



NEWS RELEASE

Inovio's Cancer Immunotherapy (INO-3112) Generates T Cell Immune Responses in Tumor Tissue and Peripheral Blood in Patients with HPV-Associated Head and Neck Cancer

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Four of five study subjects in treated group show progression free survival ranging from nine to 24 months to date in phase I/IIa clinical study

PLYMOUTH MEETING, Pa., Nov. 14, 2016 (GLOBE NEWSWIRE) -- Inovio Pharmaceuticals, Inc. (NASDAQ:INO), today announced an interim data analysis showing that its INO-3112 cancer immunotherapy product generated antigen-specific CD8+ killer T cell responses measured both in tumor tissue and in peripheral blood from subjects with head and neck cancer associated with human papillomavirus (HPV). The immunology results show that INO-3112 treatment generated robust HPV16/18 specific CD8+ T cell responses in peripheral blood in four of five subjects who also showed increased T cell activation in resected tumor tissue samples. These four subjects remained disease free in continuing follow-up that ranged from nine to 24 months at the time of analysis. One subject with only minimal increases in T cell immune responses developed progressive disease at 11 months post start of the study. These results were presented November 12th at the 2016 Annual Meeting of the Society for Immunotherapy of Cancer (SITC) in National Harbor, Maryland.

Dr. J. Joseph Kim, Inovio's President and CEO, said, "In immuno-oncology, it's all about the T cells. We now have evidence in cancer patients that our immunotherapy product can generate antigen-specific CD8+ killer T cell responses in the tumor, a major step forward towards an effective immunotherapy. This study gives us an important opportunity to evaluate a novel treatment approach using a DNA vaccine platform to increase immune activation by generating a robust in-vivo T cell response, especially in the tumor, and potentially decreasing tumor recurrence in HPV positive head and neck cancer patients."

INO-3112, an active immunotherapy targeting HPV 16/18 combined with a DNA plasmid for IL-12 as an immune activator, is designed to activate patients' immune responses to specifically target and kill HPV associated tumors. This open label phase I/IIa study has fully enrolled twenty-two subjects with HPV-positive head and neck squamous cell carcinoma and is intended to assess the safety, tolerability, and immunogenicity of INO-3112 in two treatment groups. Additionally, the study is evaluating the anti-tumor response and progression free survival of patients. The first group enrolled six subjects who were treated with INO-3112 before and

after resection of their tumor. One subject withdrew consent after surgery, leaving five evaluable subjects in this group. All of these subjects received one dose of INO-3112 (averaging 14 days and ranging 7 to 28 days) prior to definitive surgery plus three additional doses post-surgery. The second group enrolled sixteen subjects who received four doses of INO-3112 after at least two months following completion of definitive chemoradiation or surgery and adjuvant chemoradiation therapy.

This poster presentation provided immune response and disease free survival data from the first treatment group. CD8+ and FoxP3 T cell expression were evaluated in tumor samples obtained before and after surgery. In addition, ELISpot analysis was performed to determine the number of T cells capable of secreting IFN- γ in response to HPV antigen stimulation. Four of five subjects had robust T cell response as measured by blood ELISpot assay and the same four subjects also showed an average increase of 60% of CD8+ to FoxP3 ratio measured by immunohistochemistry post vaccination, demonstrating increased infiltration of CD8+ T cells as well as reduction of regulatory T cells measured by FoxP3 expression in tumor tissue. These four subjects remained disease free with follow-up ranging from nine to 24 months to date. One subject with only a marginal increase in ELISpot response magnitude to HPV and no increase in CD8+/FoxP3 ratio in tumor tissue post INO-3112 developed progressive disease at 11 months post-treatment.

Overall the characteristics of these immune response data mirrored those previously observed in a phase IIb clinical study of VGX-3100 for HPV-associated cervical dysplasia. In that study, strong CD8+ T cell immune responses were positively correlated with achievement of primary and secondary efficacy endpoints. VGX-3100 is the first therapy to demonstrate that activated killer T cells induced in the body have the power to clear neoplastic lesions as well as the virus which caused the disease.

Inovio is continuing subject monitoring and comprehensive immune analyses for both cohorts of this study and expects multiple reports of additional data throughout 2017.

In August 2015, Inovio licensed INO-3112 to MedImmune, the global biologics research and development arm of AstraZeneca, for an upfront payment of \$27.5 million, \$700 million in potential development and commercial milestone payments, and royalties on INO-3112 product sales.

About HPV-Caused Head & Neck Cancer

Human papillomavirus (HPV) is the most common sexually transmitted disease in the United States, currently infecting about 79 million Americans. HPV is known to play a major role in the development of head and neck cancers, which include cancers of the oral cavity, oropharynx, nose/nasal passages and larynx. In 2016 an estimated 48,330 persons will get oral cavity or oropharyngeal cancer in the U.S. New cases of head and neck cancer occur nearly three times more often in men as in women. Incidence rates of head and neck cancers have been on the rise, especially HPV-associated oropharyngeal cancer in men, and are expected to continue growing.

About Inovio Pharmaceuticals, Inc.

Inovio is taking immunotherapy to the next level in the fight against cancer and infectious diseases. We are the only immunotherapy

company that has reported generating T cells in vivo in high quantity that are fully functional and whose killing capacity correlates with relevant clinical outcomes with a favorable 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 MedImmune, The Wistar Institute, University of Pennsylvania, DARPA, GeneOne Life Science, Plumblin Life Sciences, Drexel University, NIH, HIV Vaccines Trial Network, National Cancer Institute, U.S. Military HIV Research Program, and Laval University. For more information, visit www.inovio.com.

This press release contains certain forward-looking statements relating to our business, including our plans to develop electroporation-based drug and gene delivery technologies and DNA vaccines, our expectations regarding our research and development programs and our capital resources. Actual events or results may differ from the expectations set forth herein as a result of a number of factors, including uncertainties inherent in pre-clinical studies, clinical trials and product development programs, including INO-3112, the availability of funding to support continuing research and studies in an effort to prove safety and efficacy of electroporation technology as a delivery mechanism or develop viable DNA vaccines, our ability to support our broad pipeline of SynCon® active immunotherapy and vaccine products, the ability of our collaborators to attain development and commercial milestones for products we license and product sales that will enable us to receive future payments and royalties, the adequacy of our capital resources, the availability or potential availability of alternative therapies or treatments for the conditions targeted by the company or its collaborators, including alternatives that may be more efficacious or cost effective than any therapy or treatment that the company and its collaborators hope to develop, issues involving product liability, issues involving patents and whether they or licenses to them will provide the company with meaningful protection from others using the covered technologies, whether such proprietary rights are enforceable or defensible or infringe or allegedly infringe on rights of others or can withstand claims of invalidity and whether the company can finance or devote other significant resources that may be necessary to prosecute, protect or defend them, the level of corporate expenditures, assessments of the company's technology by potential corporate or other partners or collaborators, capital market conditions, the impact of government healthcare proposals and other factors set forth in our Annual Report on Form 10-K for the year ended December 31, 2015, our Form 10-Q for the quarter ended September 30, 2016, and other regulatory filings from time to time. There can be no assurance that any product in Inovio's pipeline will be successfully developed or manufactured, that final results of clinical studies will be supportive of regulatory approvals required to market licensed products, or that any of the forward-looking information provided herein will be proven accurate.

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