

Live virus implicates camels in MERS outbreak

April 29 2014



Dromedary camel, *Camelus dromedarius*. Credit: Jjron/Wikipedia

There is new, more definitive evidence implicating camels in the ongoing outbreak of Middle East Respiratory Syndrome, or MERS. Scientists at the Center for Infection and Immunity at Columbia University's Mailman School of Public Health, King Saud University, and EcoHealth Alliance extracted a complete, live, infectious sample of MERS coronavirus from two camels in Saudi Arabia. The sample matched MERS coronavirus (MERS-CoV) found in humans, indicating that the virus in camels is capable of infecting humans and that camels are a likely source of the outbreak.

Results appear online in the journal *mBio*.

The researchers examined nasal samples collected during a countrywide survey of dromedary [camels](#) and selected samples from two animals with the highest viral load. They cultured and obtained complete genomic sequence from both animals as well as virus in nasal samples from several other camels.

The mathematical means of all genetic sequences (the consensus genomic sequences) were consistent with viruses found in human cases; however, samples from camels contained more than one virus genotype. Over a period of 48 hours of culture in primate cells, the genomic variation of viruses narrowed, mirroring the lower sequence diversity reported in MERS-CoV found in humans.

"The finding of infectious virus strengthens the argument that dromedary camels are reservoirs for MERS-CoV," says first author Thomas Briese, PhD, associate director of the Center for Infection and Immunity and associate professor of Epidemiology at the Mailman School. "The narrow range of MERS viruses in humans and a very broad range in camels may explain in part the why human disease is uncommon: because only a few genotypes are capable of cross species transmission," adds Dr. Briese.

"Given these new data, we are now investigating potential routes for human infection through exposure to camel milk or meat products," says co-author Abdulaziz N. Alagaili, PhD, director of the Mammals Research Chair at King Saud University. "This report builds on work published earlier this year when our team found that three-quarters of camels in Saudi Arabia carry MERS virus."

To date, at least 300 people have been infected with the virus that causes MERS and approximately 100 have died since the first documented case

in Saudi Arabia in September 2012. Of these, more than 60—about one-fourth of the global total since MERS was identified—have been reported in the past month. Most cases have been in Saudi Arabia, with lower numbers in Jordan, Qatar, Tunisia, and the United Arab Emirates. France, Germany, Italy, and the United Kingdom, and more recently Malaysia and the Philippines, have also reported cases related to travel to the Middle East. While human-to-human transmission has occurred, the source of the disease in most cases has remained a mystery.

"Although there is no evidence that MERS-CoV is becoming more transmissible, the recent increase in reported cases is a cause for concern," says senior author W. Ian Lipkin, MD, director of the Center for Infection and Immunity and the John Snow Professor of Epidemiology at the Mailman School. "It is essential that investigators commit to data and sample sharing so that this potential threat to global health is addressed by the entire biomedical research community."

Provided by Columbia University's Mailman School of Public Health

Citation: Live virus implicates camels in MERS outbreak (2014, April 29) retrieved 26 April 2024 from <https://medicalxpress.com/news/2014-04-virus-implicates-camels-mers-outbreak.html>

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