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## News Release

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### **USU Professor Awarded \$5.6 Million NIH Grant to Develop Therapeutics Against Deadly Viruses**

**BETHESDA, Md.** — Researchers at the Uniformed Services University of the Health Sciences (USU) have been awarded a \$5.6 million grant from the National Institute of Allergy and Infectious Diseases (NIAID), part of the National Institutes of Health (NIH), to develop and test vaccines and treatments for the Nipah and Hendra viruses.

Dr. Christopher C. Broder, USU professor of microbiology and immunology and director of the university's interdisciplinary program in Emerging Infectious Diseases, is the principal investigator of the grant from NIAID. The grant was awarded to further develop the vaccines and therapeutics for Nipah and Hendra that his group has been working on for the past several years.

The award will support a continued collaboration with investigators Lin-Fa Wang, Ph.D. and Deborah Middleton M.V.Sc, Ph.D. of Australia's Commonwealth Scientific and Industrial Research Organization (CSIRO) Livestock Industries, Australian Animal Health Laboratory (AAHL) and Australian Biosecurity Cooperative Research Center (AB-CRC) in Geelong, Victoria, where there is a high-level biosafety and security facility for testing the vaccines and therapeutics against these deadly viruses in appropriate models.

Hendra virus and Nipah virus are recently emerged paramyxoviruses that are highly pathogenic and can cause lethal infections in several animals and in humans. Since their initial discovery in Australia and Malaysia, sporadic Hendra outbreaks have been reported from 1995 to 2007, while Nipah has caused at least 9 outbreaks between 1998 and 2008. The majority of these episodes have occurred on a regular basis in Bangladesh and India, with human case fatality rates approaching 75% along with evidence of human-to-human transmission. The most recent appearance of Nipah in 2008 claimed the lives of several children. Studies have demonstrated that the natural reservoirs for Hendra and Nipah viruses are bats, primarily several different species of large fruit bats commonly referred to as flying foxes.

The first steps in countering infections caused by these viruses were to develop a vaccine that was both safe and effective, and also to find antibodies that could neutralize them. In earlier work, also supported by NIAID through the Middle-Atlantic Regional Center of Excellence for Biodefense and Emerging Infectious Diseases Research (MARCE), a subunit vaccine for Nipah and Hendra, composed of a piece of the virus known as the G glycoprotein, was developed by Dr. Katharine Bossart, a former graduate student of Broder's laboratory. Recent experiments by Dr. Bossart and colleagues have shown the vaccine to be very effective in preventing Nipah virus disease.

Antibodies on the other hand are proteins that are found in blood or other bodily fluids of animals and humans that are used by the immune system to identify and neutralize foreign molecules, including bacteria and viruses.

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The neutralization of an invading virus is the process by which an antibody can specifically bind and block its infection, and in other recent MARCE-supported studies carried out by Broder's group in collaboration with Dimiter S. Dimitrov, Ph.D., of the National Cancer Institute's, Center for Cancer Research in Frederick, Md., and Zhongyu Zhu, Ph.D., of Dimitrov's group, a very potent Nipah and Hendra virus neutralizing human monoclonal antibody (m102.4) was developed as a potential therapeutic that could be administered to people infected by these viruses.

"We now have the critical resources needed to evaluate the therapeutic potential of both vaccines and perhaps more importantly a potent human antibody against both Nipah virus and Hendra virus, that could help control outbreaks in geographical regions susceptible to these emerging viruses, and result in a real benefit to those people at risk of infection and disease caused by these deadly agents," said Broder. "Our success in obtaining these new critical funds is also evidence of the success of NIAID's Regional Center of Excellence program," Broder added.

This NIH award will also support and bring together the expertise to structurally characterize the interaction between the Nipah and Hendra virus and the receptor proteins on cells that serve the gateway for virus infection, led by Dimitar B. Nikolov, Ph.D., and Kai Xu of Nikolov's team at the Structural Biology Program of the Memorial Sloan-Kettering Cancer Center, in New York. Information from these additional studies may lead to the discovery of new therapeutics targeting the virus-host cell infection process.

NIAID supports basic and applied research to prevent, diagnose and treat infectious diseases, influenza, tuberculosis, malaria and illness from potential agents of bioterrorism. It also supports research on basic immunology, transplantation and immune-related disorders, including autoimmune diseases, asthma and allergies.

Located on the grounds of Bethesda's National Naval Medical Center and across from the National Institutes of Health, USU is the nation's federal school of medicine and graduate school of nursing, and also offers several graduate programs in the biomedical sciences and public health. The university educates health care professionals dedicated to career service in the Department of Defense and the U.S. Public Health Service. Medical students are active-duty uniformed officers in the Army, Navy, Air Force and Public Health Service, who are being educated to deal with wartime casualties, natural disasters, emerging infectious diseases, and other public health emergencies. Of the university's more than 4,000 physician alumni, the vast majority serve on active duty and are supporting operations in Iraq, Afghanistan, and elsewhere, offering their leadership and expertise.

For more information, contact the Office of External Affairs at (301) 295-1219 or visit the USU Web site at: [www.usuhs.mil](http://www.usuhs.mil).

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