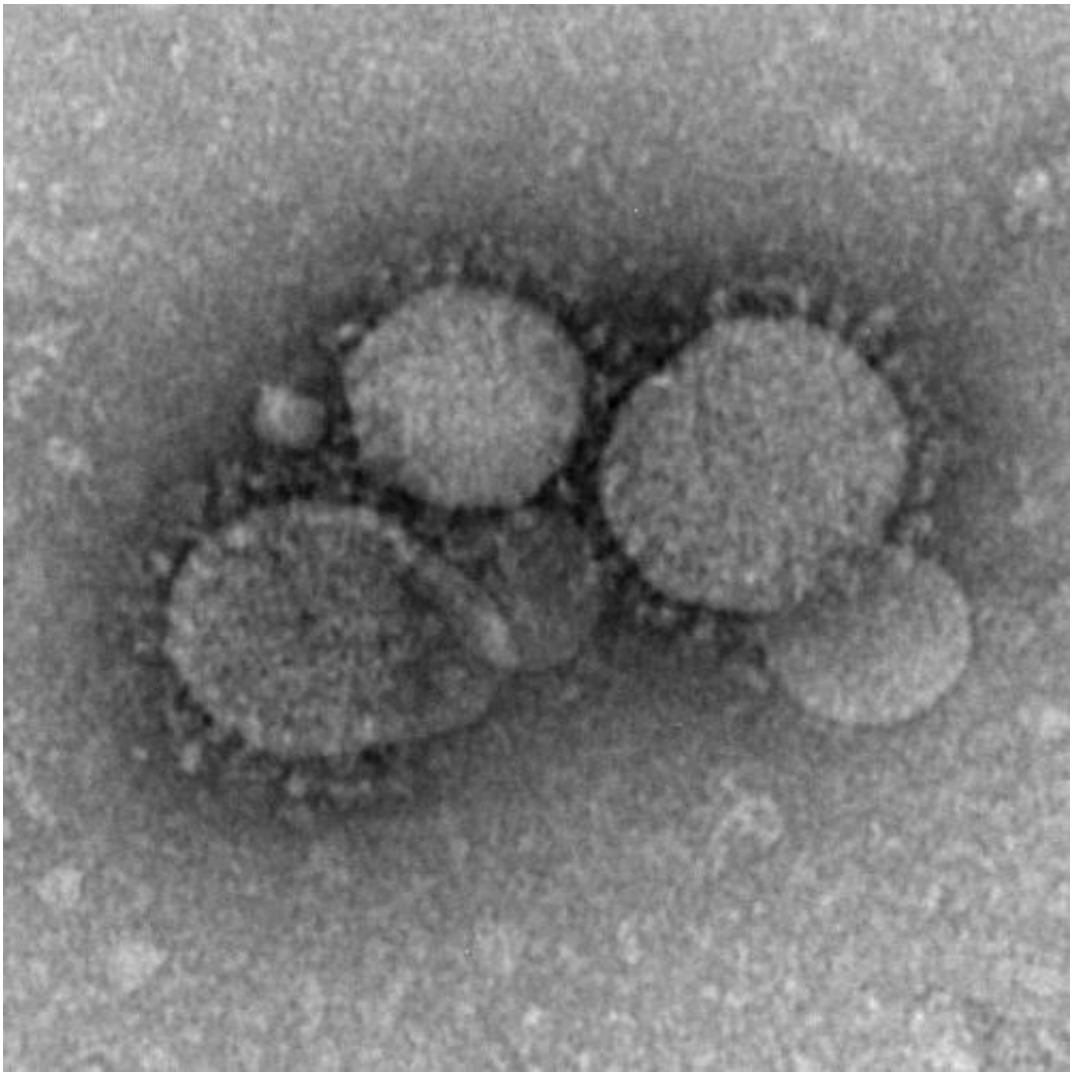
New experimental vaccine produces immune response against MERS virus

April 30 2014



MERS-CoV particles as seen by negative stain electron microscopy. Virions contain characteristic club-like projections emanating from the viral membrane. Credit: Centers for Disease Control and Prevention

The University of Maryland School of Medicine (UM SOM) and Novavax, Inc. today announced that an investigational vaccine candidate developed by Novavax against the recently emerged Middle East Respiratory Syndrome Coronavirus (MERS-CoV) blocked infection in laboratory studies. UM SOM and Novavax also reported that a vaccine candidate against Severe Acute Respiratory Syndrome Coronavirus (SARS-CoV) developed by Novavax on a similar platform also inhibited virus infection. Researchers reported these findings in an article published in the April 13, 2014 issue of *Vaccine*.

Historically, vaccine strategies for emerging pathogens have been limited due to the sudden nature in which the virus first appears and delayed by the protracted traditional vaccine development process. This peer-reviewed manuscript describes a novel method to rapidly develop vaccines against previously unknown viruses, such as MERS-CoV, which appear suddenly and cause severe illnesses in humans. The experimental vaccines, which were tested in conjunction with Novavax' proprietary adjuvant Matrix-M, induced neutralizing antibodies, or immune responses, that prevent viruses from infecting cells.

"Our protein nanoparticle vaccine technology is proving to have the potential to respond rapidly to emerging viruses such as MERS-CoV and certain potential pandemic influenza strains, addressing what are clearly urgent public health needs," said Gale Smith, Ph.D., Vice President of Vaccine Development at Novavax. "Novavax will continue to evaluate this technology to produce highly immunogenic nanoparticles for coronavirus, influenza, and other human disease pathogens with the potential for pandemic and sustained human to human transmission."

"The emergence of SARS-CoV and MERS-CoV demonstrates how coronaviruses can spillover from animals into humans at any time, causing lethal disease," said Matthew B. Frieman, Ph.D., Assistant Professor of Microbiology and Immunology at the University of

Maryland School of Medicine and corresponding author on the publication. "Despite efforts to create a vaccine against SARS-CoV, no vaccine candidate has, to date, been successfully licensed for use. We have demonstrated that this novel method rapidly creates SARS-CoV and MERS-CoV vaccines that induce neutralizing antibodies in mice."

"The University of Maryland School of Medicine investigators are continually working toward a better understanding of the interactions between the human immune system and a variety of known and novel harmful microbes," said E. Albert Reece, Vice President of Medical Affairs, the University of Maryland and the John Z. and Akiko Bowers Distinguished Professor and Dean, University of Maryland School of Medicine. "This makes our faculty poised to respond to emerging infectious diseases, such as MERS-CoV, which threaten the health and wellbeing of the global population."

The vaccine candidates were made using Novavax' recombinant nanoparticle vaccine technology and based on the major surface spike (S) protein, a SARS-CoV and MERS-CoV surface protein responsible for attaching the virus to cells. Novavax previously demonstrated that spike protein nanoparticles could protect animals against lethal live challenge using the SARS-CoV virus.

More information: C. M. Coleman et al. Purified coronavirus Spike protein nanoparticles induce coronavirus neutralizing antibodies in mice. *Vaccine*. In press, April 13, 2014.

Y. Liu et al. Chimeric severe acute respiratory syndrome coronavirus (SARS-CoV) S glycoprotein and influenza matrix 1 efficiently form virus-like particles (VLPs) that protect mice against challenge with SARS-CoV, 2011; 29(38): 6606-6613.

Provided by University of Maryland