Inovio Pharmaceuticals Zika Vaccine Protects Animals from Infection, Brain Damage and Death

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PLYMOUTH MEETING, Pa. – November 10, 2016 – **Inovio Pharmaceuticals, {NASDAQ: INO}** today announced that Inovio and its collaborators have published results in Nature Partner Journals (npj) Vaccines demonstrating that its Zika DNA vaccine (GLS-5700) protected animals from infection, brain damage and death.

In this study 100% of GLS-5700 vaccinated animals were protected from Zika infection after exposure to the virus. In addition, vaccinated mice were protected from degeneration in the cerebral cortex and hippocampal areas of the brain while unvaccinated mice showed significant degeneration of the brain after Zika infection.

Prior preclinical studies have tested potential Zika vaccine candidates in animal models involving normal mice and non-human primates that are naturally resistant to Zika. While providing useful immunology data, they cannot provide relevant evidence of an effective means of controlling the spread or medical impacts of this disease by vaccination. In addition to reporting immunogenicity in such Zika-resistant species, this paper represents the first published research to also analyze a Zika vaccine using the special transgenic murine strain A129 lacking interferon alpha and beta receptors (IFNAR-/-), making them highly susceptible to Zika infection and disease.

Taking this extra step provided data on how vaccine-generated immune responses could protect against a lethal viral challenge and demonstrates the benefit a Zika vaccine might provide in people.

Dr. J. Joseph Kim, President and CEO of Inovio, said, "*We clearly demonstrated the power and speed of our product development platform when we and our collaborators moved our Zika vaccine from the bench to human clinical studies in less than six months, a vaccine industry record. We're pleased to now build further evidence of the potential utility of our product*."

"*Our results support the critical importance of immune responses for both preventing infection as well as ameliorating disease caused by the Zika virus*" said lead researcher **David B. Weiner, Ph.D., Executive Vice President and Director of the Vaccine Center at The Wistar Institute** and the W.W. Smith Charitable Trust Professor in Cancer Research at Wistar. Dr. Weiner is also a member of Inovio's board of directors and chairs its scientific advisory board. "*As the*

threat of Zika continues, these results further encourage the study of this vaccine as a preventative approach for protecting humans."

This study demonstrated that Inovio's synthetic DNA vaccine expressed antigens specific to Zika and generated robust antigen-specific and neutralizing antibody and T cell responses in mouse and non-human primate models. Moreover, the study also demonstrated that GLS-5700 provided protection against the disease and death in Zika-susceptible A129 transgenic mice while also being neuroprotective, meaning the disease was unable to spread to the brain. This is especially important given the risk that babies born with the disease have of developing microcephaly, a birth defect resulting in an abnormally small head and that may prevent the brain from developing properly.

This Zika vaccine was developed in a collaboration between Inovio Pharmaceuticals, Inc., The Wistar Institute, and GeneOne Life Science Inc. and is currently in two human clinical studies. Inovio expects to report phase I data before the end of this year from the first 40-subject study being conducted in Miami, Philadelphia and Quebec City.

In August, the companies initiated a second study of GLS-5700 in 160 subjects in Puerto Rico. The CDC estimates that Zika will infect more than 25 percent of the Puerto Rican population by the end of the year, providing the potential for this study's placebo control design to provide exploratory signals of vaccine efficacy in 2017.

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, Drexel University, NIH, HIV Vaccines Trial Network, National Cancer Institute, U.S. Military HIV Research Program, and Laval University.

For more information, visit the coroporate website www.inovio.com

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