

New SARS-like coronavirus discovered in Chinese horseshoe bats

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Rhinolophus sinicus is the host of the newly discovered SL-CoV. Credit: Dr. Libiao Zhang, Guangdong Entomological Institute/South China Institute of Endangered Animals

EcoHealth Alliance, a nonprofit organization that focuses on local conservation and global health issues, announced the discovery of a new SARS-like coronavirus (CoV) in Chinese horseshoe bats.

Ten years after the SARS outbreak, EcoHealth Alliance scientists and an international group of collaborators have uncovered genome sequences of a new virus closely related to the SARS coronavirus that erupted in Asia in 2002 – 2003, which caused a global pandemic crisis. For the first time ever, the group was able to isolate the live SARS-like virus from bats allowing scientists to conduct detailed studies to create control measures to thwart outbreaks and provide opportunities for vaccine development. The research team involved scientists from China, Australia, Singapore, and the U.S. and the results were published today in the journal *Nature*.

"Our discovery that bats may directly infect humans has enormous implications for public health [control measures](#)," stated co-senior author

Peter Daszak, PhD, President of EcoHealth Alliance. Dr. Daszak is also principal investigator on a National Institutes of Health (NIH)/National Science Foundation (NSF) Ecology and Evolution of Infectious Diseases (EEID) grant, and leads EcoHealth Alliance's work on the USAID PREDICT project, both of which funded the current work. "Since 2003 there has been disagreement about the origin of the virus that directly evolved into human SARS-CoV, the causative agent of the first emerging pandemic threat of the 21st century. Even though our team reported that bats are natural reservoirs of SARS-like coronaviruses in 2005, we have been searching for this missing link for 10 years, and finally we've found it," said Dr. Zhengli Shi, Director of Emerging Infectious Diseases at the Wuhan Institute of Virology, Chinese Academy of Sciences and co-senior author on the paper.

The research team isolated and cultured a live virus that binds to the human SARS receptor ACE2 and can therefore be transmitted directly from bats to people. During the original outbreak of SARS in the wet markets of Guangdong province in China over 10 years ago, it was thought that bat [viruses](#) first infected civets, and then the virus evolved to infect people by this intermediate wildlife host. The current breakthrough suggests that SARS may have originated from one of these viruses, precluding civets from playing a part in the transmission process. "This paper hasn't resolved the provenance of SARS CoV; nonetheless, it does provide compelling evidence that an intermediate host was not necessary," commented W. Ian Lipkin, MD, John Snow Professor and Director, Center for Infection and Immunity of Columbia University.

"EcoHealth Alliance continues to work on predicting and preventing the next pandemic crisis. Our research uncovered a wide diversity of potentially pandemic viruses present, right now, in bats in China that could spillover into people and cause another SARS-like outbreak. Even worse, we don't

know how lethal these viruses would be if such an outbreak erupted," said Dr. Daszak. "The results point out the importance of continuing surveillance of viruses in bats, with the goals of identifying other viruses, including coronaviruses, that could cross species and potentially cause serious disease in humans or domesticated animals," conveyed Stanley Perlman, M.D., Ph.D. Professor in the Department of Microbiology University of Iowa.

"There are lessons here for the recent [outbreak](#) of Middle East Respiratory Syndrome coronavirus that likely originated in Saudi Arabian bats. We need to protect bat habitats from severe human-induced changes to the environment as well as create public health measures to reduce the risk of transmission," continued Daszak. It is not uncommon for bats to be used as a food source for many people in China and other parts of Asia so the risk is substantial. EcoHealth Alliance is working to help find alternative measures to decrease the hunting of bats for food and sport as well as monitoring the global wildlife trade. Bats are vitally important to the health of ecosystems providing seed dispersal and pollination services while also controlling insect populations and agricultural pests.

EcoHealth Alliance's contribution to the USAID-funded PREDICT program targets pathogen discovery in high-risk wildlife species in emerging disease global hotspots. This is a completely new approach for pandemic diseases – most of which originate in wildlife – in this case EcoHealth Alliance scientists are identifying the wildlife host and cataloging both known and previously unknown viruses before spillover events could infect people.

The results published in *Nature*, are based on genetic analyses of samples taken over the course of a year from members of a horseshoe bat colony in Kunming, China. At least seven different strains of SARS-like CoVs were found to be circulating within the single group of [bats](#). The findings highlight the importance of research programs targeting high-risk wildlife groups in emerging disease hotspots to predict, prepare for, and prevent pandemics.

PREDICT is part of USAID's Emerging Pandemic

Threats (EPT) program, designed to target surveillance of wildlife populations and identify potential pandemic viruses before they emerge. "This work validates our assumption that we should be searching for viruses of pandemic potential before they spillover to humans. That USAID has designed and implemented such an innovative approach through their EPT program is very forward thinking. We may finally begin to get ahead of the curve and prevent pandemics," said University of California, Davis, School of Veterinary Medicine, One Health Institute Director, Professor Jonna Mazet, Co-Director of PREDICT.

"The paradigm setting study provides the most compelling information to date that zoonotic coronaviruses, like SARS-CoV and perhaps the MERS-CoV, are preprogrammed to transmit directly between species. Clearly, SARS-CoV is not extinct, but rather, the virus is hiding out in animal reservoirs-poised to recolonize the human host at the first opportunity. The study further demonstrates the critical importance of continued surveillance and the development of [public health](#) preparedness platforms to control these important and deadly emerging human coronaviruses," said Ralph Baric, Professor, Department of Epidemiology, School of Public Health, University of North Carolina at Chapel Hill.

More information: Paper: [dx.doi.org/10.1038/nature12711](https://doi.org/10.1038/nature12711)

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