

Groundbreaking study could lead to fast, simple test for Ebola virus

May 7 2019



Ebola virus. Credit: NIAID

In a breakthrough that could lead to a simple and inexpensive test for Ebola virus disease, researchers have generated two antibodies to the deadly virus.

The antibodies, which are inexpensive to produce, potentially could be used in a simple filter paper test to detect Ebola [virus](#) and the related

Marburg virus. (If the filter paper turns color, the virus is present.)

Corresponding author Ravi Durvasula, MD, and colleagues report their findings in the *American Journal of Tropical Medicine & Hygiene*. Dr. Durvasula, a world leader in global infectious diseases research, is a professor and chair of the department of medicine of Loyola Medicine and Loyola University Chicago Stritch School of Medicine. First author Adinarayana Kunamneni, Ph.D., is a research assistant professor in Loyola's department of medicine.

Ebola and Marburg viruses can cause severe bleeding and organ failure, with fatality rates reaching 90 percent in some outbreaks. The diseases spread through direct contact with [bodily fluids](#) of an infected person, monkey, gorilla, chimpanzee or bat.

Ebola and Marburg belong to a class of viruses native to Africa called filoviruses. There are four known types of Ebola virus and two known types of Marburg virus. They are textbook examples of emerging diseases that appear quickly, often in remote areas with little or no public health infrastructure. There were major Ebola outbreaks in West Africa from 2013 to 2016. There is no effective vaccine or drug to treat the diseases.

Early symptoms of Ebola and Marburg, such as fever, headache and diarrhea, mimic more [common diseases](#), so there's a critical need for a rapid diagnostic test. Such a test could help in efforts to limit outbreaks by quickly quarantining infected persons. But existing diagnostic tests either are inaccurate or are expensive and require extensive training to administer.

Antibodies could be key to diagnosing Ebola and Marburg viruses. An antibody is a Y-shaped protein made by the immune system. When a virus or other pathogen invades the body, antibodies mark it for the

[immune system](#) to destroy.

Using a technology called cell-free ribosome display, researchers generated two synthetic antibodies that bind to all six Ebola and Marburg viruses. (The research involved the use of non-hazardous proteins that sit on the surface of Ebola and Marburg viruses. Because the actual viruses were not used in the study, there was no risk of infection to researchers or the public.)

It will take further research to validate the antibodies' potential for diagnosing Ebola and Marburg viruses, Drs. Durvasula and Kunamneni said.

The study is titled, "Generation and Selection of a Panel of Pan-Filovirus Single-Chain Antibodies using Cell-Free Ribosome Display."

More information: Adinarayana Kunamneni et al, Generation and Selection of a Panel of Pan-Filovirus Single-Chain Antibodies using Cell-Free Ribosome Display, *The American Journal of Tropical Medicine and Hygiene* (2019). [DOI: 10.4269/ajtmh.18-0658](https://doi.org/10.4269/ajtmh.18-0658)

Provided by Loyola University Health System

Citation: Groundbreaking study could lead to fast, simple test for Ebola virus (2019, May 7) retrieved 18 April 2024 from

<https://medicalxpress.com/news/2019-05-groundbreaking-fast-simple-ebola-virus.html>

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