



National Institutes of Health
National Institute of Allergy
and Infectious Diseases
Bethesda, Maryland 20892

September 26, 2019

The Honorable Edward Markey
United States Senate
Washington, DC 20510

Dear Senator Markey:

Thank you for your September 6, 2019, letter regarding Eastern equine encephalitis virus (EEEV). I appreciate your interest in the National Institute of Allergy and Infectious Diseases (NIAID) research programs and am pleased to respond.

Diseases spread by vectors, such as mosquitoes, are a serious public health problem affecting nearly half of the world's population. To assist in responding to diseases caused by EEEV and other mosquito-borne pathogens, NIAID is conducting and supporting research to better understand the biology of vectors, how they transmit diseases, and how they find and interact with human hosts, with the goal of developing new and improved ways to prevent the transmission of diseases. This includes a range of basic research projects that will contribute to a better understanding of key aspects of the biology of arthropod vectors. The program also supports translational and clinical research projects to identify and evaluate products and techniques designed to prevent the transmission of pathogens. In addition, NIAID supports research on several vector-borne viruses, including West Nile virus, Western equine encephalitis virus (WEEV), and Venezuelan equine encephalitis virus (VEEV). The findings of this research also help inform our understanding of the pathogenesis of EEEV and the development of EEEV countermeasures.

Regarding EEEV, NIAID supports extramural research on this particular pathogen and related alphaviruses to better understand the diseases they cause and to develop novel medical countermeasures to combat them. For example, NIAID-supported scientists are identifying and characterizing proteins that play a role in EEEV replication and pathogenesis, elucidating factors that enable EEEV to bind to and infect particular cells and target specific organs, and studying how the immune system responds to EEEV infection and contributes to disease severity. These research efforts may lead to the identification of new targets for the development of vaccines and therapeutics. NIAID also provides support to advance development of a candidate vaccine and a candidate therapeutic compound that showed promise in EEEV animal models. In addition, NIAID helps accelerate the development of medical countermeasures for EEEV by providing the infectious disease research community with a suite of preclinical services that can fill knowledge gaps and lower the financial risk for potential commercial partners. Supplementary to the research on EEEV, NIAID supports research on mosquito vectors that transmit EEEV. NIAID-

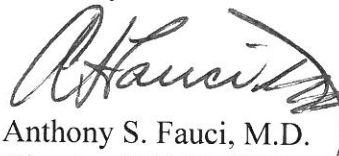
supported research aims to elucidate virus-vector interactions, mosquito mating behavior, how mosquitoes detect humans, and approaches to control mosquitoes.

The NIAID Division of Intramural Research (DIR) also conducts and supports a comprehensive vector biology research program to advance science and identify approaches that will help control or prevent the transmission of vector-borne pathogens to humans. This research program includes efforts within the Laboratory of Malaria and Vector Research mentioned in your letter. While NIAID DIR researchers are not directly investigating EEEV, there are several efforts by NIAID DIR scientists that may contribute to potential interventions to treat or prevent mosquito-borne diseases. For example, researchers have completed a Phase I clinical trial of a novel universal mosquito-borne disease vaccine that targets mosquito saliva for the purpose of preventing transmission of multiple protozoal and arboviral infections, such as EEEV. The data from this trial are currently being analyzed. A follow-up trial of a refined version of this vaccine began in August 2019 and is expected to be completed by the end of the year.

In addition, NIAID scientists at the NIAID Vaccine Research Center (VRC) are developing a three-component, virus-like particle-based vaccine designed to protect against WEEV, EEEV, and VEEV, respectively. This candidate vaccine, called Western, Eastern, and Venezuelan equine encephalitis (WEVEE) vaccine, underwent initial testing in non-human primates that showed complete protection against the three equine encephalitis viruses. The candidate has advanced to first-in-human Phase I clinical testing conducted by the NIAID VRC at the Emory Vaccine Center. The trial has completed enrollment and incremental doses of the vaccine were found to be safe and well-tolerated in 30 healthy volunteers. Results of immunogenicity testing for the vaccine trial are expected to be available in October 2019. The vaccine represents a safe and potentially effective tool for protecting against diverse equine encephalitis viruses.

Thank you for your interest in NIAID research related to EEEV. I hope that this information is helpful. I will also provide a copy of this letter to Senator Elizabeth Warren, the co-signer of your letter. Best personal regards.

Sincerely,



Anthony S. Fauci, M.D.
Director, NIAID, NIH