

Inovio Receives Authorization from the U.S. FDA To Begin Phase 1/2 Clinical Trial for INO-3107, a DNA Medicine To Treat a Rare Disease -- Recurrent Respiratory Papillomatosis (RRP)

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- RRP is a rare, potentially fatal orphan disease caused by Human Papillomavirus (HPV) 6 and 11
- Inovio's DNA medicine pipeline includes 15 clinical programs focused on HPV-associated diseases, cancer, and infectious diseases, including the novel coronavirus (2019-nCoV)

PLYMOUTH MEETING, Pa., Feb. 10, 2020 /PRNewswire/ -- Inovio Pharmaceuticals, Inc. (NASDAQ: INO) today announced the U.S. Food and Drug Administration (FDA) has accepted its Investigational New Drug (IND) application to evaluate its DNA medicine INO-3107 in a Phase 1/2 trial for treatment of Recurrent Respiratory Papillomatosis or RRP. RRP is a rare disease caused by the human papillomavirus (HPV) types 6 and 11 infections, a condition that causes noncancerous tumor growths leading to life-threatening airway obstructions, and occasionally can progress to cancer. Currently, the disease is incurable and is mostly treated by surgery, which temporarily restores the airway. The tumor almost always recurs and the surgery must be repeated, often multiple times a year. RRP can severely impact the quality of life for those living with the disease.

The open-label, multicenter Phase 1/2 trial will enroll approximately 63 subjects in the U.S. and will evaluate the efficacy, safety, tolerability, and immunogenicity of INO-3107 in subjects with HPV 6 and/or 11-associated RRP who have required at least two surgical interventions per year for the past three years for the removal of associated papilloma(s). For this study, adult subjects will first undergo surgical removal of their papilloma(s) and then receive four doses of INO-3107, one every three weeks. The primary efficacy endpoint will be a doubling or more in the time between surgical interventions following the first dose of INO-3107 relative to the frequency prior to study therapy. Upon obtaining sufficient safety and potential efficacy data in adults, Inovio plans to expand the trial to include pediatric patients as well as a potential booster regimen.

"Inovio's investigational DNA medicine INO-3107 is designed to destroy and clear tumors caused by HPV 6 and 11

infections from the body exactly where they are hiding," said Jeffrey Skolnik, M.D., Inovio's Vice President of Clinical Development. "We believe this DNA medicine has the potential to provide people living with RRP a long-term, if not life-long, improvement in their disease, especially as an alternative to often successive and debilitating surgeries that may temporarily remove HPV growths from the airways but do not address the underlying recurring virus."

J. Joseph Kim, Ph.D., Inovio's President and Chief Executive Officer, said "Our mission at Inovio is to rapidly provide patients with urgent health needs access to our novel DNA medicines. We are pleased the FDA has authorized our INO-3107 clinical trial, and look forward to working closely with the RRP patient and medical community to drive recruitment as quickly as possible."

In addition to initiating this efficacy trial, Inovio also plans to attain Orphan Disease designation with the FDA's Office of Orphan Products Development (OOPD). The FDA grants orphan status to drugs and biologic products that are intended for the safe and effective treatment, diagnosis, or prevention of rare diseases or disorders that affect fewer than 200,000 people in the United States. OOPD provides a drug developer with certain benefits and incentives, including a period of marketing exclusivity if regulatory approval is ultimately received for the designated indication.

Inovio recently published data from its pilot clinical study of INO-3106 (DNA medicine candidate targeting HPV6 caused RRP) in the scientific journal *Vaccines* (MDPI). Study results demonstrated that INO-3106 generated immunogenicity and engagement and expansion of an HPV 6-specific cellular response, including cytotoxic T cells. The paper also showed that Inovio's immunotherapy allowed two out of two patients who previously required approximately two surgeries per year for several years to manage this disease to delay the need for surgery to a robust degree; with one patient able to delay surgery for over a year and a half (584 days surgery-free) and a second that remained surgery-free for over two and a half years (over 915 days surgery-free).

About Inovio's DNA Medicines

Inovio has 15 DNA medicine clinical programs currently in development focused on HPV-associated diseases, cancer, and infectious diseases, including the novel coronavirus (2019-nCoV) under a grant from the Coalition for Epidemic Preparedness Innovations (CEPI). DNA medicines are medicines composed of optimized DNA plasmids, which are small circles of double-stranded DNA that are synthesized or reorganized by a computer sequencing technology and designed to produce a specific immune response in the body.

