Bird flu can transmit in mammals, study finds

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In a long-awaited study that helped prompt a contentious debate over the wisdom of conducting research that has the potential to help as well as harm, scientists reported Wednesday that they had engineered a mutant strain of bird flu that can spread easily between ferrets - a laboratory animal that responds to flu viruses much as people do.

That means that bird flu has "the potential to acquire the ability to transmit in mammals," said University of Wisconsin virologist Yoshihiro Kawaoka, who led the study.

Only a few mutations were necessary for the transformation, he added, which suggests that a more contagious strain of bird flu could emerge on its own without targeted prodding by scientists in the lab.

Kawaoka's discovery, published online after a months-long delay by the journal Nature, dampens hopes that the deadly H5N1 virus simply wasn't capable of becoming a highly contagious bug in mammals, including humans.

He and his team developed a hybrid bird flu virus that combined an H5 hemagglutinin gene - which helps viruses bind to host cells - with genes from 2009's pandemic H1N1 flu, also known as swine flu.

Using a sort of selective breeding to favor flu strains whose H5 protein could bind with human rather than bird host cells, the researchers developed a version of the virus with four mutations in its H5 that

sickened ferrets.

The pathogen traveled in respiratory droplets through the air to infect ferrets in adjacent cages. It did not kill any of the animals used in the study.

Richard Webby, a virologist at St. Jude Children's Research Hospital in Memphis, Tenn., said that the changes in the virus Kawaoka's team identified had all been seen before, but that scientists had not recognized that together they could make a flu virus spread more easily among mammals.

"It's a great place to start looking for exactly what's going on," he said, noting that researchers still don't understand how changes in host organisms affect transmissibility.

The publication of Kawaoka's paper comes after months of debate over his research and experiments conducted in the lab of Dutch virologist Ron Fouchier, who has also developed strains of bird flu that can pass between ferrets.

The worry, voiced by biosecurity experts, was that nefarious-minded people could use details provided in the papers to turn bird flu into a biological weapon of sorts and inflict widespread harm.

In the last 15 years or so, the H5N1 virus has killed millions of chickens and ducks. Very few people - 602, according to the latest World Health Organization estimate - have been infected since the latest outbreak in 2003, but 355 of them died. That has fueled concerns that a contagious strain of the virus could spawn a pandemic, potentially causing millions of deaths around the world.

Fear that a pandemic strain could emerge in nature prompted scientists

to study its potential to mutate, so that they could monitor new variants as they arise and get a head start on developing a vaccine and treatment. The National Institutes of Health helped fund Kawaoka's and Fouchier's studies in high-security labs.

When the scientists were ready to publish their results, critics said the research could be used as a recipe for bioterrorism - assuming a dangerous strain of the virus wasn't stolen directly from a laboratory.

A U.S. government advisory panel recommended in November that Nature as well as Science, the journal that planned to publish Fouchier's research, remove sensitive details from the papers. It was an unprecedented step.

The journals agreed to delay publication and virologists put their H5N1 research on hold while the scientific and security communities debated their next steps. Ultimately, the advisory panel decided the papers were safe to publish, but the release of Kawaoka's research - and the expected publication shortly of Fouchier's - won't mark the end of the conversation, scientists said.

"There are still a lot of unknowns about how this will be dealt with going forward," Webby said.

In the meantime, Kawaoka said he hopes his research will help public health workers trying to fight the spread of H5N1 by suggesting useful mutations to incorporate in vaccines or to track as the virus spreads.

One of the mutations his team identified is already circulating in viruses in the Middle East and Asia, he said.