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For Immediate Release:

USU Discovery Leads to Development of Vaccine to Help Prevent Deadly Virus

Bethesda, MD—A scientific discovery made in the laboratory of Christopher C. Broder, Ph.D., professor of microbiology and immunology at the Uniformed Services University of the Health Sciences (USU), has led to the development of a vaccine to aid in the prevention of the deadly Hendra virus. On Nov. 1, Pfizer Animal Health announced that the new vaccine, called Equivac® HeV, is now available for use in Australia.

Since its first appearance in 1994, the Hendra virus has killed more than 80 horses and four of the seven people infected to date. An equine vaccine is crucial to breaking the cycle of Hendra virus transmission from flying foxes to horses and then to people, as it helps to prevent the horse from both developing the disease and transmitting the virus to other horses and people. Experiments have shown that vaccinated horses survived infection by Hendra virus and have shown no evidence of virus, disease, replication or shedding of the virus, a critical finding to help prevent transmission.

The vaccine is derived from original work by Broder and Katharine Bossart, Ph.D., a USU alumna and assistant professor at Boston University School of Medicine. Their work was supported by the National Institute of Allergy and Infectious Disease (NIAID), part of the National Institutes of Health.

“The vaccine component is a soluble portion of a Hendra virus G glycoprotein, known as Hendra-sG,” said Broder. Bossart developed Hendra-sG while a graduate student in Broder’s laboratory at USU. “This glycoprotein is critical in mediating viral infection. If you block its function, you block virus infection. We have shown it to be highly effective in preventing Hendra virus and the related Nipah virus infection when it is used as a vaccine in animals. Vaccinated animals make antibodies to Hendra G, and these antibodies will subsequently prevent virus infection.”

To date, Hendra virus has been found only in Australia. The nation experienced an unprecedented number of 18 outbreaks across Queensland and New South Wales in 2011, during which 22 horses died or were euthanized. Authorities detected the first case of Hendra virus antibodies in a dog within a natural environment that same year. The virus has appeared seven times in 2012, causing equine deaths and serious cases of human exposure to infection. In July 2012, a woman with significant exposure risk was given an experimental human monoclonal antibody therapy on a compassionate use basis. Dimitar Dimitrov, Ph.D., of the NIH, working in collaboration with Broder, developed the antibody, known as m102.4.

The Hendra virus, and the similar Nipah virus, both members of the paramyxovirus family, are highly infectious agents that emerged from flying foxes in the 1990s to cause serious disease outbreaks in humans and livestock in Australia, Bangladesh, India, Malaysia and Singapore. Recent Nipah outbreaks have resulted in acute respiratory distress syndrome and encephalitis, person-to-person transmission, and greater than 75 percent case fatality rates among humans. A collaborative group led by Broder published its groundbreaking Hendra and Nipah virus work in two articles in *Science Translational Medicine*, including the Aug. 2011 article that describes the Hendra-sG vaccine’s ability to completely protect nonhuman primates from Nipah virus infection, paving the way for a potential human-use vaccine, and the Oct. 2011

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article that describes a breakthrough in the development of an effective therapy against both viruses now in development for use in humans.

Broder and Bossart collaborated with a team at the Commonwealth Scientific and Industrial Research Organisation's (CSIRO) Australian Animal Health Laboratory (AAHL) in Geelong, Australia, to advance the Hendra vaccine technology. The bio-security facility at AAHL is the only laboratory in the world where Hendra virus challenge testing of the vaccine in horses could have been accomplished -- work presently under the direction of Deborah Middleton, D.V.P. The technology used to develop the vaccine was licensed from The Henry M. Jackson Foundation for the Advancement of Military Medicine, Inc. (HJF) by Pfizer Animal Health, who joined the collaborative effort two years ago, bringing its development and regulatory expertise to facilitate the unprecedented rapid development, approval and deployment of the breakthrough vaccine.

The recent work to develop and evaluate the Hendra vaccine was jointly funded by CSIRO; Pfizer Animal Health; the Australian government through its Department of Agriculture, Fisheries and Forestry; and the Queensland government through its Department of Employment, Economic Development and Innovation. NIAID provided funding to support production of the vaccine component in the U.S.

About USU

The Uniformed Services University of the Health Sciences (USU) is the nation's federal health sciences university. USU students are primarily active duty uniformed officers in the Army, Navy, Air Force and Public Health Service who have received specialized education in tropical and infectious diseases, preventive medicine, TBI and PTSD, disaster response and humanitarian assistance, and acute trauma care. A large percentage of the university's nearly 5,000 physician and 600 advanced practice nursing alumni are supporting operations around the world, offering their leadership and expertise. The University also has graduate programs in biomedical sciences and public health, most open to civilian and military applicants, and oral biology, committed to excellence in research which have awarded more than 400 doctoral and 900 masters degrees to date. For more information about USU and its programs, visit www.usuhs.mil.