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Data Reveals Plant-Made Flu Vaccine Demonstrates Ability to Elicit Strong T-Cell Immune Response

Montreal, Canada – November 12, 2014— Caprion announced today that its immune monitoring business unit, ImmuneCarta[®], jointly published data with Medicago Inc. on the immune response induced by a Virus-like particles (VLPs) vaccine, targeted at the H5 and H1 influenza (flu) viruses. In two independent Phase I/II clinical trials, the immune response of CD4+ and CD8+ T cells was characterized in subjects that were vaccinated with placebo, commercially available trivalent inactivated vaccine (TVI: Fluzone[™]), or VLP vaccine. By measuring the immune response *ex vivo* utilizing multiparametric flow cytometry in cryopreserved PMBC (peripheral blood mononucleated cells) of 141 patients, it was determined that plant-made HA (hemagglutinin) VLP vaccines elicited a greater poly-functional, cross-reactive CD4+ T-cell response than Fluzone or placebo vaccines.

Flu vaccines traditionally provide some protection against the flu by activating a humoral or antibody response involving B-cells in the immune system. However, in pursuit of improving flu vaccines further, there is growing interest in the role of T-cells. The VLP vaccine, developed by Medicago, was made in *Nicotina enthamiana*, a close relative of the tobacco plant. Data appeared in the recent issue of *Clinical Immunology*, entitled “Influenza virus-like particle vaccines made in *Nicotiana enthamiana* elicit durable, poly-functional and cross-reactive T cell responses to influenza HA antigens”. The full article is available on PubMed at www.ncbi.nlm.nih.gov/pubmed/25128897.

Poly-functional T-cells fight flu more effectively because they release different types of cytokines (proteins that fight pathogens and contribute to the development and organization of an adequate immune response). Vaccine-induced T-cell responses were also shown to be cross-reactive to other subtypes of hemagglutinin, enabling effective control of influenza infection by different viral subtypes. Cross-reactive T-cells fight pathogens more effectively because they are activated by a broader range of pathogens. In addition to inducing this strong T-cell immune response, the VLP vaccine also induced a humoral immune response seen in present-day flu vaccines.

While additional studies need to be conducted *in vivo* to determine the full potential impact of the elicited T-cell response, the activation of both T and B cell responses by VLP vaccines will likely offer superior protection from flu.

Nathalie Landry, Vice President of Product Development at Medicago said, “We are delighted to see continued success and efficacy for Medicago’s VLP vaccines. Plant-based VLP vaccines show great promise to improve the present day egg-derived vaccines. The recent work done in collaboration with Caprion’s ImmuneCarta team contributes to that demonstration.”

Martin LeBlanc, CEO of Caprion, stated, “We are pleased to support Medicago in the advancement of its VLP vaccine programs.” Mr. LeBlanc continued, “Our collaboration with Medicago is a great example of how Caprion’s ImmuneCarta provides a unique expertise for the monitoring of cell-mediated immunity in a clinical setting, to support the vaccine development programs of our biopharmaceutical partners across various infectious diseases.”

About Caprion

Caprion is the leading provider of proteomics and immune monitoring services to the pharmaceutical and biotechnology industry. Its immune monitoring business unit, ImmuneCarta[®], offers proprietary multiparametric flow cytometry for functional analyses of innate and adaptive immune responses. Caprion’s proteomics business unit, ProteoCarta[™], offers proprietary gel-free, label-free mass spectrometry (MS) for comprehensive, quantitative and robust comparative measurement of proteins across large sets of biological samples for the discovery and validation of protein biomarkers. Caprion also leverages ProteoCarta to develop its own in-vitro diagnostic products targeting cancer, metabolic and infectious diseases. With research sites in Montreal, Canada and in Menlo Park, CA, Caprion has been providing large-scale proteomics and immune monitoring services to over 50 major pharmaceutical and biotech clients for more than 10 years. Caprion, a privately-held company, is majority owned by Chicago Growth Partners. For more information, please visit www.caprion.com.

About Medicago

Medicago is a clinical-stage private biopharmaceutical company developing novel vaccines and therapeutic proteins to address a broad range of infectious diseases worldwide. The Company is committed to providing highly effective and competitive vaccines and therapeutic proteins based on its proprietary Virus-Like Particles (VLPs) and manufacturing technologies. Medicago is a worldwide leader in the development of VLP vaccines using a transient expression system which produces recombinant vaccine antigens in plants. This technology has potential to offer more potent vaccines with speed and cost advantages over competitive technologies, enabling the development of a vaccine for testing in approximately one month after the identification and reception of genetic sequences from a pandemic strain. This production time frame has the potential to allow vaccination of the population before the first wave of a pandemic, and supply large volumes of vaccine antigens to the world market. Medicago also intends to expand development into other areas such as biosimilars and biodefense products where the benefits of our technologies can make a significant difference. For more information, please visit www.medicago.com.