Inovio Pharma's INO-3112 shows robust immune responses in head and neck cancer patients

Inovio Pharmaceuticals {NASDAQ: INO} drug INO-3112 Shows Robust Immune responses in patients with head and neck cancer

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PLYMOUTH MEETING, Pa., Nov. 05, 2015 – **Inovio Pharmaceuticals, {NASDAQ:INO}** announced today an interim data analysis showing that its INO-3112 DNA-based immunotherapy generated specific T-cell responses and was well tolerated in all evaluable patients with head and neck cancer associated with human papillomavirus (HPV) types 16 and 18.

The immunology results show that INO-3112 generated robust HPV16/18 specific CD8+ T cell responses and antibodies against HPV16/18 in all 10 tested patients who received all treatments. These results will be presented today and tomorrow at the 30th Anniversary Annual Meeting of the Society for Immunotherapy of Cancer in National Harbor, MD and on Nov 20-22 at the European Society for Medical Oncology Symposium on Immuno-Oncology in Lausanne, Switzerland.

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 patient's immune responses to specifically kill HPV associated tumors. In this phase I/IIa study, patients with HPV positive head and neck cancer

received INO-3112 once every three weeks for a total of four injections.

The characteristics of these immune response data mirror those previously observed in a phase II 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. Data from that trial was recently published in a peer-reviewed article in *The Lancet*. This publication details that 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.

Dr. Charu Aggarwal, MD, MPH, Assistant Professor of Medicine, Medical Oncologist at Abramson Cancer Center, University of Pennsylvania, Philadelphia and the principal investigator of this study said, "*These results are in line with our hypothesis that DNA immunotherapy would lead to activation of the immune system. We are excited to follow these patients and learn about long-term results with this immunotherapy*."

Dr. J. Joseph Kim, Inovio's President and CEO, said, "*These results demonstrate we're on the right path using our DNA immunotherapies to fight cancer. In immuno-oncology, it's all about the T cells. Here we show in cancer patients that we can generate antigen-specific CD8+ killer T cell responses, which are essential to an effective immunotherapy*."

This open label study is intended to assess the safety, tolerability, and immunogenicity of INO-3112 in up to twenty

five adults with HPV-positive head and neck squamous cell carcinoma. The study (NCT02163057) includes patients who are being treated with INO-3112 before and after resection of their tumor as well as patients being treated with INO-3112 after completion of chemotherapy and radiation therapy. This study currently continues patient enrollment at Abramson Cancer Center of University of Pennsylvania in Philadelphia. 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, infecting 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. Head and neck cancers associated with HPV account for nearly 3 percent of all cancers in the United States and are twice as prevalent in men as in women. Incidence rates of HPV-caused head and neck cancers have been on the rise, especially HPV-associated oropharyngeal cancer in men, and are expected to continue growing. By 2025, researchers believe that HPV will be the causative factor of 90% of all head and neck cancers.

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 is generating T cells, in vivo, in

high quantity that are fully functional whose killing capacity correlates with relevant clinical outcomes with a favorable safety profile. With an expanding portfolio of immunotherapies, the company is advancing a growing preclinical and clinical stage product pipeline. Partners and collaborators include MedImmune, Roche, University of Pennsylvania, DARPA, GeneOne Life Science, Drexel University, 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.

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, but not limited to, the fact that pre-clinical and clinical results referenced in this release may not be indicative of results achievable in other trials or for other indications, that the studies or trials may not be successful or achieve the results desired, including safety and efficacy for VGX-3100, that pre-clinical studies and clinical trials may not commence or be completed in the time periods anticipated, that results from one study may not necessarily be reflected or supported by the results of other similar studies and that results from an animal study may not be indicative of results achievable in human studies), 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 immune therapy and vaccine products, our ability to advance our portfolio of immune-oncology products independently, 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, our ability to enter into partnerships in conjunction with our research and development programs, evaluation of potential opportunities, 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, 2014, our Form 10-Q for the quarter ended June 30, 2015, 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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