New vaccine strategy might offer protection against pandemic influenza strains

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A novel vaccine strategy using virus-like particles (VLPs) could provide stronger and longer-lasting influenza vaccines with a significantly shorter development and production time than current ones, allowing public health authorities to react more quickly in the event of a potential pandemic.

Ted Ross, Ph.D., an assistant professor at the University of Pittsburgh's Center for Vaccine Research, will present his laboratory's latest data on the efficacy of VLP vaccines for potential pandemic strains, such as H5N1 and 1918 influenza, today at the 109th General Meeting of the American Society for Microbiology in Philadelphia.

"Virus-like particles look just like a live virus, but they are hollow shells without a genome inside and they cannot reproduce," Ross explained. "Because they look like the virus, they evoke a more robust immune response against the real thing."

Ross and his colleagues have already made VLP vaccines that have been tested in early clinical trials and appear to provide complete protection against both the H5N1 avian influenza virus and the 1918 Spanish influenza virus.

"There is a debate in the influenza community about priming the human population for potential pandemic strains such as H5N1 or 1918," Ross said. "Some researchers advocate adding these strains to the annual flu vaccine. They might not match the next pandemic flu strain exactly, but

could provide some of protection."

Others contend that it might be premature, as well as costly, to vaccinate people against a virus that may never emerge, he said.

The current injectable vaccine for seasonal influenza is a trivalent, inactivated vaccine. It consists of three different influenza strains that are grown in eggs and then inactivated, or killed, by chemicals that break them into tiny pieces. Because they no longer look like the circulating virus, conventionally made vaccines strains do not elicit as strong an immune response as VLP vaccines. Because it is made with live, attenuated virus, the inhaled, mist-based vaccine can elicit a strong immune response but can also increase the risk of side effects.

VLPs can be quickly and easily produced in several ways, including growing them in cell cultures or in plants. Also, if the genes in the disease virus are identified, then researchers can generate particles for a vaccine without an actual sample of the agent.

"The sequence for the recent H1N1 'swine flu' virus was online and available to scientists long before physical samples could be delivered," Dr. Ross noted. "It would have been possible to produce VLPs in quantity in as little as 12 weeks while conventional vaccines require physical samples of the virus and production can take approximately nine months."

One VLP-based vaccine already is on the market, namely the human papilloma virus (HPV) vaccine.

Source: American Society for Microbiology