



NEWS RELEASE

Major Cancer Journal Highlights Data From An Inovio-Sponsored Trial In Which A Patient Achieved Full Remission After Dosing With DNA Immunotherapy and Checkpoint Inhibitor

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Study results published in *Clinical Cancer Research* shows that DNA immunotherapy approach drove T cell infiltration in tumors. PLYMOUTH MEETING, Pa., Oct. 02, 2018 (GLOBE NEWSWIRE) -- Inovio Pharmaceuticals, Inc. (NASDAQ:INO) announced today a paper published in a major cancer journal detailed results of a patient with head and neck cancer treated with MEDI0457 achieved a sustained complete response (full remission) on treatment with a subsequent PD-1 checkpoint inhibitor. In the Inovio-sponsored study of 22 patients with head and neck squamous cell carcinoma the company reported 91% (20/22) showed T cell activity in the blood or tissue. MEDI0457 – formerly called INO-3112 – was in 2015 licensed to MedImmune, the global biologics research and development arm of AstraZeneca. These immune data as well as the financial terms of the license agreement have been previously reported by Inovio.

Dr. J. Joseph Kim, Inovio's President and CEO, said, "We are buoyed by the study as it lends support to all of our HPV and oncology programs. These data demonstrated that Inovio's technology based in MEDI0457 can generate durable HPV16/18 antigen-specific peripheral and tumor immune responses. The study supports our belief that this approach may be used as a complementary strategy to PD-1/PD-L1 inhibition in HPV-associated head and neck and other types of cancer to improve therapeutic outcomes. Inovio is collaborating with MedImmune (w/ MEDI0457) as well as Genentech and Regeneron (w/ INO-5401) in efficacy trials coupling Inovio's DNA-based cancer immunotherapies with checkpoint inhibitors designed to increase response rates with data expected in 2019."

An article in the most recent edition of **Clinical Cancer Research** highlights data from an Inovio-sponsored trial that demonstrated that after a cancer progressed a patient was subsequently given a PD-1 checkpoint inhibitor. The patient achieved a complete response, which has sustained for over two years and counting. Increasing evidence suggests that response rates from checkpoint inhibitors can be enhanced when used in combination with cancer vaccines like MEDI0457 that generate tumor-specific T cells. Interim data from a MEDI0457 monotherapy study of head and neck cancer patients demonstrated that MEDI0457 generated robust

HPV16/18 specific CD8+ T cell responses in peripheral blood and increased CD8+ T cell infiltration in resected tumor tissue samples.

Charu Aggarwal, MD, MPH, the study's principal investigator and an assistant professor of Hematology-Oncology at the University of Pennsylvania's Perelman School of Medicine, said, "We wanted to know if this vaccine (MEDI0457) can boost the immune systems of patients with HPV-related head and neck cancer, potentially opening the door for better response rates to other existing therapies, and our findings show that we can."

The article notes that researchers administered four doses of MEDI0457 to 21 patients separated into two different groups. One group received a dose before surgery, followed by three doses after surgery. The second group received four doses following chemotherapy and radiation. Eighteen out of the 21 patients showed elevated T cell activity that lasted at least three months after the final vaccine dose, meaning the immune effect persisted for at least six months from the start of immunotherapy. Five tumors were biopsied both before and after one dose of the vaccine, and there was evidence of T cells infiltrating into tumors and expressing proteins associated with cell killing potential.

"We have not seen that kind of T cell infiltration with just one dose of a vaccine before," Dr. Aggarwal added. "These findings open the door for utilizing targeted immunotherapy approaches against specific cancer-causing targets like HPV."

Overall the characteristics of these immune response data mirrored those previously observed in a Phase 2b 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, which is currently in global REVEAL 1 Phase 3 trial, 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.

About MEDI0457 and VGX-3100

MEDI0457 (formerly called INO-3112 (VGX-3100, plus IL-12) which MedImmune in-licensed from Inovio) is under evaluation by MedImmune to treat HPV-associated cancers. Inovio is investigating VGX-3100, a DNA-based immunotherapy for the treatment of HPV-16 and HPV-18 infection and pre-cancerous lesions of the cervix (Phase 3) and vulva (Phase 2). VGX-3100 has the potential to be the first approved treatment for HPV infection of the cervix and the first non-surgical treatment for pre-cancerous cervical lesions. VGX-3100 works by stimulating a specific immune response to HPV-16 and HPV-18, which targets the infection and causes destruction of pre-cancerous cells. In a randomized, double-blind, placebo-controlled phase 2b study in 167 adult women with histologically documented HPV-16/18 cervical HSIL (CIN2/3), treatment with VGX-3100 resulted in a statistically significantly greater decrease in cervical HSIL and clearance of HPV infection vs. placebo. The most common side effect was injection site pain, and no serious adverse events were reported. VGX-3100 utilizes the patient's own immune system to clear HPV-16 and HPV-18 infection and pre-cancerous lesions without the increased risks associated with surgery, such as loss of reproductive health and negative psychosocial impacts.

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 2018 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 a late-stage biotechnology company focused on the discovery, development, and commercialization of DNA immunotherapies that transform the treatment of cancer and infectious diseases. Inovio's proprietary platform technology applies next-generation antigen sequencing and DNA delivery to activate potent immune responses to targeted diseases. The technology functions exclusively in vivo, and has been demonstrated to consistently activate robust and fully functional T cell and antibody responses against targeted cancers and pathogens. Inovio is the only immunotherapy company that has reported generating T cells whose killing capacity correlates with relevant clinical outcomes. Inovio's most advanced clinical program, VGX-3100, is in Phase 3 for the treatment of HPV-related cervical pre-cancer. Also in development are Phase 2 immuno-oncology programs targeting head and neck cancer, bladder cancer, and glioblastoma, as well as platform development programs in hepatitis B, Zika, Ebola, MERS, and HIV. Partners and collaborators include MedImmune, Regeneron, Roche/Genentech, ApolloBio Corporation, The Wistar Institute, University of Pennsylvania, Parker Institute for Cancer Immunotherapy, CEPI, 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, including the planned initiation and conduct of clinical trials and the availability and timing of data from those trials, and our plans and expectations regarding partnerships. 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, 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 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 us or our collaborators, including alternatives that may be more efficacious or cost effective than any therapy or treatment that we and our collaborators hope to develop, issues involving product liability, issues involving patents and whether they or licenses to them will provide us 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 we

can finance or devote other significant resources that may be necessary to prosecute, protect or defend them, the level of corporate expenditures, assessments of our 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, 2017, our Quarterly Report on Form 10-Q for the quarter ended June 30, 2018 and other regulatory filings we make from time to time. There can be no assurance that any product candidate in our pipeline will be successfully developed, manufactured or commercialized, that final results of clinical trials 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. Forward-looking statements speak only as of the date of this release, and we undertake no obligation to update or revise these statements, except as may be required by law.

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