Inovio Pharmaceuticals Initiates Cervical Cancer Clinical Trial

Inovio Pharmaceuticals Inc. (NYSE MKT: INO) today announced it has initiated a phase I/IIa clinical trial to evaluate safety, immunogenicity, clinical responses and disease-free survival of its DNA immunotherapy product, INO-3112, in treating human papillomavirus (HPV)-associated cervical cancer.

This open-label study, called HPV-004, will evaluate INO-3112 in 20 female subjects, with inoperable invasive cervical cancer.

This cervical cancer study is being conducted at the University of Chicago Medical Centre.

Inovio's Immunotherapy will Treat Women with Inoperable HPV-caused Cancer

BLUE BELL, PA – June 23, 2014 – Inovio Pharmaceuticals, Inc. (NYSE MKT: INO) today announced it has initiated a phase I/IIa clinical trial to evaluate safety, immunogenicity, clinical responses and disease-free survival of its DNA immunotherapy product, INO-3112, in treating human papillomavirus (HPV)-associated cervical cancer. INO-3112 is a combination of Inovio's lead active immunotherapy product, VGX-3100, and its proprietary immune activator expressing interleukin-12 (IL-12). VGX-3100 is currently being evaluated in a randomized phase II efficacy trial for the treatment of high grade cervical dysplasia (pre-cancer).

This open-label study, called HPV-004, will evaluate INO-3112 in 20 female subjects with inoperable invasive cervical cancer. Subjects will receive four treatments of INO-3112 every four weeks after completion of a standard chemoradiation regimen. Each INO-3112 treatment will be a combination of 6 mg of VGX-3100 and 1 mg of DNA-based IL-12 delivered together intramuscularly with the CELLECTRA® delivery system.

As an exploratory analysis, the study team will evaluate clinical responses at the tumor site (tumor shrinkage or regression) and assess disease-free survival and disease recurrence up to 12 months after the initial immunotherapy with Inovio's INO-3112. Cellular (T cell) immune responses will be analyzed pre- and post-immunotherapy in the tumor tissue as well as in the bloodstream.

In a phase I trial of VGX-3100, Inovio demonstrated that this HPV immunotherapy produced high levels of durable T cell immune responses, notably CD8+ T cells, in 78% of all patients. These CD8+ T cells showed the functional ability to kill target cells displaying the antigens E6 and E7. In preclinical animal models, this DNA-based immunotherapy demonstrated 100% protection against HPV E6 and E7-expressing tumors and prevented or delayed the growth of such tumors. The proprietary IL-12 immune activator, called INO-9012, was previously shown to enhance antigen-specific CD4+ and CD8+ T cell immune responses to Inovio's PENNVAX® HIV DNA vaccine in a clinical trial. Inclusion of this DNA-based immune activator in INO-3112 is intended to further strengthen the generation of HPV-specific CD8+ T cells to treat HPV-caused cancer.

This cervical cancer study is being conducted at the University of Chicago Medical Center and at the Comprehensive Cancer Center at Silver Cross, IL, where Dr. Yasmin Hasan, Director of Gynecological Radiation Oncology and Brachytherapy, is the principal investigator.

Dr. J. Joseph Kim, Inovio's President and CEO, said, "This

study extends our pioneering HPV immune-based treatment into cervical cancer, the No. 2 cancer killer of women in the world. Our goal is to fully address the post-HPV infection immune therapeutics markets, targeting not only HPV-related cervical pre-cancer but also cervical cancer as well as head and neck and anogenital cancers."

"Cancer immunotherapy is focused on generating cancer fighting T cells and freeing them to attack targeted cancer cells. Inovio has demonstrated that its therapies mobilize more antigen-specific T cells than any other product on the market or in development. We look forward to reporting unblinded cervical dysplasia phase II study data on efficacy and T cell responses by the end of July. Our aim is to have the best and most extensive pipeline of active cancer immunotherapies with the potential to seek out and destroy cancer cells," said Dr. Kim.

HPV and Cervical Cancer

Human papillomavirus (HPV) is the most common sexually transmitted disease in the United States, infecting 79 million Americans and causing almost all cervical cancers. Approximately 12,000 women in the U.S. are diagnosed with cervical cancer annually and more than 4,000 will die from the disease. Worldwide, cervical cancer results in about 275,000 deaths per year. Currently available HPV vaccines are highly effective at prevention; however, they are not intended for women already infected with HPV or those who already have developed dysplasia or cancer. Current treatments include surgery (radical hysterectomy) and/or combination radiation and chemotherapy. These treatments have many potential damaging side effects.

VGX-3100 and INO-3112 for Treating HPV-Caused Diseases

Inovio's lead product, VGX-3100, is a DNA-based immunotherapy for pre-cancers and cancers caused by HPV. This product,

without an immune activator, is currently in a randomized, double-blind phase II trial evaluating its efficacy and immune responses against HPV-caused cervical dysplasia. INO-3112 combines this immunotherapy with a DNA-based IL-12 immune activator to further boost the targeted immune response against head and neck cancer, cervical cancer and other cancers.

Inovio’s Immune Activators

Immune activators can play a vital role in augmenting antigen-specific immune responses such as those generated by Inovio’s DNA vaccines. Inovio’s portfolio of patent-protected, DNA-based immune boosters vary in their ability to activate and enhance therapeutic T cells or preventive antibodies, modulate the type of immune responses produced by the vaccine, impact durability of immune responses, and drive immune responses to sites of infection, e.g. mucosal surfaces. Different immune activators can therefore play unique roles in achieving desired immune responses generated by DNA immunotherapies and vaccines. Moreover, while some protein-based cytokines and chemokines have been shown to have severe toxicity, likely due to their dosing levels and systemic delivery, Inovio’s DNA-based immune activators and immunotherapeutics are delivered together at one injection site with the goal of enabling local production by the body of cytokines or chemokines, along with antigens that drive immune responses with disease modifying benefits and no toxic systemic effects.

About Inovio Pharmaceuticals, Inc.

Inovio is revolutionizing vaccines to prevent and treat today’s cancers and challenging infectious diseases. Its SynCon® vaccines, in combination with its proprietary electroporation delivery, are generating best-in-class immune responses, with therapeutic T-cell responses exceeding other technologies in terms of magnitude, breadth, and response rate. Human data to date have shown a favorable safety

profile. Inovio’s lead vaccine, a therapeutic against HPV-caused pre-cancers and cancers, is in phase II. Other phase I and preclinical programs target prostate, breast, and lung cancers as well as HIV, influenza, malaria and hepatitis. Partners and collaborators include Roche, the University of Pennsylvania, NIH, HIV Vaccines Trial Network, National Cancer Institute, U.S. Military HIV Research Program, US Dept. of Homeland Security, and University of Manitoba.