

HJF works with global team to develop equine vaccine against deadly hendra virus

November 1 2012

The technology used to develop a new vaccine as an aid in the prevention of clinical disease caused by Hendra virus in horses has been licensed from The Henry M. Jackson Foundation for the Advancement of Military Medicine, Inc. (HJF) by Pfizer Animal Health, a multinational animal health company with expertise in the discovery, development and manufacturing of innovative vaccines. The new vaccine, called Equivac HeV, is now available for use in Australia. The vaccine's availability was announced today during a news conference held by Pfizer Animal Health in Brisbane, Australia.

The vaccine is derived from the original work of Christopher C. Broder, Ph.D., of the Uniformed Services University of the Health Sciences (USU) and Katharine Bossart, Ph.D., a USU alumna and assistant professor at Boston University School of Medicine. The National Institute of Allergy and Infectious Disease (NIAID), part of the U.S. National Institutes of Health, supported the work.

Progression of the technology is the result of a close, ongoing collaboration with Pfizer [Animal Health](#) and a team at Commonwealth Scientific and Industrial Research Organisation's (CSIRO) Australian Animal Health Laboratory (AAHL) in Geelong, Australia. 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. Two years ago, Pfizer Animal Health joined this collaborative effort, bringing its development and regulatory expertise to facilitate the

unprecedented rapid development, approval and deployment of this breakthrough vaccine.

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 prevent the horse from both developing the disease and transmitting the virus to other horses and to humans. Current 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 component is a soluble portion of a Hendra virus G glycoprotein, known as Hendra-sG. It is this glycoprotein that mediates viral infection. If you block its function, you block virus infection," Broder said. Bossart developed Hendra-sG while a student in Broder's laboratory at USU. This is a type of vaccine known as a subunit, which is safe to use.

"We have shown that vaccination with test formulations containing Hendra-sG to be effective in helping to prevent Hendra infection. Studies with Hendra-sG glycoprotein have shown promise in helping to prevent infection by its close relative, Nipah virus," Broder said. The Hendra-sG glycoprotein results in horses confirm earlier experimental work by Broder and his colleagues, where formulation containing the protein was shown to be protective in other animal models of Hendra and Nipah virus infection, including ferret, feline and nonhuman primates. The viruses are found in several bat species in the Eastern hemisphere, but increasing evidence suggests they may be more widespread, stretching from Asia to West Africa.

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 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 and Nipah viruses, 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 has published its groundbreaking Hendra and Nipah virus work in two articles in *Science Translational Medicine*. A breakthrough in the development of an effective therapy against Hendra (and Nipah) virus that is now in development for use in people was published in an October 2011. The ability of a Hendra-sG based trial formulation to completely protect nonhuman primates from Nipah virus infection, that is paving the way for a potential human-use vaccine, was published in August 2011.

"We are pleased to have worked with The Henry M. Jackson Foundation, Uniformed Services University of the Health Sciences and CSIRO in the development of this innovative vaccine," said Catherine Knupp, Vice President, Veterinary Medicine Research and Development, Pfizer Animal Health. "Our involvement in the collaboration to develop Equivac HeV speaks to our determination to

support the global veterinary community with effective vaccines to aid in the control of potentially life-threatening diseases such as the [Hendra virus](#)."

The recent work to develop and evaluate the Hendra vaccine Equivac® HeV 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.

Provided by Henry M. Jackson Foundation for the Advancement of Military Medicine

Citation: HJF works with global team to develop equine vaccine against deadly hendra virus (2012, November 1) retrieved 25 April 2024 from <https://medicalxpress.com/news/2012-11-hjf-global-team-equine-vaccine.html>

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