Vivaldi Biosciences' DeltaFLU Pandemic Influenza Vaccine
Shows Superior Antibody Response in Clinical Trial

– Results Published in the Journal *Vaccine* –

FORT COLLINS, Colorado and VIENNA, Austria – June 19, 2019 -- Vivaldi Biosciences, a clinical-stage biotechnology company developing advanced vaccines for seasonal and pandemic influenza, today announced the publication of Phase 1 clinical trial results for its DeltaFLU vaccine for protection against influenza H5N1, a strain with pandemic potential. The data published in the journal *Vaccine* show that Vivaldi's DeltaFLU H5N1 vaccine induced a superior antibody response with a single intranasal dose.

The Phase 1 clinical trial demonstrated that 75% of the study volunteers achieved seroconversion (a 4-fold or greater increase in serum hemagglutination inhibition assay [HAI] H5N1 antibody levels) after one intranasal dose of the DeltaFLU H5N1 vaccine. After two doses of DeltaFLU, 92% of the volunteers achieved a 4-fold or greater increase in HAI antibody levels.

The results of the Phase 1 study of DeltaFLU H5N1 compare favorably with manufacturers' data for the two influenza H5N1 vaccines licensed by the US Food & Drug Administration (FDA). The licensed vaccines are administered by intramuscular injection in a two-dose regimen. In reported clinical studies of the licensed vaccines, neither vaccine achieved 75% seroconversion with the first dose.

Vivaldi's high-efficiency, high-yield Vero cell production system can make DeltaFLU vaccines available for distribution within 7 weeks of the declaration of an influenza pandemic. The vast majority of vaccines for seasonal and pandemic influenza are produced in chicken eggs. Traditional egg-based production takes up to 6 months, and may induce antigenic changes that reduce vaccine efficacy. The emergence of an avian influenza strain with pandemic potential could jeopardize egg-based production.

DeltaFLU H5N1 Phase 1 Clinical Trial Summary

The Phase 1 clinical trial was a double-blind, placebo-controlled study in healthy adult volunteers age 18 to 50 years who were seronegative for influenza H5N1 (antibody titers <1:10 in an HAI assay). The volunteers were randomly assigned at a 2:1 ratio to receive two intranasal immunizations of a monovalent DeltaFLU H5N1 candidate vaccine against the influenza H5N1 strain A/Vietnam/1203/04 at one of two dose levels (6.8 or 7.5 $\log_{10}$ $TCID_{50}$) or a placebo. The vaccine was safe and well tolerated at both dose levels. The DeltaFLU H5N1 vaccine induced significant vaccine-specific antibody titers, measured by both HAI and microneutralization assay (MNA), even at the lower dose. After a single administration of the 7.5 $\log_{10}$ dose, 75% of study participants achieved seroconversion, and 92% achieved seroconversion after a second administration. At the lower dose of 6.8 $\log_{10}$, 50% of study volunteers achieved a 4-fold increase in neutralizing antibodies. After a second immunization at the lower dose, 83% of study volunteers achieved this 4-fold increase. Vaccine-specific local IgA responses were observed among individuals that showed serum antibody responses. DeltaFLU vaccine strains are replication-deficient, do not produce viral progeny, and are not shed by the recipient. The study confirmed the lack of shedding; no vaccine virus was recovered from any volunteer at any time point

post-immunization. (Nicolodi, C., *et al.* Safety and immunogenicity of a replication-deficient H5N1 influenza virus lacking NS1. *Vaccine* 2019;37:3722-29.)

