Washington University in St. Louis
Office of Technology Management

FUSION PROTEIN FOR TREATING MULTIPLE STRAINS OF VENEZUELAN EQUINE ENCEPHALITIS VIRUS

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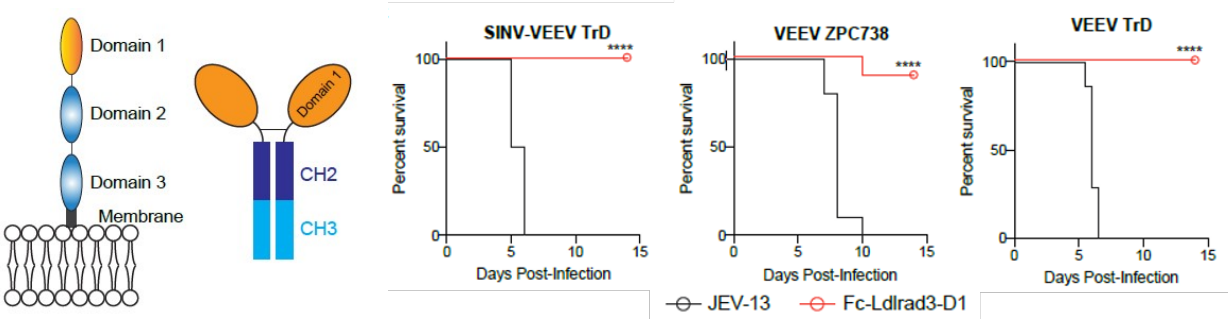
Disease indication - Venezuelan equine encephalitis virus (VEEV) infection, either naturally-arising and as a result of bioterrorism

Drug format – Biologic (soluble receptor fusion protein)

Drug class – First-in-class

Mode of action – This soluble fusion protein contains domain 1 of LDLRAD3, the receptor for VEEV infection. Treatment with the fusion protein blocks infection, as the soluble LDLRAD3 out-competes cells for VEEV binding.

Research stage and Preliminary data – The inventors performed both *in vitro* and *in vivo* proof-of-concept experiments using a soluble fusion protein they generated by fusing domain 1 of LDLRAD3 to the Fc region of human IgG1. Treatment with the fusion protein blocked infection by VEEV, even across multiple strains with differing virulence. Mice treated either prophylactically or up to 48 hours after viral exposure were able to avoid systemic infection and recovered fully.



Treatment with the LDLRAD3 fusion protein blocks VEEV infection by multiple strains

Background – Venezuelan equine encephalitis virus (VEEV) is highly pathogenic and transmitted by mosquito. Though outbreaks are relatively uncommon, VEEV is a biodefense concern due to the lack of available treatments, potential for aerosol spread, and history of Cold War weaponization research. LDLRAD3, a highly conserved membrane-bound protein, has recently been identified by the inventors as a surface receptor for VEEV binding.

Competitive edge – There are currently no treatments for VEEV. By blocking viral entry, this therapeutic would be effective against multiple strains of VEEV, including the highly virulent.

Publication – Ma, H., Kim, A.S., Kafai, N.M., Earnest, J.T., Shah, A.P., … & Diamond, M.S. (2020). LDLRAD3 is a receptor for Venezuelan equine encephalitis virus. *Nature*, 588: 308-314.

Patent status - Pending

Web Links – Diamond Profile & Lab