# Researchers isolate antibody that blocks bird flu

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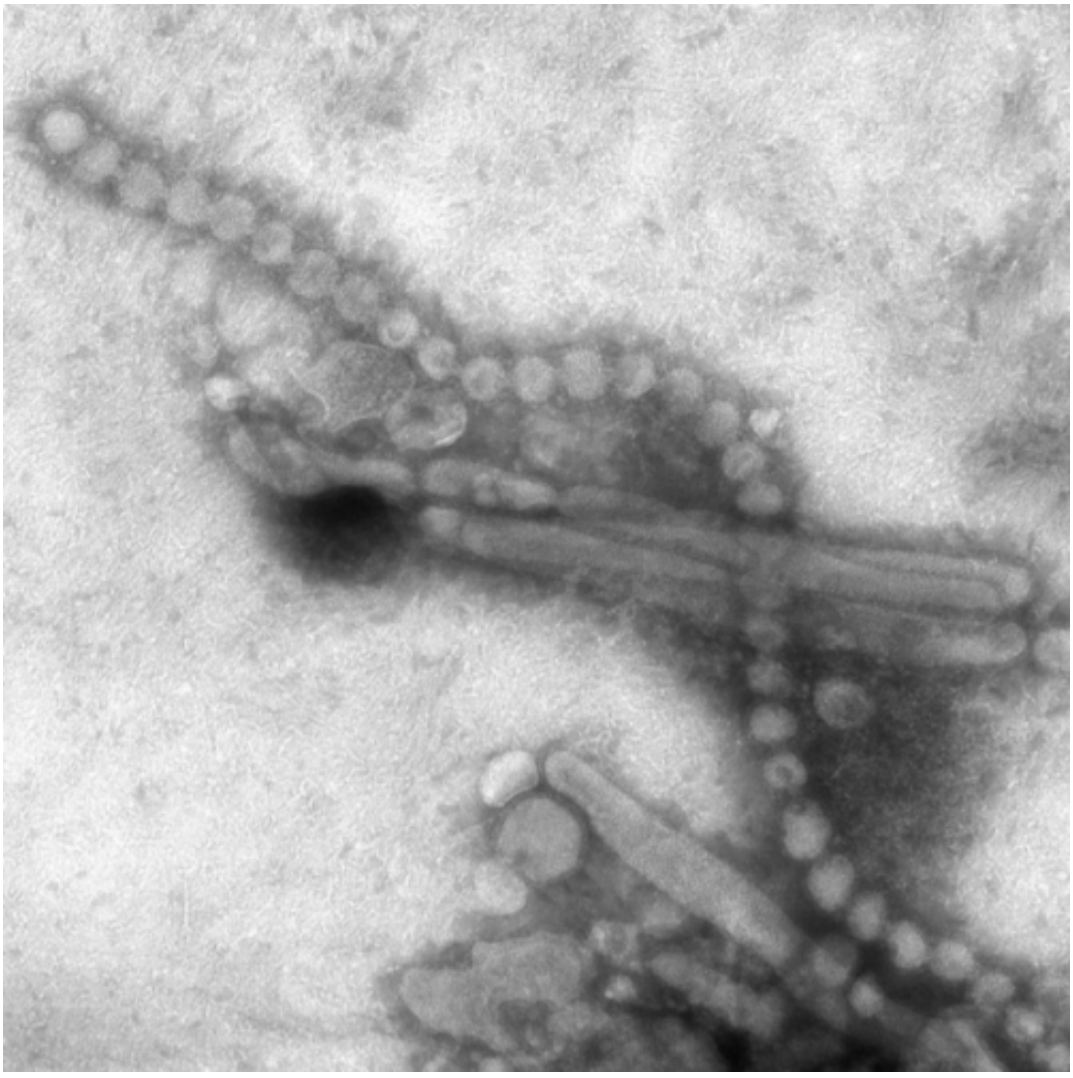

Influenza A (H7N9) as viewed through an electron microscope. Both filaments and spheres are observed in this photo. Credit: CDC

Despite efforts to contain it, bird flu remains a serious menace to public health.

That's why scientists at Vanderbilt University Medical Center are redoubling their efforts to help people fight off the virus if they become infected. Their focus is H7N9, one of the most dangerous of the influenza viruses that have been transmitted from birds to humans.

In the journal *Cell Host & Microbe*, James Crowe Jr., MD, and colleagues report that human monoclonal antibodies, isolated from two survivors of H7N9 infections and produced in bulk in the laboratory, protected mice from an otherwise lethal viral challenge.

"The point of this paper is that antibodies humans make are sufficient to protect or treat H7N9 flu," said Crowe, who directs the Vanderbilt Vaccine Center.

"The implications are twofold," he said. "The antibodies described could be used to prevent or treat disease in humans. And the work suggests that optimized vaccines that induce this type of antibody would protect against disease."

Carried by wild birds, the H7N9 virus can infect humans when it crosses over to domestic poultry. The first known outbreak occurred in China in 2013. By the end of that year, 144 cases had been reported and 46—more than 30%—of the infected individuals had died.

"This is definitely one of the most lethal influenza viruses we have seen so far," a World Health Organization official told reporters at the time.

If the virus mutates slightly and becomes capable of being transmitted from person to person, a worldwide pandemic could occur, Crowe said.

Crowe holds the Ann Scott Carell Chair in the Departments of Pediatrics and Pathology, Microbiology and Immunology at Vanderbilt University School of Medicine.

His lab has developed high-efficiency methods that can quickly isolate antibody-producing white blood cells from survivor blood samples and then fuse them to fast-growing myeloma (cancer) cells. In this way the researchers can produce large quantities of "monoclonal" antibodies that target specific viruses.

He and his colleagues have isolated human monoclonal antibodies for many pathogenic viruses including Zika, HIV, dengue, Ebola, norovirus, respiratory syncytial virus (RSV) and rotavirus. They have pioneered the rational design of neutralizing antibody treatments and vaccines, some of which have progressed to clinical trials.

The H7N9 study was conducted with colleagues from the Department of Integrative Structural and Computational Biology and Skaggs Institute for Chemical Biology at The Scripps Research Institute in La Jolla, California, and the University of California, San Diego.

**More information:** Iuliia M. Gilchuk et al. Influenza H7N9 Virus Neuraminidase-Specific Human Monoclonal Antibodies Inhibit Viral Egress and Protect from Lethal Influenza Infection in Mice, *Cell Host & Microbe* (2019). DOI: 10.1016/j.chom.2019.10.003

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