About Pandemic Influenza

Pandemic influenza is a relentless global public health threat. A pandemic occurs when an influenza virus undergoes genetic changes resulting in a strain to which humans have little or no immunity and is directly transmissible from human to human. Three influenza pandemics in the 20th century caused over 50 million deaths in total. The 2009 H1N1 influenza pandemic led to over a quarter of a million deaths worldwide. A highly pathogenic avian influenza H5N1 strain (A/Vietnam/1203/04) commonly known as avian influenza or "bird flu" began spreading from poultry to humans in 1997. Outbreaks occur sporadically in populations associated with direct contact with infected birds, though this virus has not been shown to spread efficiently from human to human. A new strain with pandemic potential, influenza H7N9, was first reported to cause disease in humans in 2013. Most human cases have occurred through exposure to infected poultry or a contaminated environment. The risk of a pandemic will be significant if either of these strains acquires the ability for direct human-to-human transmission. Vivaldi is developing DeltaFLU vaccines for protection against influenza H5N1 and H7N9. Vivaldi also has a broadly protective DeltaFLU vaccine for seasonal influenza in Phase 2 development that shows promise as a universal influenza vaccine.

About Vivaldi Biosciences

Vivaldi Biosciences is developing DeltaFLU influenza vaccines for intranasal administration, to provide broad protection and superior efficacy in the prophylaxis of seasonal and pandemic influenza. DeltaFLU vaccines are composed of influenza vaccine strains genetically modified by deletion of the gene for nonstructural protein 1 (NS1). The NS1 protein blocks interferon, a key component of the immune system's response to viral infection. Lacking NS1, DeltaFLU vaccines rapidly induce interferon and broadly neutralizing mucosal antibodies in the nasal passages, creating a first line of defense directly at the point of entry of circulating viruses. The self-adjuvanting effect of interferon also creates a second line of defense by stimulating the immune system's T cells and antibody-producing B cells to achieve a broadly protective systemic immune response. DeltaFLU strains are replication-deficient and are not shed by the recipient, providing significant safety advantages. A recent nonclinical study showed that a single dose of DeltaFLU provides protection against distantly drifted influenza strains, and even provides protection against an antigenically shifted influenza strain. Vivaldi Biosciences CSO Thomas Muster, PhD led the initial development of DeltaFLU vaccines at AVIR Green Hills Biotechnology (GHB). Vivaldi Biosciences acquired the DeltaFLU vaccine technology previously owned by GHB. Vivaldi Biosciences is based at the Research Innovation Center at Colorado State University and in Vienna, Austria. NGN Capital LLC is the lead investor in Vivaldi Biosciences. Additional information can be found at www.vivaldibiosciences.com.

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Forward-Looking Statements

This release contains forward-looking statements relating to Vivaldi Biosciences, which are not historical facts and are forward-looking statements within the meaning of the Private Securities Litigation Reform Act of 1995. All statements included in this communication concerning activities, events or developments that we expect, believe or anticipate will or may occur in the future are forward-looking statements. Our actual results, performance or achievements may differ materially from those expressed or implied by these forward-looking statements. Forward-looking statements are based on current expectations and projections about future events and involve known and unknown risks, uncertainties and other factors, including, but not limited to, the following: the uncertainty of clinical success and of obtaining regulatory approvals, the difficulty of predicting FDA approvals, acceptance and demand for new vaccines and other pharmaceutical products, product efficacy or safety concerns resulting in product recalls or regulatory action, the impact of competitive products and pricing, new product development and launch, reliance on key strategic alliances, availability of raw materials, availability of additional intellectual property rights, availability of future financing sources, the ability to obtain future funding and to obtain such funding on commercially reasonable terms, the regulatory environment and other risks the Company may identify from time to time in the future. These factors are not necessarily all of the important factors that could cause our actual results, performance or achievements to differ materially from those expressed in or implied by any of our forward-looking statements. These forward-looking statements speak only as of the date of this communication and we undertake no obligation to update or revise any forward-looking statement, whether as a result of new information, future events and developments or otherwise, except as required by law. If we update one or more forward-looking statements, no inference should be drawn that we will make additional updates with respect to those or other forward-looking statements. This press release should not constitute an offer to sell or a solicitation of an offer to buy securities.