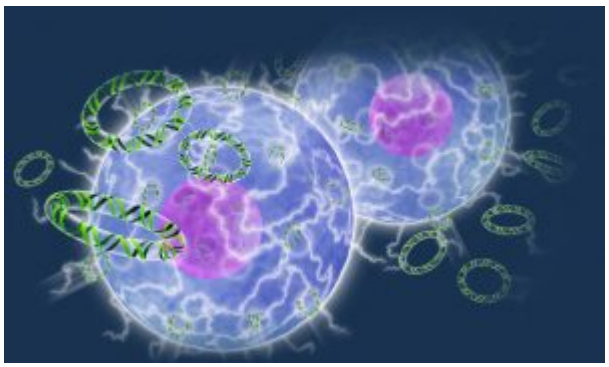
Inovio’s DNA-Encoded Monoclonal Antibody (dMAb™) moves ahead with positive data, patents and grants

Inovio Pharmaceuticals, Inc. (NASDAQ:INO)

Announced that it has received the first two U.S. patents for its DNA-encoded **monoclonal antibody technology** (dMAb™) from the U.S. Patent & Trademark Office and has been awarded a $2.2 million grant from the Bill & Melinda Gates Foundation to advance its dMAb platform and new clinical delivery devices.



Inovio’s DNA-Encoded Monoclonal Antibody (dMAb™) Platform

Moves Ahead with Positive Data, Patents and Grants

Two new U.S. Patents for Inovio's dMAb technology were issued

Inovio awarded new $2.2 million Gates Foundation grant to support dMAb development and next-generation dMAb delivery clinical device

PLYMOUTH MEETING, Pa., October 17, 2018 – **Inovio Pharmaceuticals, Inc. (NASDAQ:INO)** announced today that it has received the first two U.S. patents for its DNA-encoded monoclonal antibody technology (dMAb™) from the U.S. Patent & Trademark Office and has been awarded a $2.2 million grant from the Bill & Melinda Gates Foundation to advance its dMAb platform and new clinical delivery devices.

This U.S. patent protection of Inovio's dMAb intellectual property will provide exclusivity for the use of this innovative technology. Additional support for Inovio's dMAb platform has come from the Bill & Melinda Gates Foundation which has invested $2.2 million to advance Inovio's dMAb platform and to support the development of next-generation clinical DNA delivery devices. Inovio's dMAbs have high applicability for rapidly responding to emerging global viral threats and addressing critical vaccine limitations.

Inovio will employ the Gates Foundation grant to design and test its dMAb constructs targeting priority pathogens in preclinical studies. This funding will also help further develop Inovio's innovative DNA delivery technology to enhance both dMAb expression and the ease of use in the clinic and low resource settings.

Traditional monoclonal antibodies account for more than $50 billion in pharmaceutical sales each year and Inovio's dMAb products may improve upon this class using its synthetic design and in patient production. When delivered directly into the body, the genetic instructions provided by the DNA plasmid may enable the patient's own cells to become the factory which manufactures the therapeutic antibody products or dMAbs.

Laurent Humeau, Ph.D., Inovio's Senior Vice President – R&D, said, *"We thank the Gates Foundation for their investment in Inovio's innovative technology and their understanding of the role Inovio can play in protecting and improving global health. We continue to see positive preclinical data as well as growing support and funding from partners and collaborators on our dMAb platform. We plan on advancing the first clinical dMAb candidate into the first-in-human study in the coming months and expect to attract additional partnerships to further advance dMAb products targeting cancers and infectious diseases."*

While monoclonal antibody therapies have revolutionised medicine, they are expensive and cumbersome to produce taking them out of reach for most developing world areas. Inovio's dMAbs may address critical vaccine limitations because they can be rapidly designed and scaled up in response to an outbreak and are stable at room temperature – offering potential advantages over traditional vaccines which require cold-chain storage and shipping. Inovio's dMAbs may also provide rapid protection, unlike traditional vaccines that take days to begin offering viral protection and they may eliminate the need for viral culture, facilitating easy dMAb protective combinations, and negating the need for annual vaccine antigen specificity matching – while also decreasing cost and production restrictions associated with traditional

protein monoclonal antibodies (mAbs) as a preventative for infectious diseases.

Inovio has been moving its cancer and infectious disease dMAb franchise forward with several key milestones. Inovio recently announced the successful animal testing of its dMAbs targeting the immune checkpoint molecule CTLA-4, as reported in the prestigious journal Cancer Research. The breakthrough preclinical study demonstrated that highly optimised dMAbs targeting mouse CTLA-4 protein can be robustly expressed in vivo, and shrank tumors in mice. More importantly, Inovio's dMAb constructs for anti-human CTLA-4 antibodies ipilimumab (YERVOY®) and tremelimumab, achieved high expression levels in mice (approximately 85µg/ml and 58µg/ml, respectively). These dMAbs exhibited long-term expression with maintenance of serum levels >15µg/ml for over a year.

A recent article in the journal Cancer Immunology, Immunotherapy detailed how the dMAb construct against prostate specific membrane antigen (PSMA) produced monoclonal antibodies that shrank prostate tumors in a preclinical animal model. This study was significant because it was the first to report on the use of Inovio dMAb technology to develop novel monoclonal antibody-based therapies against cancer targets. Inovio has previously published several papers demonstrating its dMAb product candidate's ability to treat multiple virus targets such as flu, dengue, chikungunya, and HIV.

About Inovio's DNA-based Monoclonal Antibody Platform

Traditional monoclonal antibodies are manufactured outside the body in bioreactors, typically requiring costly large-scale manufacturing facility development and laborious production.

Inovio’s disruptive dMAb technology has the potential to overcome these limitations by virtue of their simplified design, rapidity of development, product stability, ease of manufacturing and deployability, and cost effectiveness, thereby providing potential new avenues for treating a range of diseases. Another significant advancement seen in Inovio dMAb technologies is that the optimised genes for a desired monoclonal antibody is encoded in a DNA plasmid, which is produced using very cost effective and highly scalable fermentation techniques. These plasmids are delivered directly into cells of the body using electroporation and the encoded monoclonal antibody is then directly produced by these cells. Previously published studies show that a single administration of a highly optimised DNA-based monoclonal antibody targeting HIV virus produced a high level of expression of the antibody in the bloodstream of mice; Inovio similarly reported data showing that dMAb products against flu, Ebola, chikungunya and dengue protected animals against lethal challenge. Inovio Ebola dMAb™ product is being developed under a grant from the Defense Advanced Research Projects Agency (DARPA).

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 Bill & Melinda Gates Foundation, The Wistar Institute, University of Pennsylvania, Parker Institute for Cancer Immunotherapy, CEPI, 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, please visit www.inovio.com

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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.