Inovio Pharmaceuticals {NYSE: IVO }

Inovio Pharmaceuticals HPV Immunotherapy Achieves Primary Efficacy Endpoint in Randomized Phase II Cervical Dysplasia Trial

Treatment with VGX-3100 induces regression of precancerous cervical disease and clears HPV infection with robust T cell responses

Inovio Pharmaceuticals, Inc. (NYSE MKT: INO) today announced successful results from its randomized, double-blind, placebo-controlled phase II trial of VGX-3100 in women with biopsy-proven cervical intraepithelial neoplasia 2/3 (CIN2/3) associated with human papillomavirus (HPV) types 16 or 18. Treatment with VGX-3100, Inovio's HPV16/18-specific immunotherapy, resulted in histopathological regression of CIN2/3 to CIN1 or no disease, meeting the study's primary endpoint. In addition, the trial demonstrated clearance of HPV in conjunction with regression of cervical lesions. Robust T-cell activity was detected in subjects who received VGX-3100 compared to those who received placebo.

"This is a significant step toward providing women and their physicians a non-surgical approach to the treatment of precancerous lesions by stimulating their immune system to eliminate high risk HPV infection and induce regression of a cervical intraepithelial neoplastic process," said Mark Bagarazzi, MD, Chief Medical Officer, Inovio Pharmaceuticals. "This proof of concept trial will guide the advancement of VGX-3100 for precancerous dysplasias as well as HPV-associated cervical, head and neck, and anogenital cancers."

Treatment was randomized 3:1 between the VGX-3100 and placebo groups, and was stratified by age and severity of CIN. The

primary endpoint, histologic regression, was evaluated 36 weeks after the first treatment. In the per protocol analysis, CIN2/3 resolved to CIN1 or no disease in 53 of 107 (49.5%) women treated with VGX-3100 compared to 11 of 36 (30.6%) who received placebo. This difference was statistically significant ($p<0.025$).

Virological clearance of HPV 16 or 18 from the cervix in conjunction with histopathological regression of cervical dysplasia to CIN1 or no disease, a secondary endpoint of the trial, was observed in 43 of 107 (40.2%) VGX-3100 recipients compared to 5 of 35 (14.3%) placebo recipients ($p<0.025$).

As in the phase I study, VGX-3100 elicited robust HPV-specific T cell responses in the majority of treated subjects. A comprehensive analysis of T cell responses is ongoing.

The treatment was generally well-tolerated, with only administration site redness occurring significantly more frequently in the VGX-3100 group compared to the placebo group in the 7- and 28-day periods following treatment.
“Beyond the direct clinical implications of this phase II study, these results are a breakthrough for the field of immunotherapies. This efficacy and T cell data provide evidence that our SynCon® immunotherapy technology can activate the immune system to fight chronic infections, pre-cancers – and ultimately, cancers,” said Dr. J. Joseph Kim, Inovio’s President and CEO. “These results significantly de-risk our product and business development strategy for VGX-3100 and our broad pipeline of SynCon® active immune therapy and vaccine products.

“We thank the women who participated and the clinical investigators who provided patient care and made this trial possible.”

Topline results will be presented at the 2014 International Society of DNA Vaccines Conference in San Diego, on July 23,

2014. Detailed study findings will be submitted for publication in a peer-reviewed scientific journal.

About VGX-3100

Inovio's VGX-3100 is an immunotherapy containing two DNA plasmids targeting the E6 and E7 oncogenes of HPV types 16 and 18. The treatment is administered to patients by injection into muscle (typically in the arm), followed by electroporation using Inovio's CELLECTRA® device. VGX-3100 has been shown to induce a robust immune response against the E6 and E7 oncogenes associated with HPV types 16 and 18. These oncogenes are responsible for transforming HPV-infected cells into pre-cancerous and cancerous cells. Apart from this cervical dysplasia study, Inovio is also conducting studies using this immunotherapy against cervical as well as head and neck cancers caused by these HPV types.

About HPV-003 (ClinicalTrials.gov: NCT01304524; EudraCT: 2012-001334-33)

This phase II trial is a randomized, placebo-controlled, double-blind study of women with CIN2 or CIN3 who were randomized 3:1 to the active and placebo groups. Women in the active group received three 6 mg doses of VGX-3100 in a 1 mL intramuscular injection followed by electroporation with Inovio's CELLECTRA® device at weeks 0, 4, and 12. Cervical tissue was examined before starting blinded treatment and 9 months later.
Cornelia Trimble, MD, Associate Professor of Gynecology and Obstetrics, Oncology, and Pathology, Johns Hopkins School of Medicine, is the principal investigator for the study.

About HPV and Cervical Dysplasia

Human papillomavirus (HPV) is the most common sexually transmitted disease. At any given time, approximately 11% percent of the world population is infected with HPV. Roughly 90% of HPV infections are cleared by naturally occurring

immune responses within two years.

Persistent HPV infection can lead to dysplasia, or premalignant changes, in cervical cells. HPV types 16 and 18 cause 70% of cervical dysplasia and cervical cancer cases. Each year in the United States, 1.4 million women are diagnosed with CIN1 and 300,000-400,000 women are diagnosed with CIN 2/3. All cervical cancers arise from untreated CIN2/3.

About Inovio Pharmaceuticals, Inc.

Inovio is revolutionizing the fight against cancer and infectious diseases. Our immunotherapies uniquely activate best-in-class immune responses to prevent and treat disease, and have shown clinically significant efficacy with a favourable safety profile. With an expanding portfolio of immune therapies, the company is advancing a growing preclinical and clinical stage product pipeline. Partners and collaborators include Roche, University of Pennsylvania, NIH, HIV Vaccines Trial Network, National Cancer Institute, U.S. Military HIV Research Program, and University of Manitoba. For more information, visit **www.inovio.com**.