Inovio's DNA medicines deliver optimized plasmids directly into cells intramuscularly or intradermally using Inovio's proprietary hand-held smart device called CELLECTRA®. CELLECTRA uses a brief electrical pulse to open small pores in the cell reversibly to allow the plasmids to enter. Once inside the cell, the plasmids begin replicating, thereby strengthening the body's own natural response mechanisms. Administration with the CELLECTRA device

ensures that the DNA medicine is delivered directly into the body's cells, where it can go to work immediately mounting an immune response. Inovio's DNA medicines are not interfering with or changing in any way an individual's own DNA, which is the case with gene therapy or gene editing.

With more than 2,000 patients receiving Inovio investigational DNA medicines in more than 6,000 applications across a range of clinical trials, Inovio's DNA medicines have consistently activated safe, robust, and fully functional T cell and antibody responses against targeted pathogens and cancers.

About RRP

Recurrent respiratory papillomatosis (RRP) is a rare disease (estimated at 15,000 active cases in the U.S.) that is characterized by the growth of tumors in the respiratory tract caused by the human papillomavirus. Although benign, papillomas can cause severe, even life-threatening airway obstruction and respiratory complications. A distinguishing aspect of this disease is the tendency for the papilloma to recur after surgical procedures to remove them. Left untreated, if RRP develops in the lungs, affected individuals can potentially experience recurrent pneumonia, chronic lung disease (bronchiectasis) and, ultimately, progressive pulmonary failure. In extremely rare cases (less than 1%), papillomas can become cancerous (malignant transformation) developing into squamous cell carcinoma. Additional symptoms of RRP can include hoarse voice, difficulty in sleeping and swallowing, and chronic coughing. RRP symptoms are usually more severe in children than in adults. In children, the disorder is most often diagnosed at or around the age of four years. In adults, the disorder occurs most often in the third or fourth decade.

About Inovio Pharmaceuticals, Inc.

Inovio is a biotechnology company focused on rapidly bringing to market precisely designed DNA medicines to treat, cure, and protect people from diseases associated with HPV, cancer, and infectious diseases. Inovio is the first and only company to have clinically demonstrated that a DNA medicine can be delivered directly into cells in the body via a proprietary smart device to safely produce a robust immune response to destroy and clear high-risk HPV 16 and 18, which are responsible for 70% of cervical cancer, 90% of anal cancer and 69% of vulvar cancer. In addition to HPV, Inovio's optimized plasmid design and delivery technology have been demonstrated to consistently activate robust and fully functional T cell and antibody responses against targeted cancers and pathogens. Inovio's most advanced clinical program, VGX-3100, is in Phase 3 development for the treatment of HPV-related cervical pre-cancer. Also in development are Phase 2 immuno-oncology programs targeting HPV-related cancers and GBM, as well as externally funded vaccine development programs in Zika, MERS, Lassa, HIV, and the novel coronavirus (2019-nCoV). Partners and collaborators include ApolloBio Corporation, AstraZeneca, The Bill & Melinda Gates Foundation, Coalition for Epidemic Preparedness Innovations (CEPI), Defense Advanced Research Projects Agency, GeneOne Life Science, HIV Vaccines Trial Network, Medical CBRN Defense Consortium

(MCDC), National Cancer Institute, National Institutes of Health, National Institute of Allergy and Infectious Diseases, Regeneron, Roche/Genentech, University of Pennsylvania, Walter Reed Army Institute of Research, and The Wistar Institute. For more information, visit www.inovio.com.

This press release contains certain forward-looking statements relating to our business, including our plans to develop DNA medicines, our expectations regarding our research and development programs, as well as commercialization activities, including the planned initiation and conduct of clinical trials, the availability and timing of data from those trials and our commercialization strategy and tactics. 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, product development programs and commercialization activities and outcomes, 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, 2018, our Quarterly Report on Form 10-Q for the quarter ended September 30, 2019, and other filings we make from time to time with the Securities and Exchange Commission. 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 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.

CONTACTS:

Investors:

Ben Matone, Inovio, 484-362-0076, ben.matone@inovio.com

Media:

Jeff Richardson, Inovio, 267-440-4211, jrichardson@inovio.com

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