Study fingers chickens, quail, in spread of H7N9 influenza virus

March 18 2014

Among the copious species of poultry in China, quail and chickens are the likely sources of infection of H7N9 influenza virus to humans, according to a paper published ahead of print in the *Journal of Virology*.

"Knowing the likely poultry species lets us target our interventions better to prevent human infections," says corresponding author David Suarez, of the United States Department of Agriculture.

The H7N9 avian influenza virus was first reported in humans in March 2013 in China. Since then over 375 human cases have been confirmed and over 100 have died. Only 1 case has been reported outside of China: A woman from Guangdong Province who was traveling in Malaysia and is presumed to have contracted the virus in China. According to the World Health Organization, most known human infections have resulted from direct or indirect contact with poultry.

Suarez' laboratory originally became concerned about H7N9 after sequences from several isolates were made available in public databases, early in the outbreak. "We quickly recognized that the virus from this outbreak was unusual, and represented a real human and veterinary risk," he says. Most of the genes had come from a poultry virus that had existed in china for many years, and two genes probably came from a wild bird isolate, he says.

"We felt a major knowledge gap in the outbreak was that we didn't know which poultry species was maintaining the virus and exposing people,"

says Suarez. "With this information, better decisions can be made to control and hopefully eradicate the virus."

In the study, Suarez and his collaborators first infected seven species of poultry with a human isolate of the Chinese H7N9 virus. The virus replicated well in quail and chickens, and the former quickly infected their cage-mates, says Suarez.

The virus replicated less well in other poultry species, and did not transmit efficiently. Pigeons were notably resistant to becoming infected. In additional experiments, quail transmitted virus efficiently, while pekin ducks and pigeons did not.

None of the poultry species became sick when infected with H7N9, making detection of the virus that much more difficult in the birds, says Suarez. "This work supports the need for better surveillance in animal species for avian influenza," says Suarez.

"The silent carriage also creates a conflict between poultry producers, who want to preserve their flocks, versus the public health goals of eradicating the virus," says Suarez.

"This work supports the field epidemiology studies that had identified live poultry markets as the likely source of the outbreak," says Suarez. "The Chinese correctly closed the live bird markets where they had human infections, and that reduced the number of cases for a while. However, their efforts did not eradicate the virus and it has returned for a second wave."

More information: The manuscript can be found online at jvi.asm.org/content/early/2014 … 689-13.full.pdf+html . The final version of the article is scheduled for the May 2014 issue of the *Journal of Virology*.