[Announcer] This podcast is presented by the Centers for Disease Control and Prevention. CDC – safer, healthier people.

[Dan Rutz] I'm your host, Dan Rutz, and today I'm with Dr. Nina Marano, Chief of the Geographic Medicine and Health Promotion Branch in the Division of Global Migration and Quarantine at CDC. Nina also serves as a guest editor for Emerging Infectious Diseases and just completed the third annual issue focusing on zoonoses, that is, diseases that spread from animals to humans.

Nina, this December 2006 issue is full of stories about emerging zoonoses around the world, including an article on bats and SARS. Now that really sounds interesting – remind us - what made the outbreak of Severe Acute Respiratory Syndrome, or SARS, so remarkable in the first place?

[Nina Marano] Thanks Dan. SARS was the 21st century's first worldwide emerging disease outbreak. It started in November 2002 and was brought under control in July 2003, after it had spread to 33 countries on 5 continents and had resulted in more than 8,000 human infections and 700 deaths. The outbreaks were caused by a newly discovered virus that was named SARS coronavirus.

Investigations of these outbreaks led researchers to conclude that the coronviruses originally came from animals. And their conclusion was based on the observations that laboratory tests showed that the SARS coronavirus was a new virus with no relatedness to human coronaviruses and that the virus had not previously spread in humans. Studies that these researchers did found that animal traders were infected more frequently than other people and that the viruses identified in animals being sold for human food in the animal markets were similar to SARS coronaviruses that were identified in humans.

[Dan Rutz] Okay. So, but how are bats connected to this story? I mean, no one that we are aware of would sell bats for human food, would they?

[Nina Marano] No. They normally wouldn't be selling bats. But they would be selling animals that might some way become connected with bats. I'll explain a little bit more.

During the SARS outbreaks, the investigations showed that the masked palm civet was the likely source of human infection. The masked palm civet is an animal that's sold in the live markets in Southeast Asia for human food; it's a mammal that lives in a tree, that looks like a cross between a cat and a raccoon. And these studies didn't show whether the civet was only a step in the transmission cycle or if they were actually the natural host of the SARS coronavirus.

Recently, this presence of SARS coronaviruses in different species of horseshoe bats has been reported. Bats with high levels of antibodies to SARS coronaviruses were detected in different parts of China. Nearly 84% of the bats in the study had these antibodies. High levels of antibody and wide distribution of positive bats are two clues to support the theory that bats could actually be the natural reservoir host of SARS.

[Dan Rutz] Okay, so that would require then that the bats somehow infected the civets. How do we think that happened? And how did the civets in turn infect the humans?

[Nina Marano] Well, that's quite a story. For a virus to get from bats to humans, several things have to happen. First the wildlife reservoir, or the bat, has to interact with an animal, the civet, and then the virus has to infect the civet. The virus from the civet has to infect a human, and then the virus has to adapt to humans so it can be transmitted easily from person to person – and this is what happened during the SARS outbreaks.

So how are the viruses transmitted to the civets? Well, it is not fully understood. But the investigators suspected that transmission could have occurred in the markets or during trade, where bats could mix with civets in warehouses, transportation vehicles, and markets. The viruses were probably transmitted from the civets to the humans during the handling and the slaughter of the civets in the live animal markets.

[Dan Rutz] Well that is a fascinating story, Nina, but what's the take-home message here?

[Nina Marano] Dan, it is fascinating, but it's serious. New infectious agents continue to emerge with the opportunity for global health repercussions. This particular work has shed new light on the origin and transmission of SARS coronavirus. Continued research in the field and in laboratories should eventually identify the most important bat species that may act as reservoirs. The recent emergence of SARS coronavirus and other bat-associated viruses, such as henipaviruses, Menangle, Tioman, and lyssaviruses, shows that bats are a source of human infectious diseases.

[Dan Rutz] Thank you, Nina, for your comments.

This discussion with Dr Marano was prompted by the article "Review of Bats and SARS" by Lin-Fa Wang, Zhengli Shi, Shuyi Zhang, Hume Field, Peter Daszak, and Bryan T. Eaton. That article, as well as others on emerging microbial dangers to human and animal health, are available online from www.cdc.gov/eid

Comments on this interview may be sent to eideditor@cdc.gov. That's eideditor, one word, at cdc.gov

I'm Dan Rutz for Emerging Infectious Diseases.

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