Inhaled Ebola vaccine may offer long-term protection from virus (Update)

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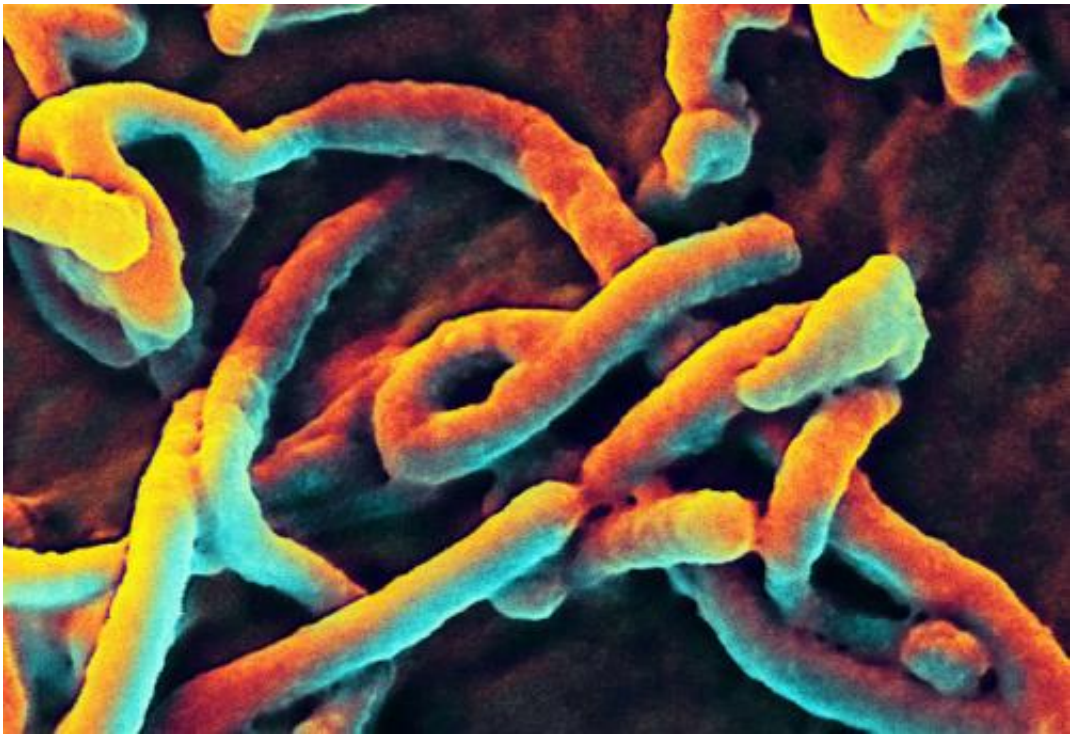

A scanning electron micrograph of Ebola virus budding from a cell (African green monkey kidney epithelial cell line). Credit: NIAID

A potentially breathable, respiratory vaccine in development has been shown to provide long-term protection for non-human primates against the deadly Ebola virus, as reported this week in the online edition of the journal *Molecular Pharmaceutics*.

Results from a recent pre-clinical study represent the only proof to date that a single dose of a non-injectable vaccine platform for Ebola is long lasting, which could have significant global implications in controlling future outbreaks. A breathable vaccine could surmount the logistical obstacles of storing, transporting and administering injectable vaccines in parts of Africa most afflicted by the virus.

Professor Maria Croyle and graduate student Kristina Jonsson-Schmunk of The University of Texas at Austin's College of Pharmacy, who co-authored the paper with Dr. Gary Kobinger and his team at the National Microbiology Laboratory in Winnipeg, will make a presentation on the newly published work in San Diego Nov. 5 at the 2014 American Association of Pharmaceutical Scientists (AAPS) Annual Meeting and Exposition, the world's largest pharmaceutical sciences meeting.

The Ebola virus is an often fatal illness that is spread among the human population via direct contact with blood or bodily fluids from an infected individual. The current Ebola outbreak in Western Africa is the largest and most complex epidemic since the virus was first discovered in 1976, according to the World Health Organization. With a fatality rate currently as high as 70 percent, officials are declaring this outbreak a public health emergency of international concern.

Croyle, Jonsson-Schmunk and colleagues worked over seven years to develop a respiratory formulation that improved survival of immunized non-human primates from 67 percent to 100 percent after challenge with 1,000 plaque forming units of Ebola Zaire 150 days after immunization.

This improvement is statistically significant because only 50 percent of the primates given the vaccine by the standard method of intramuscular injection survived challenge.

Ebola causes devastating outbreaks with fatality rates of 25 to 90 percent

in Africa and Asia. Although progress has been made in understanding the virus' biology, no licensed vaccines or treatments currently exist, noted the researchers.

"There is a desperate need for a vaccine that not only prevents the continued transmission from person to person, but also aids in controlling future incidences," said Jonsson-Schmunk.

"The main advantage of our vaccine platform over the others in clinical testing is the long-lasting protection after a single inhaled dose," added Croyle. "This is important since the longevity of other vaccines for Ebola that are currently being evaluated is not fully evaluated. Moreover, this immunization method is more attractive than an injectable vaccine given the costs associated with syringe distribution and needle safety and disposal."

The next stage of research for Croyle's team is a phase I clinical trial that tests the effectiveness of their vaccine in human subjects. They will also further explore preliminary data they have collected for administration of the vaccine as a thin film under the tongue in non-human primates.

More information: pubs.acs.org/doi/abs/10.1021/mp500646d

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