MedicalXpress

New vaccine against deadliest strain of avian flu tested by scientists

January 30 2008

A vaccine against the most common and deadliest strain of avian flu, H5N1, has been engineered and tested by researchers at the University of Pittsburgh's Center for Vaccine Research and Novavax Inc.

According to a study published by the Public Library of Science in the Jan. 30 issue of PLoS ONE, the vaccine produced a strong immune response in mice and protected them from death following infection with the H5N1 virus. The vaccine is being tested in humans in an early-phase clinical trial.

Recent outbreaks of avian flu around the world have prompted health officials to warn of its continued threat to global health and potential to trigger a flu pandemic. "While worldwide avian flu control efforts have been mostly successful, avian flu, like seasonal influenza, mutates year to year, creating new subtypes and strains that could easily and quickly spread among humans," said Ted M. Ross, Ph.D., lead author of the study and assistant professor, Center for Vaccine Research, University of Pittsburgh. "To stem the spread of a potential pandemic, we need stockpiles of vaccines available that can be readily adapted to enhance the immune system's response to new strains."

A future flu pandemic is inevitable because of the virus's ability to continually reinvent itself and the lack of broad immunity in humans, according to Dr. Ross. Influenza pandemics have occurred three times throughout modern history with deadly consequences. The first, the Spanish Flu of 1918, caused more deaths than World War I.

Unlike other avian flu vaccines, which are partially developed from live viruses, the vaccine uses a virus-like particle, or VLP, that is recognized by the immune system as a real virus but lacks genetic information to reproduce, making it a potentially safer alternative for a human vaccine. Given the evolving nature of H5N1, the vaccine was engineered to encode genes for three influenza viral proteins to offer enhanced protection against possible new strains of the virus.

To test the vaccine, researchers administered it to mice in one-dose and two-dose regimens. Mice immunized twice with the vaccine developed protective antibodies against H5N1 and were protected from disease and death when directly exposed to the virus. The researchers also compared modes of vaccine administration by delivering the vaccine to the muscle or the nose. Both methods of vaccine administration were equally effective. However, mice injected with the vaccine through the muscle developed more antibodies in the blood, while mice that received the nasal administration had more antibodies in their lungs.

“VLPs may be advantageous over other vaccine strategies because they are easy to develop, produce and manufacture,” said Dr. Ross. “Using recombinant technologies, within ten weeks, we could generate a vaccine most effective towards the current circulating strain of virus, making it a cost-effective counter-measure to the threat of an avian influenza pandemic.”

Source: University of Pittsburgh Schools of the Health Sciences