DNA vaccine against Ebola virus shows potent and long-term efficacy in preclinical studies

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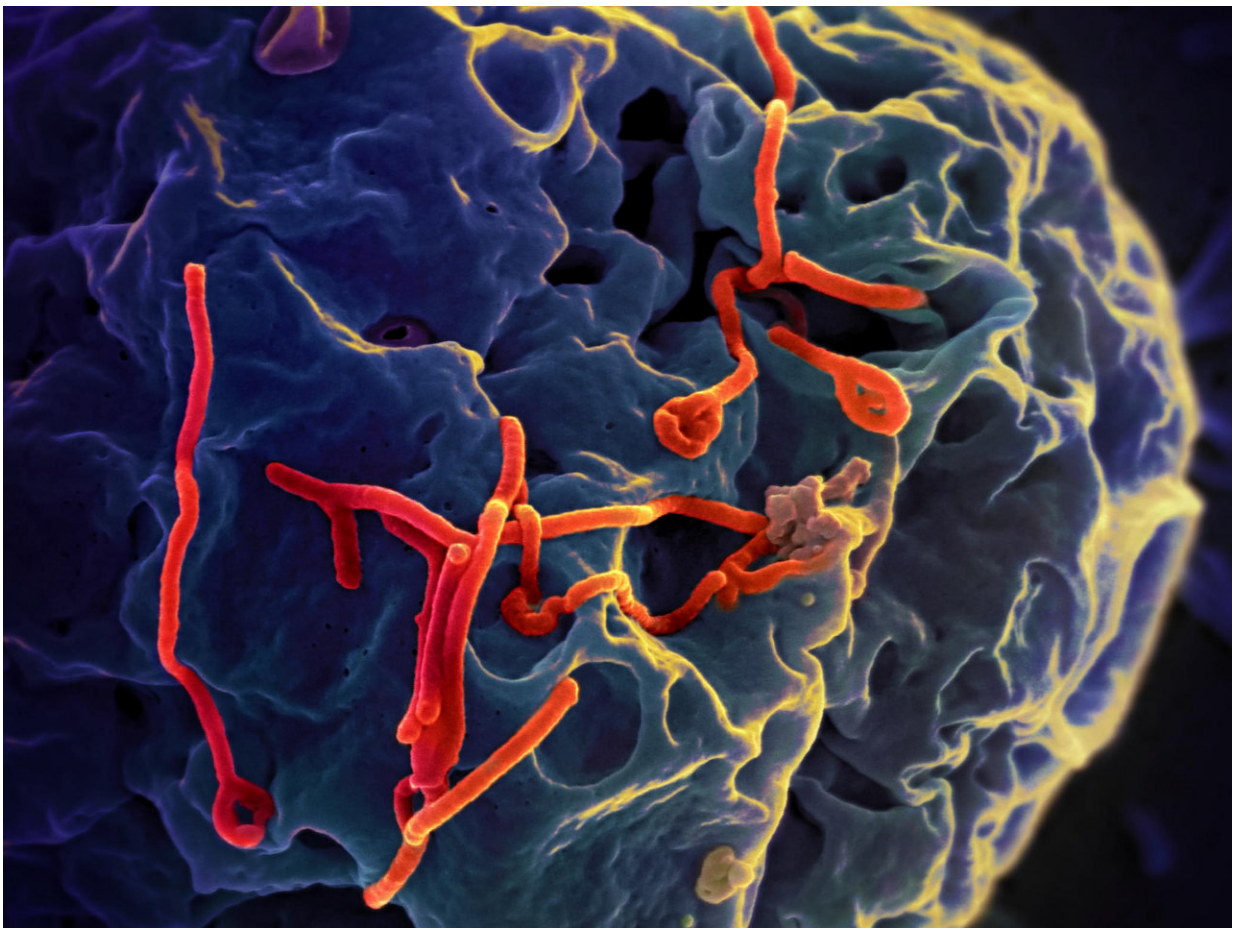

Ebola virus particles (red) on a larger cell. Credit: NIAID

A novel synthetic DNA vaccine developed based on technology pioneered by scientists at The Wistar Institute Vaccine & Immunotherapy Center offers complete protection from Zaire Ebolavirus (EBOV) infection in promising preclinical research. Study results were published online in the *Journal of Infectious Diseases*.

Ebola virus infection causes a severe hemorrhagic fever that has a 50% fatality rate, according to the World Health Organization. Recent advances have led to the development of promising experimental vaccine candidates that may be associated with side effects and/or may not be applicable in specific vulnerable populations, such as children, pregnant women and immunocompromised individuals. In addition, there is a need to boost these vaccines to provide long-term protection.

Using a unique approach, Wistar scientists designed optimized synthetic DNA vaccine candidates targeting a virus surface protein called glycoprotein. They demonstrated efficacy of the novel vaccine candidates and durability of the immune responses in animal models. Importantly, results showed strong immune responses one year after the last dose, supporting the long-term immunogenicity of the vaccine—a particularly challenging area for Ebola vaccines.

"Synthetic non-viral based DNA technology allows for rapid vaccine development by delivery directly into the skin, resulting in consistent, potent and rapid immunity compared to traditional vaccine approaches," said lead researcher David B. Weiner, Ph.D., executive vice president and director of Wistar's Vaccine & Immunotherapy Center, and W.W. Smith Charitable Trust Professor in Cancer Research. "An anti-Ebola virus DNA vaccine like this may provide an important new tool for protection, and we are excited to see what future studies will unveil."

The researchers optimized a shorter, dose-sparing, immunization regimen and simplified vaccine administration directly into the skin.

This new approach induced rapid and protective immunity from virus challenges. The detected antibody levels were equal or higher to those reported for other vaccines currently being evaluated in the clinic, according to the study.

"The success of intradermal delivery of a low-dose regimen is very encouraging," said Ami Patel, Ph.D., associate staff scientist in the Weiner Lab. "The ultimate goal of our work is to create effective and safe vaccines that are optimized for field use in at-risk areas."

Provided by The Wistar Institute