

Scientists race to understand deadly new virus | Genes & Cells

SARS-like infection causes severe illness, but may not spread quickly

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WASHINGTON — A deadly new virus has scientists scrambling to learn more about it and figure out whether the virus will become a pandemic or remain a limited threat.

The virus has sickened 13 people and killed seven of them in the Middle East and England since last April. All but one of those infected were hospitalized with severe pneumonia and several also developed kidney failure.

“We have a new and virulent virus,” Gwen Stephens, of the Saudi Arabia Ministry of Health in Riyadh, told members of the American Society of Microbiology on February 27 during the annual Biodefense and Emerging Diseases Research Meeting. “We can only guess at its risks.”

Not yet named, the mysterious culprit is a coronavirus, a class that includes the virus that causes SARS, or severe acute respiratory syndrome. SARS spread like wildfire in 2002 and 2003, infecting some 8,100 people and killing nearly 800.

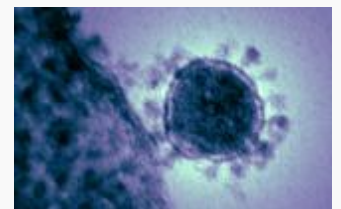
The new virus is most closely related to coronaviruses that bats carry, but it probably didn't jump directly from bats to people, Vincent Munster, of the National Institutes of Health's Virus Ecology Unit in Hamilton, Mont., said at the meeting. None of the people who got the disease had direct contact with bats, he said, and the virus is not exactly the same as any known to infect bats.

Much like SARS did, the new virus causes severe pneumonia. But that, Stephens said, is where the similarity between viruses ends.

While SARS passed easily from person to person through the air, the new virus doesn't seem to transmit that way. Family members and health care workers who have cared for people sick with the novel coronavirus have, with the exception of one family, not fallen ill, Stephens said. That suggests that people must come into direct contact with the virus, such as by touching something an infected person has coughed or sneezed on.

Still, scientists do not know how people catch the virus or how infectious it is. Also uncertain is whether the new virus could evolve into a SARS-like pandemic, or whether it will slip away as mysteriously as it appeared.

Meanwhile, Munster and his colleagues are conducting animal studies to learn how the virus produces illness and perhaps how to counter it. His group tried — and failed — to infect mice and ferrets, both common stand-ins for people in infectious disease studies. Rhesus macaques did get mildly to moderately ill when infected with the novel coronavirus. The monkeys lost their appetites, and developed fevers, goose bumps,



VIRAL CULPRIT

A new type of coronavirus, pictured in a false-color micrograph, has sickened 13 people, seven of whom have died. Scientists are scrambling to better understand how the virus works and how it's transmitted.

Credit: NIAID/NIH

rapid breathing, and hunched postures, Munster reported. The virus damaged the monkeys' lungs, but didn't show up in any other body tissues. The monkey study confirmed that the coronavirus that scientists had isolated really can cause disease.

To stop the virus, researchers first have to know how it damages the body. The monkey study begins to address that issue. After the monkeys were infected with the virus, activity of 173 genes changed, Munster's group found. Many of those genes are known to fight viruses, produce inflammation or direct cells toward chemical signals. By day six of the infection, the monkeys were already starting to clear the virus out of their bodies, and the activity of all but 37 genes had returned to normal, Munster reported.

His team is now using what they've learned from monkeys to focus on developing antiviral therapies and vaccines, he said.

The discoveries made thus far about the virus have occurred thanks to serendipity and public health sleuthing. Researchers first learned about the virus in September, when Saudi Arabia-based physician Ali Mohamed Zaki reported the first known case on an online public health forum called ProMed-mail. In the Nov. 8 *New England Journal of Medicine*, Zaki and colleagues described details of the case, a 60-year-old man from Saudi Arabia who got sick in June. They also presented details about the virus's genetic makeup and closest relatives.

Zaki's September forum post proved interesting reading for Alison Bermingham of the United Kingdom's Health Protection Agency, she said. In September, Bermingham and her colleagues were working to diagnose an unknown virus that caused pneumonia and kidney failure in a 49-year-old Qatari man who was being treated in a London hospital. After reading Zaki's report, Bermingham's group tested whether the man carried a coronavirus and found that he was infected with a virus nearly identical to the one Zaki had described. Scientists discovered later that the coronavirus had killed two people in Jordan in April.

Until this month, no one had been certain that the virus could spread from person to person, Bermingham said. Then, a 60-year-old U.K. resident who had traveled to Pakistan and Saudi Arabia got sick with the coronavirus and passed it to his son, who died. The case is the first known human-to-human transmission of the virus.

A young woman relative probably also caught the virus from the older man. She had a mild case that didn't require hospitalization, raising the possibility that other people may have contracted the new virus but mistook it for the flu or another common respiratory illness, Bermingham said. To find out how widely the new coronavirus has spread, researchers hope to screen blood from many people for antibodies that would indicate previous exposure to the virus.

Citations

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