



SUBSCRIBE >>

- News
- Articles
- Videos
- Images
- Books
- Reference
- Health & Medicine
- Mind & Brain
- Plants & Animals
- Earth & Climate
- Space & Time
- Matter & Energy
- Computers & Math
- Fossils & Ruins

Science News

... from universities, journals, and other research organizations

- Save
- Email
- Print
- Share

How Deadly Marburg Virus Silences Immune System: Breakthrough Findings Point to Targets for Drugs and Vaccines

ScienceDaily (Sep. 13, 2012) — Scientists at The Scripps Research Institute have determined the structure of a critical protein from the Marburg virus, a close cousin of Ebola virus. These viruses cause similar diseases and are some of the deadliest pathogens on the planet, each killing up to 90 percent of those infected.

Share This:

- Facebook 142
- Tweet 70
- +1 5

74

See Also:

- Health & Medicine**
 - Viruses
 - HIV and AIDS
 - Infectious Diseases
- Plants & Animals**
 - Virology
 - Microbes and More
 - Microbiology
- Reference**
 - Ebola
 - Tropical disease
 - Human parainfluenza viruses
 - Pandemic

Described in the Sept. 13, 2012 publication of the journal *PLoS Pathogens*, the new research reveals how a key protein component of the Marburg virus, called VP35, blocks the human immune system, allowing the virus to grow unchecked. The structure provides a major step forward in understanding how the deadly virus works, and may be useful in the development of potential treatments for those infected.

"The immune system is designed to recognize certain hallmarks of virus infection," said Erica Ollmann Saphire, the Scripps Research scientist who led the effort. "When these are sensed, an immediate antiviral defense is launched. However, the Marburg and Ebola viruses mask the evidence of their own infection. By doing so, the viruses are able to replicate rapidly and overwhelm the patient's ability to launch an effective defense."

Deadly Outbreaks

Ebola virus outbreaks have occurred in the last month in both Uganda and the Democratic Republic of the Congo, while

Marburg virus broke out in Angola in 2005 to 2006 and again in Uganda in 2007. The Angolan Marburg virus outbreak began in a pediatric ward and killed 88 percent of those it infected. The virus has since been imported into the United States (Colorado) and the Netherlands by tourists who had visited Africa.

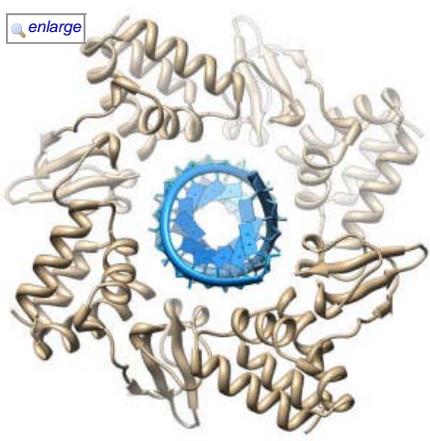
There is currently no cure for Marburg hemorrhagic fever. The virus is spread when people come into contact with the bodily fluids of a person or animal who is already infected. The best treatment consists of administering fluids and taking protective measures to ensure containment, like isolating the patient and washing sheets with bleach.

Most people, however, die within two weeks of exposure from a combination of dehydration, massive bleeding, and shock. A smaller number of people have stronger and immediate immune responses against the virus and survive.

A New Roadmap for Defense

The breakthrough described in the *PLoS Pathogens* article explains a key reason why the viruses are so deadly and provides the necessary templates to develop drugs to treat the infection.

The study's lead author, Research Associate Shridhar Bale, explains that a key signature of Marburg virus infection is the double-stranded RNA that results from its replication inside



The Marburg virus VP35 protein (beige) surrounds the virus's double-stranded RNA (blue), masking it from immune system detection. (Credit: Image by Christina Corbaci, The Scripps Research Institute)

Ads by Google

Viral Research Tools — Proteins, Antibodies, ELISA Kits For Flu, RSV, CMV, HIV Viruses ... > [www?.?Sino?Biological?.com](#)

Immunogenicity Testing — Episcreen T cell assay technology for biologics ... > [www?.antitope?.co?.uk](#)

Temporal Thermometer — Accurate temperature with a gentle forehead scan. Doctor recommended. ... > [www?.exergen?.com](#)

OPUS Disposable Columns — Cost effective pre-packed columns for single-use bioprocessing ... > [www?.repligen?.com?opus](#)

GPCR One-Stop Shop — cDNAs, Cell lines, Antibodies High-quality reagents and services ... > [www?.multispaninc?.com](#)

Related Stories

Researchers Find 'Key' Used by Ebola Virus to Unlock Cells and Spread Deadly Infection (Aug. 24, 2011) — Researchers have identified a cellular protein that is critical for infection by the deadly Ebola virus. The findings suggest a possible strategy for blocking infection due to Ebola virus, one of the ... > [read more](#)

Small Molecules May Prevent Ebola Infection (Jan. 20, 2011) — Scientists report they've discovered small molecules that appear to bind to the outer protein coat of the Ebola virus, possibly blocking the virus from entering human cells. The finding may open new ... > [read more](#)

Scientists Reveal Key Structure from Ebola Virus (Dec. 9, 2009) — Scientists have determined the structure of a critical protein from the Ebola virus, which, though rare, is one of the deadliest viruses on the planet killing between 50

Just In:
How Order in Cosmos Arises from Random Motion
▶ [more breaking science news](#)

Take advantage of this great offer
Subscribe to NEJM today

SUBSCRIBE >>

The NEW ENGLAND JOURNAL of MEDICINE

Social Networks

Recommend ScienceDaily on Facebook, Twitter, and Google +1:

