

VLDLR-BASED DECOY RECEPTORS TO PREVENT ALPHAVIRUS INFECTIONS

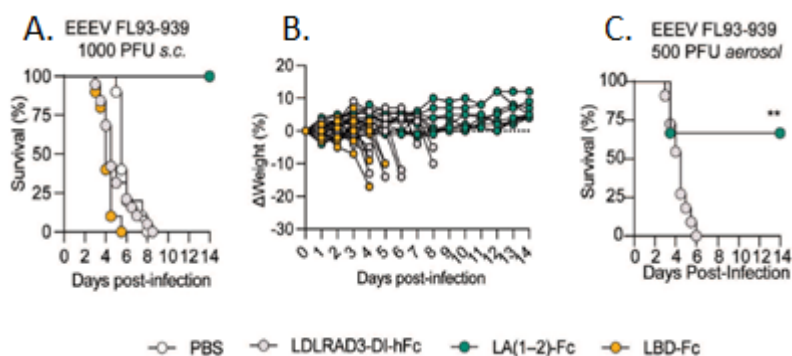
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VLDLR-based Decoy Receptors to Prevent Alphavirus Infections

Technology Description

Researchers at Washington University in St. Louis have developed very low-density lipoprotein receptor (VLDLR) soluble decoy receptors with potent inhibitory activity *in vitro* and *in vivo*. Eastern equine encephalitis virus (EEEV) is one of several alphaviruses that utilizes VLDLR to promote attachment and entry into cells. EEEV, the most pathogenic of the encephalitic alphaviruses, causes sporadic outbreaks across North America, with case fatality rates exceeding 30% in hospitalized patients. Though naturally transmitted by mosquitoes, encephalitic alphaviruses can easily be weaponized and spread via aerosolization. To date, there are no approved countermeasures for any encephalitic alphavirus infection. In mice aerosol challenge studies with VLDLR decoy receptors, EEEV infection is shown to be neutralized. In addition, VLDLR decoy receptors have shown to potently neutralize other encephalitic alphaviruses including Semliki Forest virus and Western equine encephalitis virus.



VLDLR LA(1-2)-Fc protects mice against EEEV FL93-939 challenge *in vivo*. (A) Survival and (B) weight change of 5-7-week-old female CD-1 mice administered 100 μ g of indicated Fc-fusion protein prior to subcutaneous challenge with EEEV FL93-939. The scoring system is described in STAR Methods. (C) Survival of mice treated as in (A) following aerosol challenge with EEEV FL93-939.

Stage of Research

Rationally designed VLDLR decoy receptors developed and challenge studies conducted in mice for both subcutaneous injection infection as well as aerosol infection.

Publications

[Structural and functional basis of VLDLR usage by Eastern equine encephalitis virus.](#)

Adams LJ... Diamond MS. Cell. 2024 Jan 18;187(2):360-374.e19. doi: 10.1016/j.cell.2023.11.031. Epub 2024 Jan 3. PMID:

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Applications

Neutralizing EEEV and other alphavirus infections

Key Advantages

Countermeasure for weaponized EEEV and other alphavirus infections

Patents

Provisional patent pending

Related Web Links – [Michael Diamond Profile](#); [Diamond Lab](#)