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Titan Pharmaceuticals and Opiant Pharmaceuticals Collaborate to Explore a New Approach to Opioid Use Disorder Treatment

SOUTH SAN FRANCISCO, Calif., Oct. 2, 2017 /PRNewswire/ -- Titan Pharmaceuticals, Inc. (NASDAQ:TTNP) and Opiant Pharmaceuticals, Inc. (NASDAQ:OPNT) today announced a collaboration to explore development of a novel approach to the prevention of opioid relapse and overdose in individuals with opioid use disorder. The companies will conduct a feasibility assessment of a subcutaneous implant using Titan's proprietary ProNeura™ sustained release technology to administer an opioid antagonist. A product that delivers non-fluctuating, therapeutic levels of an opioid antagonist, continuously for up to 6 months, may be ideally suited for the prevention of opioid relapse and overdose.

Relapse and fatal overdose among those with opioid use disorder is significantly higher than any other type of drug addiction. As many as 91 percent of those in recovery will experience a relapse. At least 59 percent of those who relapse do so within the first week of sobriety, while 80 percent relapse within a month after discharging from a treatment and detox program.[i] The risk of a fatal overdose is at its highest during a relapse. Even returning to a low dose of opioids after a period of abstinence can result in an overdose for a long-term opioid user.[ii]

"Currently, the only FDA-approved opioid antagonist for relapse prevention is a monthly depot injection of naltrexone," said Opiant CEO Roger Crystal, M.D. "A product with a six-month duration would allow patients to be opioid-free for a longer period, providing a greater window for long-term recovery, and most critically, relapse and overdose prevention. This six-month duration would mean that patients only have to make one good decision to initiate therapy, which is important because the longer patients receive pharmacological treatment, the less likely they are to relapse and possibly overdose."

"We are pleased to collaborate with Opiant on this important project to evaluate the addition

of an opioid antagonist implant to the armamentarium of products to treat opioid use disorder," said Titan President and CEO Sunil Bhonsle. "Our knowledge from developing the FDA-approved Probuphine® (buprenorphine) implant for the maintenance treatment of opioid addiction, coupled with the drug development expertise at both companies, should enable us to complete this evaluation relatively rapidly and, hopefully, with a successful result."

Titan continues to explore opportunities to expand the use of its ProNeura long-term, continuous drug delivery platform, and recently commenced a Phase 1/2 clinical study of a ropinirole implant for treating Parkinson's disease. An implantable triiodothyronine (T3) product for the treatment of hypothyroidism is completing non-clinical development focused on formulation optimization. Titan is also collaborating with the Walter Reed Army Institute of Research and the Southwest Research Institute in the early non-clinical evaluation of the implant drug delivery platform in malaria prophylaxis. Additional ProNeura feasibility evaluations are ongoing in the area of chronic pain treatment with a peripherally acting Kappa opioid receptor agonist, and in the treatment of type 2 diabetes with currently approved peptides.

Opiant is committed to innovation and product development in the addiction space. The company is developing additional therapies for opioid use disorder, including advancing the pre-clinical development of its heroin vaccine candidate, which was licensed in October 2016 from the Walter Reed Army Institute of Research and the National Institute on Drug Abuse (NIDA). The company's pipeline of nasal opioid antagonists also addresses both alcohol use and eating disorders. Opiant continues to maintain an active presence in national organizations such as the National Institutes of Health (NIH), and Dr. Crystal was recently invited to testify before the President's Commission on Combating Drug Addiction and the Opioid Crisis.

About Titan Pharmaceuticals
Titan Pharmaceuticals Inc. (NASDAQ:TTNP), based in South San Francisco, CA, is developing proprietary therapeutics primarily for the treatment of serious medical disorders. The company's lead product is Probuphine®, a novel and long-acting formulation of buprenorphine and the first and only commercialized treatment of opioid dependence approved by the U.S. Food and Drug Administration to provide continuous, around-the-clock blood levels of buprenorphine for six months following a single procedure. Probuphine employs Titan's proprietary drug delivery system ProNeura™, which is capable of delivering sustained, consistent levels of medication for three months or longer. Titan has granted commercial rights in the U.S. and Canada for Probuphine to Braeburn Pharmaceuticals. The ProNeura technology has the potential to be used in developing products for treating other chronic conditions such as Parkinson's disease and hypothyroidism, where maintaining consistent, around-the-clock blood levels of medication may benefit the patient and improve medical outcomes. For more information about Titan, please visit www.titanpharm.com.

About Opiant Pharmaceuticals
Opiant Pharmaceuticals, Inc. is a specialty pharmaceutical company developing pharmacological treatments for addictions. NIDA, a division of the NIH, describes these disorders as chronic relapsing brain diseases which burden society at both the individual and community levels. With its innovative opioid antagonist nasal delivery technology, Opiant is positioned to become a leader in these treatment markets. Its first product, NARCAN® Nasal

Spray, is approved for marketing in the U.S. and Canada by the company's partner, Adapt Pharma Operations Limited. For more information please visit: www.opiant.com.

Forward-Looking Statements

This 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 our product development programs and any other statements that are not historical facts. Such statements involve risks and uncertainties that could negatively affect our business, operating results, financial condition and stock price. Factors that could cause actual results to differ materially from management's current expectations include those risks and uncertainties relating to the commercialization of Probuphine, the regulatory approval process, the development, testing, production and marketing of our drug candidates, patent and intellectual property matters and strategic agreements and relationships. We expressly disclaim any obligation or undertaking to release publicly any updates or revisions to any forward-looking statements contained herein to reflect any change in our expectations or any changes in events, conditions or circumstances on which any such statement is based, except as required by law.

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[i] Smyth, B. P., Barry, J., Keenan, E. & Ducray, K. (2010). **Lapse and relapse following inpatient treatment of opiate dependence**. *Irish Medical Journal*. *103(6),176–179.*

[ii] *http://www.alcoholismdrugabuseweekly.com/m-article-detail/even-a-low-dose-of-opioids-after-a-short-period-of-abstinence-can-result-in-overdose.aspx*

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