NEWS RELEASE

Inovio's SynCon® WT1 Cancer Antigen Breaks Tolerance, Highlights Potential for Universal Cancer Immunotherapy

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SynCon WT1 and PSMA antigens join hTERT in INO-5401, Inovio's cancer product planned for immuno-oncology combination study

PLYMOUTH MEETING, Pa., Feb. 27, 2017 (GLOBE NEWSWIRE) -- Inovio Pharmaceuticals, Inc. (NASDAQ:INO) today announced that its SynCon® WT1 cancer immunotherapy was capable of breaking immune tolerance and inducing neo-antigen-like T cell responses to cause tumor regression in pre-clinical studies. Breaking tolerance has been a major challenge for developing a potent cancer therapy; researchers have tried many other methods and been unsuccessful for decades. Notably, the WT1 antigen is over-expressed in multiple cancer types but not found in most normal tissue, giving it potential to be used as part of a universal cancer vaccine against multiple tumor types.

Results of these pre-clinical studies appear in the online edition of **Molecular Therapy** in a paper entitled, "A novel DNA vaccine platform enhances neo-antigen-like T-cell responses against WT1 to break tolerance and induce anti-tumor immunity," authored by Inovio and its collaborators at The Wistar Institute.

Study results revealed that while mice did not mount an immune response to native mouse WT1 antigens, mice immunized with Inovio's SynCon WT1 antigen broke tolerance and generated robust neo-antigen-like T cells. Furthermore, the immunized mice exhibited smaller tumors and prolonged survival in a tumor challenge study. SynCon WT1 DNA vaccination also broke tolerance and generated neo-antigen-like T cell immune responses in Rhesus monkeys, a species whose immune system closely resembles that of humans. Inovio's ability to overcome the immune system's usual tolerance of WT1 antigen suggests the potential of its SynCon WT1 antigen to tackle any WT1-expressing cancer in humans, which include pancreatic, brain, lung, thyroid, breast, testicular, ovarian, and melanoma.

Dr. J. Joseph Kim, Inovio's President and CEO, said, "Our SynCon antigens' ability to overcome the immune system's inability to recognize tumor self-antigens is unique and powerful. While we systematically and synthetically mimic the body's natural process of creating tumor neo-antigens, which possess differentiated but individualized genetic sequences that may then induce an immune response, our ability to break tolerance with broadly prevalent antigens makes our approach more universal across populations. We are pleased to again show such results with an important cancer antigen – in this case, WT1 – and continue to add to our array of

promising universal cancer antigens in Inovio's product development strategy.

"To expand on our capabilities and strategy, the power of our differentiated antigens dovetails with our ability to turn cancer tumors from cold to hot by creating a significant presence of antigen-specific CD8+ killer T cells in a target lesion or tumor microenvironment, which we have shown via biopsies in two human studies. These are critical outcomes: although checkpoint inhibitors have raised the bar for treating cancers by neutralizing cancer cells' inherent ability to switch off T cells that are hunting them, they do not actually generate the antigen-specific killer T cells required to destroy cancer cells. We believe our DNA-based SynCon immunotherapies are the missing link to take immuno-oncology to the next level."

"With these accomplishments we could not be more enthusiastic about two immuno-oncology combination human studies to start in the first half of 2017. MedImmune will combine INO-3112 (also named MEDI0457) with their checkpoint inhibitor molecule in an upcoming clinical study. Inovio is also planning to conduct a combination study for INO-5401 with a checkpoint inhibitor in cancer patients. We previously noted that INO-5401 will include our hTERT SynCon antigen. I am pleased to say that INO-5401 will also include our SynCon antigens for WT1 and PSMA. We believe this product has the potential to be a very powerful universal cancer immunotherapy in combination with different checkpoint inhibitors."

The National Cancer Institute previously highlighted WT1, hTERT and PSMA among a list of attractive cancer antigens, designating them as high priorities for cancer immunotherapy development. WT1 was at the top of the list. The hTERT antigen relates to 85% of cancers and WT1 and PSMA antigens are also widely prevalent in many cancers.

Inovio's synthetically designed antigens use a consensus of human and multiple animal genetic sequences for the same antigen to create a differentiated SynCon® antigen that can be more readily recognized as "foreign" by immune sentries in the patients. This recognition may help overcome the immune system's tolerance of tumor cells displaying the native or self-antigens generated by the body. Once a significant antigen-specific T cell response is activated, these T cells may then also seek throughout the body and destroy cancer cells expressing the pre-existing natural or native tumor antigens.

There are multiple lines of evidence pointing to the potential of INO-5401 in immuno-oncology. Inovio previously reported preclinical data indicating the ability of its PSMA and hTERT tumor-associated SynCon antigens to generate significant antigen-specific killer T cell responses. Inovio is also running an ongoing phase I study of its SynCon hTERT antigen (INO-1400) to assess safety and immunogenicity in over fifty patients with at least one of nine different hTERT-expressing cancers. Our SynCon PSMA antigen is one of two components (along with SynCon PSA) making up INO-5150, which is currently in a phase I study of sixty biochemical-relapse prostate cancer patients. Interim immune responses and safety data from both INO-1400 and INO-5150 studies will be presented at cancer conferences in 2017.

Importantly, Inovio has already reported human data characterizing the activation of significant antigen-specific CD8+ killer T cells in patients and their infiltration into lesions and tumors displaying target antigens. These studies of HPV-related precancer (VGX-3100) and cancer (INO-3112) showed a significant presence of activated T cells based on pre and post immunization biopsies. In a

controlled phase 2b study for VGX-3100, Inovio also showed statistically significant efficacy in regressing HPV-related cervical dysplasia.

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, Plumbline Life Sciences, ApolloBio Corporation, 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 the cancer immunotherapy INO-5401, 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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