

Close relatives of the novel coronavirus may have circulated in bats for decades before jumping to humans

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Close relatives of the virus behind COVID-19 likely circulated in bats for decades before the viruses made their jump into humans last year.

r, igniting the worst global pandemic in more than 100 years, according to a study released Tuesday.

The paper, co-authored by Todd Castoe, a UT-Arlington researcher, and published in the journal *Nature Microbiology*, also found no evidence that the [virus](#) was either manufactured in or accidentally released from a lab in Wuhan, China, as some have speculated.

"From the 1960s or the 1970s, these viruses were just circulating undetected in [bats](#), probably ready to infect humans at any point," said Maciej Boni, the paper's lead author and an expert on infectious disease at Pennsylvania State University. "We just got unlucky in 2019."

Scientists still don't know exactly how the novel coronavirus first spread to humans, but the new study suggests bats were the virus' primary reservoir.

Until now, researchers have speculated that the virus may have come from dogs, snakes, bats or pangolins, highly trafficked mammals that resemble armadillos. Some have suggested it was created in a Wuhan lab as a bioweapon or that it was released from a lab by accident.

"The paper does a nice job at narrowing down some of the still-to-be answered questions about where this virus came from," said Robert Garry of the Tulane University School of Medicine who was not involved in the study.

By comparing the SARS-CoV-2 virus to its cousins in bats, pangolins and other animals, scientists were able to show that it was about 96% similar to its closest known bat-virus relative. They then analyzed SARS-CoV-2u2032s [genetic material](#) to estimate when it may have diverged from that closest known relative.

"We know about how fast mutations accumulate in this virus," said Castoe, an expert on genetics at UTA. "And we can use that as a kind of molecular clock." The more mutations the virus has, the longer it has been evolving along its own branch of the family tree.

They found that the branch of the family tree that gave rise to SARS-CoV-2 broke from its closest known bat virus three or more decades ago. The study indicated that close relatives of SARS-CoV-2 may have emerged as early as the 1940s.

Castoe said it was probably a lack of opportunity that prevented the viruses from jumping into humans earlier. As global population increases and humans continue to move into areas that were once undeveloped, people and animals interact more frequently.

That early origin, said Castoe, makes it even less likely that the virus was synthesized in a lab.

And if it were a natural virus held in a lab for research and released by accident, one would expect several lab workers to have fallen ill, which hasn't happened, said Boni.

Castoe added that the recombinations he observed in the virus—bits of RNA that the virus exchanged with other viruses—are no different from what he sees in nature. "This paper shows that recombination happens all the time in nature," he said. "This is 100% par for the course."

The long-ago divergence from currently known bat viruses also points to the fact that there may be similar viruses to SARS-CoV-2 circulating in bats, waiting for their opportunity to infect humans.

Scientists have known for a long time that bats harbor a wide variety of diseases. SARS and MERS, two other coronavirus diseases that cause

pneumonia in humans, have been linked to bats, as has Ebola.

The study also suggests that, because viruses mutate and change constantly, it will be difficult to identify viruses with the potential to cause significant human outbreaks before they emerge from animals like bats. This underscores the need for real-time human disease surveillance systems that can rapidly identify new viruses.

This paper is yet another sign that humans and bats may need to socially distance. In many countries, people hunt bats and buy them live at markets. "Let's maybe cut back or not use bats for food," said Garry.

He also recommends boosting virus surveillance in bats so we can stay several steps ahead of the next coronavirus pandemic.

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