- Like
- Send
- You and 39,170 others like this. 39,170 people like this. Sign
- Tweet 16.6K
- Follow 43.5K followers
- +3683 Recommend this on Google

Other bookmarking and sharing tools:

- 45.4K

Take advantage of this great offer
Subscribe to NEJM today

SUBSCRIBE >>

The NEW ENGLAND JOURNAL of MEDICINE

Breaking News ... from NewsDaily.com

- ▶ SpaceX rocket blasts off for space station
- ▶ Scientists tune into blue whale songs with defense technology
- ▶ Idaho nuclear lab fined after workers exposed to radiation
- ▶ Japan author, "spooky" science up for cut-price Nobels
- ▶ Tiny, new African dinosaur species unveiled
- ▶ Rapid gene machines used to find cause of newborn illnesses
- ▶ Lost in migration: Earth's magnetic field overdue



cells. When human immune system proteins detect this virus-specific RNA, they sound an alarm to signal the rest of the immune system to respond. The new research describes how the VP35 protein of the Marburg virus binds to the viral double-stranded RNA and hides it to prevent the alarm from being sounded.

The new research also revealed a surprise. Images from the Marburg virus reveal the VP35 protein spirals around the double-stranded RNA, enveloping it completely. This is in contrast to previous images of the similar VP35 protein from Ebola virus that showed it only capping the ends of the RNA, leaving the center of the RNA helix exposed for possible recognition.

In addition to Ollmann Saphire and Bale, the article, "Marburg virus VP35 can both fully coat the backbone and cap the ends of dsRNA for interferon antagonism," was authored by Jean-Philippe Julien, Zachary A. Bornholdt, Michelle A. Zandonatti, Gerard J.A. Kroon, Christopher R. Kimberlin, Ian J. MacRae, and Ian A. Wilson of The Scripps Research Institute, and Peter Halfmann, John Kunert, and Yoshihiro Kawaoka of the University of Wisconsin.

Support for the research was provided by grants from the Burroughs Wellcome Fund and The Skaggs Institute for Chemical Biology at Scripps Research.

Share this story on Facebook, Twitter, and Google:



Other social bookmarking and sharing tools:



Story Source:

The above story is reprinted from materials provided by Scripps Research Institute.

Note: Materials may be edited for content and length. For further information, please contact the source cited above.

Journal Reference:

1. Bale S, Julien J-P, Bornholdt ZA, Kimberlin CR, Halfmann P, et al. Marburg Virus VP35 Can Both Fully Coat the Backbone and Cap the Ends of dsRNA for Interferon Antagonism. PLoS Pathog. PLoS Pathogens, 2012; 8(9): e1002916 DOI: 10.1371/journal.ppat.1002916

Need to cite this story in your essay, paper, or report? Use one of the following formats:

- APA Scripps Research Institute (2012, September 13). How deadly Marburg virus silences immune system: Breakthrough findings point to targets for drugs and vaccines. ScienceDaily. Retrieved October 8, 2012, from http://www.sciencedaily.com/releases/2012/09/120913173320.htm
- MLA

Note: If no author is given, the source is cited instead.

Disclaimer: This article is not intended to provide medical advice, diagnosis or treatment. Views expressed here do not necessarily reflect those of ScienceDaily or its staff.

Search ScienceDaily

Number of stories in archives: 125,177

Find with keyword(s):

Enter a keyword or phrase to search ScienceDaily's archives for related news topics, the latest news stories, reference articles, science videos, images, and books.

and 90 percent of those ... > read more



'Ebola Cousin' Marburg Virus Isolated From African Fruit Bats (Aug. 2, 2009) — Infection with Marburg virus and the related Ebola virus can produce severe disease in people, with fever and bleeding. During outbreaks, as many as 90 percent of those infected have died. The ... > read more

Combination Vaccine Protects Monkeys From Ebola And Marburg Viruses (Feb. 27, 2008) — An experimental, combination vaccine against ebola and Marburg viruses using virus-like particles provides complete protection against infection in monkeys. Traditionally vaccines against viral ... > read more

Ads by Google

Influenza Hemagglutinin — Recombinant HA proteins from > 80 flu strains; plus antibodies & more ... > www?.immune-tech?.com

???????????? — ?????? ?????????? ??? ?????????????? ... > www?.tutorabc?.com

What Happens When You Die — New scientific theory says death isn't the end ... > ?Robert?Lanza?Biocentrism?.com

Integrated Purification — Purification suite: Clarification, Chromatography and Ultrafiltration. ... > www?.millipore?.com??Purification?Suite

a flip

- ▶ Boost for land speed record bid after successful rocket test
- ▶ more science news

In Other News ...

- ▶ Romney to draw contrast with Obama on foreign policy
- ▶ HSBC China services PMI recovers to 54.3 after one-year low
- ▶ World Bank cuts East Asia GDP outlook, flags China risks
- ▶ China's Huawei, ZTE should be kept from U.S. : draft Congress report
- ▶ Insight: Punchups, kidnappings mar India's efforts to privatize power
- ▶ Analysis: EADS-BAE deal must limit foreign stakes to pass U.S. muster
- ▶ Analysis: French search in vain for Hollande vision
- ▶ Cameron warns Britons to expect more budget cuts
- ▶ more top news

Copyright Reuters 2008. See Restrictions.

Free Subscriptions ... from ScienceDaily

Get the latest science news with our free email newsletters, updated daily and weekly. Or view hourly updated newsfeeds in your RSS reader:

- ▶ Email Newsletters
- ▶ RSS Newsfeeds

Feedback ... we want to hear from you!

Tell us what you think of ScienceDaily -- we welcome both positive and negative comments. Have any problems using the site? Questions?

Your Name:
Your Email:
Comments:

Click button to submit feedback:

