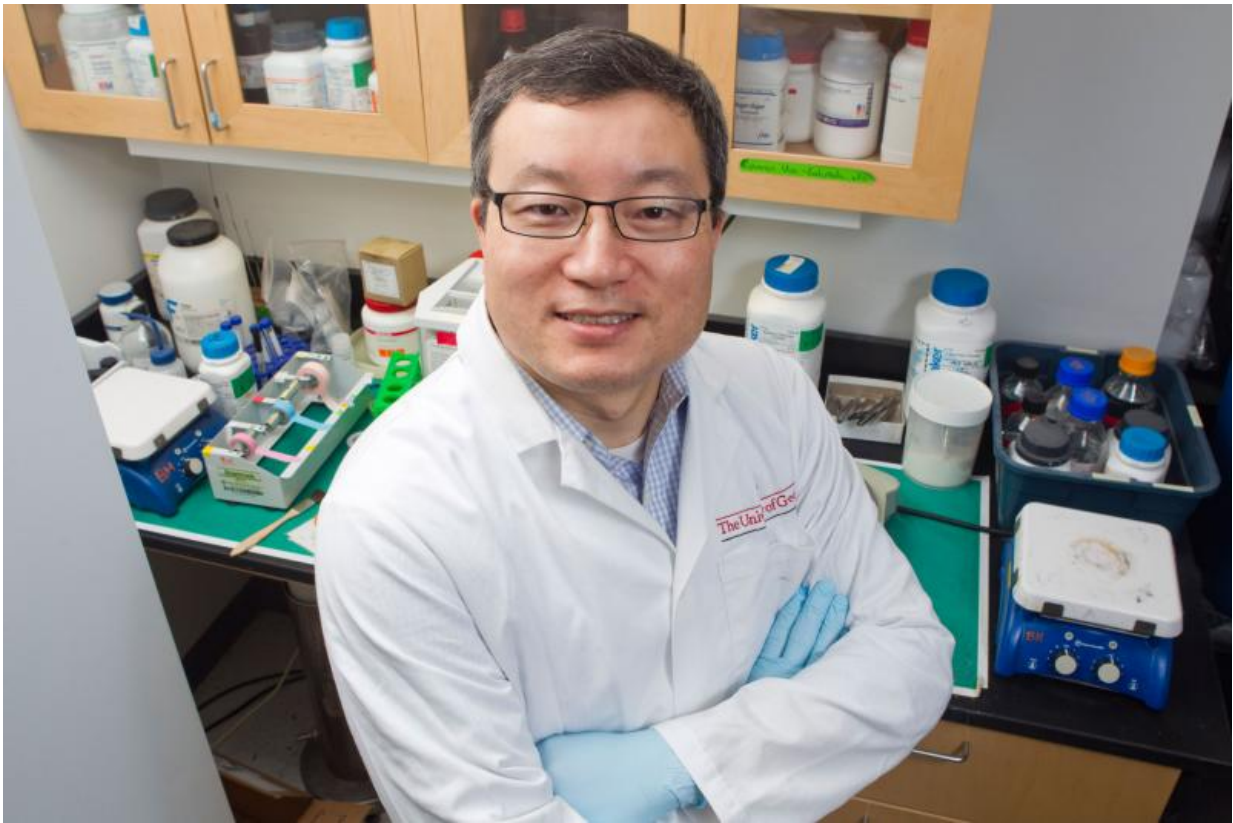


Researcher develops bird flu vaccine using virus commonly found in dogs

May 6 2015, by James Hataway



Biao He

Researchers at the University of Georgia have used a virus commonly found in dogs as the foundation for a new vaccine against H7N9 influenza, more commonly known as bird flu.

H7N9 is one of several influenza virus strains that circulate in bird populations, and the first human cases were reported in China in March 2013, according to the World Health Organization. The H7N9 [virus strain](#) is particularly concerning, however, because most patients rapidly develop severe pneumonia that sometimes requires intensive care and mechanical ventilation.

"The mortality rate for this virus is over 30 percent, so there is an urgent need to develop a good vaccine," said study co-author Biao He, the Fred C. Davison Distinguished University Chair in Veterinary Medicine in UGA's College of Veterinary Medicine. "We have developed a vaccine that protected both mice and guinea pigs against a lethal H7N9 challenge, and we think it may be a very strong candidate for human vaccine tests."

He and his collaborators, in the study detailed in the journal *PLOS ONE*, used another virus called [parainfluenza virus 5](#), or PIV5, as a kind of delivery vehicle for their H7N9 vaccine. Although harmless in humans, PIV5 is thought to contribute to [upper respiratory infections](#) in dogs.

Small segments of H7N9 genes are placed inside PIV5, which is then used to immunize animals. While destroying the harmless PIV5 carrier, the immune system learns to recognize and destroy H7N9 before it can cause severe illness.

"All of the vaccinated mice were protected against the H7N9 virus," He said. "But our experiments also revealed an unexpected result: The vaccinated animals did not produce a detectable level of antibodies."

Researchers commonly measure titers of antibody in a blood sample. The immune system uses antibodies to attack and remove foreign threats, so a high titer generally suggests that the vaccine is effective.

"The [antibody titer](#) is the gold standard in [vaccine development](#) for influenza viruses, but our research brings that standard into question for H7N9 [bird flu](#)," He said.

The immune system has another way of fighting off foreign invaders that does not involve antibodies, He said. Cell-mediated immunity is a process that activates phagocytes and T-cells and other cells, all of which are able to destroy harmful viruses and bacteria.

"This suggests that our test subjects were protected through cell mediated immunity and the antibody titer may not be as reliable an indicator of immunity as we originally thought," He said.

"It would be like using a student's SAT test scores to determine if she is a good musician or sculptor," He said. "Yes, the SAT tells us a lot about a student's general abilities and academic potential, but it doesn't show the whole picture."

He and his colleagues plan to continue investigating their H7N9 vaccine in other animal models, but he hopes that their most recent discovery may lead other researchers to re-examine vaccines that did not produce a high antibody titer.

"There may be a lot of perfectly good vaccines out there for a variety of diseases that were simply shelved because they did not perform well on the antibody titer test," He said.

More information: "Efficacy of a Parainfluenza Virus 5 (PIV5)-Based H7N9 Vaccine in Mice and Guinea Pigs: Antibody Titer towards HA Was Not a Good Indicator for Protection." *PLoS ONE* 10(3): e0120355. [DOI: 10.1371/journal.pone.0120355](https://doi.org/10.1371/journal.pone.0120355)

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