NEWS RELEASE

Inovio and Plumbline Life Sciences Establish Animal Health Collaboration to Develop A Novel Vaccine Against Deadly African Swine Fever Virus

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PLYMOUTH MEETING, Pa. and SEOUL, South Korea, May 15, 2019 /PRNewswire/ -- Inovio Pharmaceuticals Inc. (NASDAQ: INO) and Plumbline Life Sciences (XKRX: 222670) today announced a collaboration to co-develop a novel animal health vaccine for African swine fever (ASF) virus. The vaccine will be developed using Inovio's SynCon® technology and delivered using CELLECTRA® efficacy-enabling devices. Plumbline, based in South Korea, will fund all development and commercialization of the ASF vaccine. Inovio and Plumbline already have a license partnership in animal health fields and Inovio currently holds an approximately 15% equity ownership in Plumbline. As part of this agreement, Inovio will construct and test the ASF vaccine in small animal models. Plumbline will further test the vaccine in larger animal models, including in pig challenge models and further develop to commercialize the vaccine. Financial arrangements were not disclosed.

African swine fever (ASF) is a highly contagious haemorrhagic viral disease of domestic and wild pigs, which is responsible for serious economic and production losses. There is no approved vaccine for ASF currently and the current outbreak in Asia is dramatically threatening the agricultural economies of many Asian countries including China, Vietnam and Korea. The disease is incurable in pigs but innocuous to humans.

Dr. Laurent Humeau, Inovio's Chief Scientific Officer, said "We are extremely pleased to apply Inovio's Synthetic Nucleics platform to develop a vaccine to combat this deadly pig virus. Inovio has a track record of developing novel emerging infectious disease vaccines and we are pleased to work with Plumbline to further test and commercialize an ASF vaccine."

Anthony K. Kim, President and CEO of Plumbline said, "Plumbline is very excited to collaborate with Inovio to advance a new vaccine for this horrible threat for animal health and agriculatural food supplies. Plumbline has a proven track record of commercializing DNA-based therapies for animal health as we have the distinction of having our product for pigs, LifeTide®SW5, already approved in Australia, New Zealand and South Korea. We will devote our full resources to commercialize a vaccine for ASF as rapidly as possible."

The current official estimates count 1 million pigs have already been culled in China but the slaughter data suggest 100 times more

could be removed from China's 440 million-strong swine herd in 2019. The U.S. Department of Agriculture forecast in April a decline in China of 134 million head — equivalent to the entire annual output of American pigs — and the worst slump since the department began counting China's pigs in the mid 1970s.

ASF virus, indigenous to Africa, infects only domestic and wild pigs and a species of soft ticks that transmits the disease. The disease emerged in Africa decades ago and have been detected among domestic and wild pigs in Europe. In 2007, the viral disease appeared in the Republic of Georgia and spread through the Caucasus region, and then it eventually reached China in August 2018 and then Mongolia in January and Vietnam in February this year. Japan detected their first case of infectious ASF in late March. The strain of African swine fever spreading in Asia is highly lethal, killing virtually every pig it infects by a hemorrhagic illness reminiscent of Ebola in humans even though it not known to sicken people.

About Plumbline Life Sciences, Inc.

Plumbline Life Sciences, Inc., an animal biopharmaceutical company, focuses on companion animals. It develops deoxyribonucleic acid (DNA)-based vaccines and therapies for animals using plasmid-based DNA delivery and expression technology by electroporation to optimize an animal's natural biological and immunological potential. The company's solutions include growth hormone releasing hormone (GHRH), a naturally occurring molecule; and an electroporation technology for delivering plasmids into skeletal muscle cells and skin. It offers products for dog cancer/anemia, equine laminitis, cat renal failure/anemia, dog renal failure/anemia, and swine GHRH. Plumbline Life Sciences, Inc. is based in Seoul, South Korea.

About Inovio Pharmaceuticals, Inc.

Inovio is an innovative biotechnology company focused on the discovery, development, and commercialization of its synthetic nucleic technology targeted against cancers and infectious diseases. Inovio's proprietary technology platform applies antigen sequencing and 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'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 HPV-related cancers, bladder cancer, and glioblastoma, as well as platform development programs in hepatitis B, Zika, Ebola, MERS, and HIV. Partners and collaborators include AstraZeneca, Regeneron, Roche/Genentech, ApolloBio Corporation, GeneOne Life Science, The Bill & Melinda Gates Foundation, Coalition for Epidemic Preparedness Innovations, Parker Institute for Cancer Immunotherapy, Defense Advanced Research Projects Agency, National Institutes of Health, National Institute of Allergy and Infectious Diseases, National Cancer Institute, HIV Vaccines Trial Network, Walter Reed Army Institute of Research, The Wistar Institute, and the University of Pennsylvania. 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-based immunotherapies, 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. 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, 2018, our Quarterly Report on Form 10-Q for the quarter ended March 31, 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.

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