

New arenavirus discovered as cause of hemorrhagic fever outbreak in South Africa and Zambia

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Scientists at Columbia University's Mailman School of Public Health, the South African National Institute for Communicable Diseases of National Health Laboratory Service (NICD-NHLS), the U.S. Centers for Disease Control and Prevention, and Roche's 454 Life Sciences Corporation have discovered the new virus responsible for a highly fatal hemorrhagic fever outbreak in Zambia and South Africa in late 2008. It is the first new hemorrhagic fever-associated arenavirus from Africa identified in nearly four decades.

A detailed genetic analysis of this novel arenavirus, named Lujo virus, after the sites of the outbreak (Lusaka, Zambia, and Johannesburg, South Africa) is published online in *PLoS Pathogens* (<http://dx.plos.org/10.1371/journal.ppat.1000455>).

The previously unknown arenavirus, which was identified using genetic extracts of blood and liver from the victims and through unbiased high-throughput sequencing, is distantly related to Lassa virus and Lymphocytic choriomeningitis virus (LCMV). Characterization of the novel virus confirms the utility of unbiased high-throughput sequencing for pathogen discovery and provides a blueprint for public health efforts to quickly curb unidentified emerging viral disease outbreaks in the future. It will also enable the development of specific tests to diagnose infection, determine the origin of the virus, and develop drugs and vaccines to treat and prevent disease.

In September and October 2008, five cases of undiagnosed hemorrhagic fever were recognized in South Africa after air transfer of a critically ill individual from Zambia. The disease was fatal in four of the five cases, including the originally infected individual, the paramedic who attended the patient during air transfer, the nurse who attended the patient in the intensive care unit, and a member of the hospital staff who cleaned the room after the death of the patient. The fifth case, a nurse who attended the paramedic, one day before barrier nursing procedures were implemented, received anti-viral treatment and recovered.

"Within 72 hours we identified the [novel virus](#) using high-throughput sequencing," stated Thomas Briese, PhD, associate professor of clinical Epidemiology and associate director of the Center for Infection and Immunity (CII) at Columbia University Mailman School of Public Health.

"It is reassuring that we now have the tools needed to rapidly detect and respond to the challenges of unknown pathogens. A key challenge that remains is deployment of these technologies to the 'hot spots' where new killer viruses frequently emerge. We remain committed to this important public health effort as it represents a unique opportunity to prevent the next pandemic, be it a threat like HIV or SARS," said Ian Lipkin, MD, John Snow Professor of Epidemiology and professor of Neurology and Pathology at Columbia University and director of CII.

"The successful international collaboration during this highly fatal outbreak highlighted the importance of global cooperation in outbreak response to emerging and highly dangerous pathogens", stated Janusz Paweska, DVSc, Head of the Special Pathogens Unit of NICD-NHLS, extraordinary professor at the University of Pretoria, and deputy director of the Southern African Centre for Infectious Disease Surveillance.

"This south-north collaboration created a powerful partnership of scientific excellence, resulting in rapid and comprehensive full genetic

characterization of the new virus".

"454-sequencing enables researchers to quickly identify organisms present in a complex sample without any prior knowledge or bias," explained Michael Egholm, co-author and Chief Technology Officer and Vice President of Research and Development at 454 Life Sciences. "Our work with Lipkin and colleagues in developing a comprehensive approach to pathogen detection has borne fruit in resolving a number of recent disease outbreaks and confirms that it will be a critical tool for public health. We were honored in this most recent example to work with outstanding investigators at the U. S. [Centers for Disease Control and Prevention](#), the National Institute for Communicable Diseases, South Africa, the CII, and the World Health Organization."

Source: Columbia University's Mailman School of [Public Health](#) ([news](#) : [web](#))

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