP) today announced that data from its previously completed and announced Phase 3 randomized, placebo-controlled clinical trial of Probuphine were published in the *Journal of the American Medical Association (JAMA)*. The article highlights data from the 163-patient trial, which showed that patients receiving Titan's Probuphine implant had significantly less illicit opioid use, experienced fewer symptoms of withdrawal and craving, stayed in treatment longer and had greater overall improvement when compared to placebo patients over the course of the 24-week study.

Probuphine is an innovative, subcutaneous implant formulation designed using Titan's proprietary ProNeura™ technology to deliver a steady, round-the-clock low dose of the marketed drug buprenorphine over six months following a single treatment.

"The introduction of buprenorphine into clinical practice is arguably the most significant improvement in the treatment of opioid addiction in the last decade; however, physicians excited with the clinical success of buprenorphine are also rightfully concerned about medication adherence and diversion - and potential for abuse - of the sublingual formulations of buprenorphine," said Walter Ling, M.D., Professor of Psychiatry and Director, Integrated Substance Abuse Programs at the David Geffen School of Medicine at UCLA and the paper's lead author. "Probuphine does away with these concerns by eliminating the need for take home doses. Additionally, by providing a sustained blood level of active medication, Probuphine helps diminish the daily fluctuation of the medication effects—and potentially side effects-- and reduces the total exposure of buprenorphine over time."

The publication, "Buprenorphine Implants for Opioid Dependence: A Randomized Controlled Trial" will appear in the October 13, 2010 issue of *JAMA* and details key trial results:

- Patients receiving Probuphine had a mean percentage of urine samples that tested negative for illicit opioids across the full 24 weeks of 36.6 percent; those in the placebo group had a mean of 22.4 percent ($p=0.01$)
- Nearly 66 percent of patients receiving Probuphine completed the study vs. the 31 percent who received placebo implants ($p<0.001$)
- Probuphine patients experienced fewer clinician-rated ($p<0.001$) and patient-rated ($p=0.004$) withdrawal symptoms

-- Probuphine patients reported lower ratings of craving (p<0.001)
-- Probuphine patients had a greater change on clinician global ratings of severity of opioid dependence (p<0.001)
-- Probuphine patients demonstrated a greater change on the clinician global ratings of improvement (p<0.001)
-- Minor implant site reactions were the most common adverse events and were consistent across the Probuphine and placebo groups

Titan is currently conducting a confirmatory Phase 3 clinical trial of Probuphine for the treatment of opioid addiction. Patient enrollment in that trial is now complete and results are expected in the second quarter of 2011, approximately three months ahead of the original schedule. This study is part of Titan's registration-directed program intended to obtain marketing approval of Probuphine for the treatment of opioid addiction in the U.S. and Europe.

"We believe that Probuphine represents a significant step forward in the safe and effective treatment of opioid addiction," said Dr. Katherine L. Beebe, Senior Vice President, Clinical Development and Medical Affairs and a co-author of the publication. "Probuphine was designed as an innovative implant formulation so that it could reduce the risk of diversion and abuse. With only one treatment, Probuphine provides a round-the-clock, effective low dose of buprenorphine over six months, which should significantly improve compliance. These improvements could change the way opioid addiction is treated and dramatically impact patients' lives."

The World Health Organization estimates that 2.8 million individuals in the U.S. andEurope are addicted to illicit opiates such as heroin, and more than 2.0 million individuals in the U.S. alone are addicted to prescription opioid medications. It is estimated that about 20 percent of this population are currently receiving pharmacological treatment.

About Probuphine

Probuphine is designed to deliver six months of continuous round-the-clock, long-term therapeutic levels of the drug buprenorphine following a single subcutaneous treatment. Buprenorphine, an approved agent for the treatment of opioid addiction, is currently available mainly in the form of a sublingual tablet formulation. The safety and effectiveness of treatment with Probuphine has been initially established in the three Phase 3 studies conducted to date, specifically, a 163 patient placebo controlled study which demonstrated clinically meaningful and statistically significant treatment with Probuphine over a 24 week period, an open label 24 week retreatment study in 62 patients who had successfully completed six months of treatment in the controlled study, and a relative bioavailability study in 9 patients treated with Suboxone® and then switched to Probuphine treatment for 60 days.

Probuphine was developed using ProNeura, Titan's continuous drug delivery system that consists of a small, solid rod made from a mixture of ethylene-vinyl acetate (EVA) and a drug substance. The resulting product is a solid matrix that is placed subcutaneously, normally in the upper arm in a simple office procedure, and is removed in a similar manner at the end of the treatment period. The drug substance is released slowly, at continuous levels, through the process of diffusion. This results in a constant rate of release similar to intravenous

administration.

About Titan Pharmaceuticals

For information concerning Titan Pharmaceuticals, Inc., please visit the Company's website at www.titanpharm.com.

The press release may contain "forward-looking statements" within the meaning of Section 27A of the Securities Act of 1933 and Section 21E of the Securities Exchange Act of 1934. Such statements include, but are not limited to, any statements relating to the Company's development program and any other statements that are not historical facts. Such statements involve risks and uncertainties, including, but not limited to, those risks and uncertainties relating to difficulties or delays in development, testing, regulatory approval, production and marketing of the Company's drug candidates, adverse side effects or inadequate therapeutic efficacy of the Company's drug candidates that could slow or prevent product development or commercialization, the uncertainty of patent protection for the Company's intellectual property or trade secrets, and the Company's ability to obtain additional financing. Such statements are based on management's current expectations, but actual results may differ materially due to various factors, including those risks and uncertainties mentioned or referred to in this press release.

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