New study finds promising results for MERS treatment

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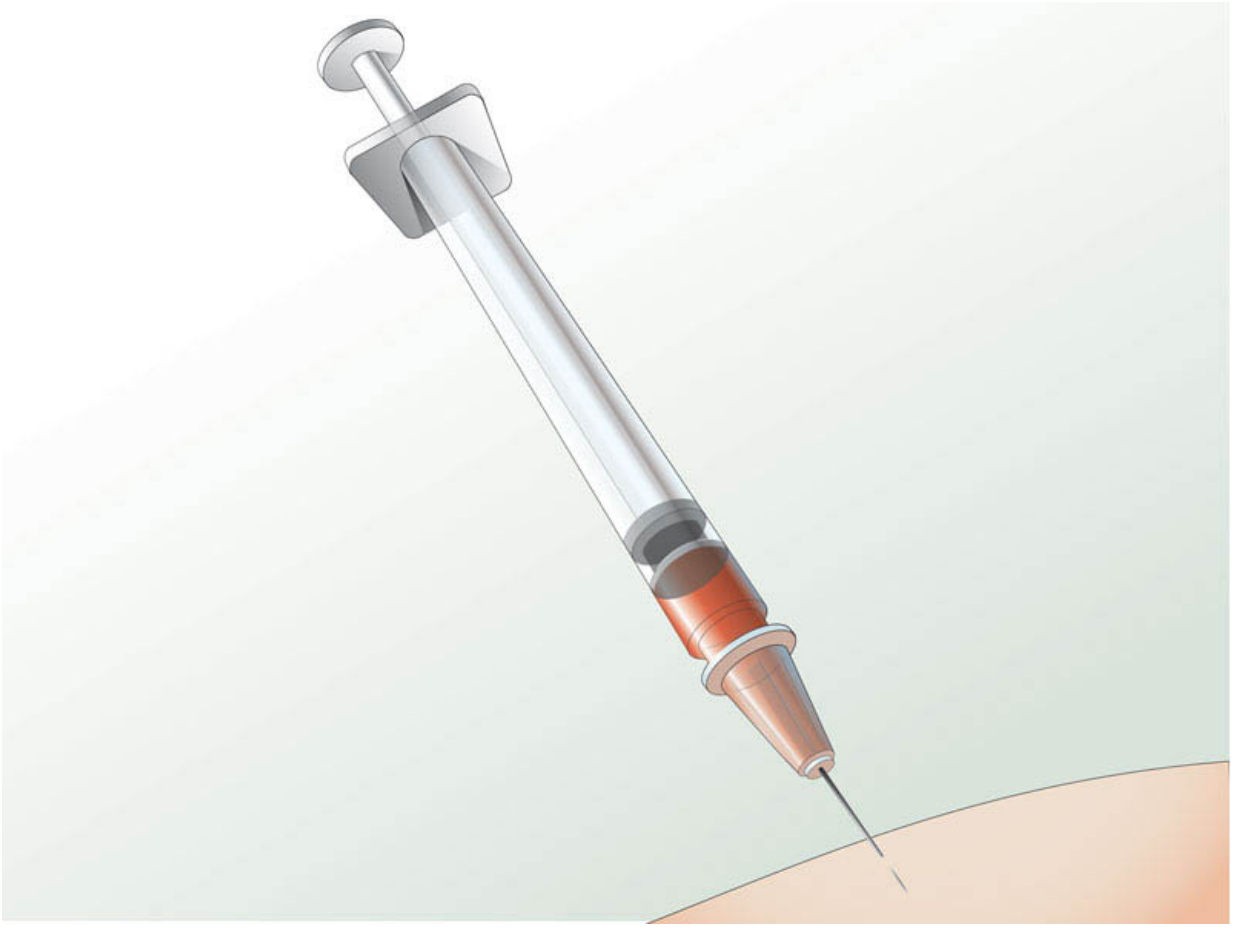

Researchers report that cows bioengineered to produce human antibodies against the Middle East respiratory syndrome (MERS) coronavirus may offer a potentially valuable platform for massproducing a MERS vaccine. Credit: V. Altounian / Science Translational Medicine (2016)

In a new study, University of Maryland School of Medicine researchers have had promising results with a new treatment for Middle East Respiratory Syndrome (MERS). The study, published today in the journal *Science Translational Medicine*, found a new treatment that protected mice from MERS infection.

The treatment - an antibody that blocks the MERS virus - was produced by cows that had been genetically modified to mimic certain aspects of the human immune system. These cows were given a new MERS vaccine that led to production of anti-MERS antibodies in large quantities. These antibodies were then purified to produce the therapeutic that was tested in the MERS-infected mice.

Last year, a South Korean epidemic of MERS killed more than 30 people. Overall, MERS has killed nearly 600 people since it was first discovered four years ago in Saudi Arabia. The South Korean outbreak, which began when a traveler returned from Saudi Arabia, infected hundreds of people there.

The research is a partnership between the University of Maryland School of Medicine (UM SOM), SAB Biotherapeutics (SAB), Novavax and the Naval Medical Research Center. The researchers tested the treatment for MERS, a disease that can cause severe respiratory symptoms and has a death rate of 40 percent.

"These results are very promising," says one of the lead researchers on the study, Matthew B. Frieman, PhD, an Associate Professor of Microbiology and Immunology at UM SOM. "This is important not only because it gives us a potential way to attack MERS, but also because it provides evidence that using these transgenic cows can rapidly produce therapeutics."

SAB, a biopharmaceutical company based in Sioux Falls, South Dakota,

provided the genetically modified cows, a technology that it invented. Novavax, a vaccine biotech company based in Gaithersburg, provided the vaccine that triggered the antibody production in the cows.

"Through this collaborative team, we've brought together the top talent of the scientific community, global health experts and novel technologies to demonstrate the efficacy, safety, and responsiveness of our human antibody therapeutic," said Dr. Eddie Sullivan, PhD, President and CEO of SAB Biotherapeutics, Inc. "As we complete successful studies targeting various diseases, we're realizing the potential broad application and significance of the our platform in addressing these global health threats."

The next step, which will occur in the next three to six months, will be a human clinical trial to test the safety of the therapeutic. If that works, a Phase 2 trial will follow, to test whether it is effective for use in humans, in emergency situations.

MERS was first discovered in 2012 in Saudi Arabia. It appears that the disease spread to humans from camels, who may themselves been infected by bats. Research has shown that it is similar to Severe acute respiratory syndrome (SARS), which emerged in 2003 and resulted in over 8000 infections, killing 10% of those infected. Both are caused by Coronaviruses, both cause serious respiratory problems, and both are often fatal.

"Prof. Frieman's work is a fantastic example of how the school is partnering with private industry to break new ground fighting disease," said UM SOM Dean E. Albert Reece, MD, PhD, MBA, who is also the vice president for Medical Affairs, University of Maryland, and the John Z. and Akiko K. Bowers Distinguished Professor. "This work provides a great model for how we can respond rapidly to emerging diseases that threaten health around the world."

More information: Human polyclonal immunoglobulin G from transchromosomic bovines inhibits MERS-CoV in vivo, *Science Translational Medicine*, stm.sciencemag.org/lookup/doi/ … scitranslmed.aaf1061

Provided by University of Maryland School of Medicine