Tulane University

Tulane study shows vaccine protects against equine viruses that threaten humans

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Leslie Tate ltate1@tulane.edu

There is no current vaccine or treatment against Western, Eastern and Venezuelan equine encephalitis, which are spread by mosquitoes. Photo by Shutterstock.

For the first time, a new vaccine provided complete protection against three types of equine encephalitic viruses in nonhuman primates, according to a new study published in the journal *Science Translational Medicine*. The research was a joint collaborative effort involving Tulane University, the National Institutes of Health and the U.S. Army.

These encephalitic alphaviruses are possible bioterrorism agents because of their potential to be aerosolized, punctuating the need for a vaccine to protect populations in the event of an attack.

Tulane University researchers Chad J. Roy and Vicki Traina-Dorge, both Tulane National Primate Research Center (TNPRC) faculty, directed the portion of the studies involving the use of specialized biocontainment laboratories located at the TNPRC.

“These findings are an important milestone in the development of a vaccine that could be employed in the event that these viruses are ever used in a deliberate release,” said Roy, director of Infectious Disease Aerobiology and Biodefense Research Programs at Tulane.

There is no current vaccine or treatment against Western, Eastern and Venezuelan equine encephalitis, which are spread by mosquitoes. In summer months when temperatures rise and mosquitos increase, horse populations are particularly susceptible to fatal infection from these viruses. Transmission from horses to humans occurs by mosquitoes as well, and can cause serious illness and death in vulnerable populations, particularly the elderly and children.

Using nonhuman primate and mouse models of aerosol infection, the study showed that the trivalent virus-like particle (VLP) vaccine induced a robust immune response and provided complete protection from all three viruses. The vaccine induced an immune response strong enough to effectively block the neurological effects of infection, which is normally a hallmark of disease with any of the three viruses.

“It was really exciting to see the VLP vaccine provide complete protection from all three types of viruses,” said Traina-Dorge, associate professor of microbiology and immunology. “This is a significant step, not only in protecting human populations from possible threats of bioterrorism, but also protecting both animals and humans from natural vector-borne disease transmission.”

As the global climate warms and human and animal populations increase, mosquito-borne infectious diseases have greater potential to spread. Having vaccines available to protect global populations from natural outbreaks is paramount to public health.

The Tulane National Primate Research Center improves human and animal health through basic and applied biomedical research. As one of the seven National Primate Research Centers funded by the National Institute of Health, the TNPRC is committed to discovering causes, preventions, treatments, and cures that allow people around the world to live longer, healthier lives. Primary research interests include developing vaccines, treatments and diagnostic tools for infectious diseases such as AIDS, Lyme disease, malaria, and tuberculosis. Learn more about the TNPRC at www2.tulane.edu/tnprc.

Tulane University researchers Vicki Traina-Dorge (left) and Chad J. Roy, both Tulane National

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