Promising results in mice on needle-free candidate universal vaccine against various flu viruses

December 8 2011

Scientists from the International Vaccine Institute (IVI) have discovered that an antigen common to most influenza viruses, and commonly referred to as matrix protein 2 (M2), when administered under the tongue could protect mice against experimental infection caused by various influenza viruses, including the highly pathogenic avian H5 virus and the pandemic H1 ("swine flu") virus.

Importantly, this experimental sublingual vaccine was found to induce immunity in the lungs whereas the same vaccine administered by injection failed to do so and conferred only limited protection against experimental infection. The study, spearheaded by IVI scientist Dr. Man-ki Song and Dr. Haryoung Poo from the Korea Research Institute of Bioscience and Biotechnology (KRIBB), was reported in the November 30th issue of the journal PLoS ONE.

Current seasonal influenza vaccines are designed to induce immunity against hemagglutinin (HA), a major component of influenza virus. Because HA undergoes frequent mutations, these vaccines have to be reformulated and manufactured every year to incorporate newly emerging influenza virus strains selected by the World Health Organization.

Due to the recent emergence of highly pathogenic influenza virus strains and the threat of a human flu pandemic, health authorities and vaccine

producers are under increasing pressure to manufacture and deliver a sufficient number of vaccine doses in a short time, amid a limited global production capacity.

The influenza virus M2 has already been considered as a rational target antigen for development of a universal flu vaccine because this protein is highly conserved among the different types of influenza viruses. However, attempts to develop M2-based vaccines administered by injection have been unsuccessful.

"Sublingual vaccination with M2 induced immune responses in the lungs of mice whereas the same vaccine administered by injection failed to do so. This is probably why earlier attempts involving injection of M2-based vaccines failed to protect against influenza infection and disease," said Dr. Man-ki Song, IVI scientist and lead author of the study. "This vaccination approach offers an additional strategy to prevent influenza infection and may be used to control potential influenza pandemics."

Plans to test this vaccination approach in humans are being considered. "This study suggests that aside from being a more convenient way to immunize people, sublingual vaccination induces special immune responses in the respiratory tract which are important in protection but more difficult to generate with traditional injectable vaccines. Clearly, if these promising findings obtained in laboratory animals can be reproduced in humans, they will represent a major milestone in the IVI R&D agenda." said Dr. Cecil Czerkinsky, IVI Deputy Director-General for Laboratory Sciences.

Provided by International Vaccine Institute

Citation: Promising results in mice on needle-free candidate universal vaccine against various flu