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“One Health is the collaborative efforts of multiple disciplines working locally, nationally, and globally to attain optimal health for people, animals, plants and our environment.”

“One Health implementation will help protect and/or save untold millions of lives in our generation and for those to come.”

“Between animal and human medicine there are no dividing lines--nor should there be.”

Rudolf Virchow, MD (the father of cellular pathology)

Posted on One Health Initiative website June 1, 2013

***Hendra Virus Vaccine: A Classical Example of One Health**

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In November, 2012, Pfizer Animal Health launched Equivac®HeV, a vaccine for the prevention of Hendra virus disease of horses in Australia. Since horses are a major source of contact spread of Hendra virus to humans, the vaccine promises to make an important contribution to human health as well. Fear of acquiring the disease has also constrained equine veterinary practice in Australia.¹

Development of Equivac®HeV was a collaborative effort between Pfizer and CSIRO's Australian Animal Health Laboratory. Testing of the vaccine in horses was performed at CSIRO's high-containment facilities at Geelong. Support for the development program was also provided by the Uniformed Services University of the Health Sciences and the Henry Jackson Foundation for the Advancement of Military Medicine in the US. A provisional approval for limited use of the vaccine was obtained in early 2012, and full approval in November.

Hendra virus is a member of the Henipavirus genus, family *Paramyxoviridae*. The reservoir hosts of Hendra virus are fruit bats (flying foxes, *Pteropus* spp.), and spread from bats to horses is by contact, respiratory droplets, or food or fomites contaminated with bat urine, or by contact with other horses. Human cases have resulted from contact with infected horses. The disease was first described in 1994. Human and equine cases have been

recorded in coastal Queensland and New South Wales and positive bats have been detected also in the Northern Territory. A total of 81 deaths in equids have been reported in 14 outbreaks with a 75% case-fatality rate, and 8 cases (4 fatal) have occurred in humans, all of whom had contact with sick horses, including horse trainers and veterinarians. The disease is manifested by severe systemic illness, respiratory symptoms or encephalitis.² Swine appear to be susceptible to experimental infection, and there is serological evidence of exposure was found in a single dog. A closely related bat-borne virus, Nipah virus in SE Asia has caused outbreaks in swine and humans.

The vaccine is a soluble, recombinant glycoprotein (G) of Hendra virus, and antibodies to the protein neutralize cell receptor binding of the virus. In addition to horses, the adjuvanted vaccine has been shown to protect ferrets against experimental infection.³ The vaccine also cross-protects against Nipah virus.

The availability of Equivac®HeV should lead to rapid uptake by horse owners in Australia. The Equine and horse racing industry in Australia is large, contributing billions of dollars, and over 1% of total Gross Domestic Product.⁴ The occurrence of at least one Hendra virus outbreak annually since 2006, and the high lethality of the disease, has raised considerable awareness.. Vaccination of horses represents a strategy not only for protection of valuable animals, but also for prevention of human cases. Similar strategies for immunizing animals for the prevention of both animal and human diseases are used (rabies, Brucellosis, avian influenza) or have been considered (e.g. *Bartonella*, bovine tuberculosis, Lyme disease, Venezuelan equine encephalitis, Japanese encephalitis, Rift Valley fever). However, vaccination of horses against Hendra virus may turn out to be one of the most straightforward and demonstrably effective strategies of all.

References:

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Dr. Monath is a founding member of the One Health Initiative Autonomous *pro bono* team.

*Article provided exclusively to the One Health Initiative website May 30, 2013.