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Office of Technology Management

TARGET AND METHOD TO TREAT ALPHAVIRUS INFECTIONS

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Value Proposition: *Fusion protein that can be used to prevent and treat arthritogenic alphavirus infections.*

Technology Description

Researchers at Washington University in St. Louis have identified MXRA8 (matrix remodeling associated protein 8) protein as a key receptor for alphavirus entry and infection of host cells. Arthritogenic alphaviruses such as chikungunya (CHIKV), Ross River, Mayaro and O'nyong nyong (ONNV) are RNA viruses transmitted by mosquitos that cause debilitating acute and chronic musculoskeletal disease. There are currently no medicines to treat Chikungunya virus infection.

This invention identified the cell adhesion molecule MXRA8 as the critical entry receptor for allowing many alphaviruses to gain access to the cytoplasm. MXRA8 is shared by multiple arthritogenic alphaviruses including CHIKV, Ross River, Mayaro and ONNV, providing a much-needed therapeutic target and approach for treating many types of arthritogenic alphavirus infection.

Stage of Research

The inventors showed MXRA8-Fc fusion protein or anti-MXRA8 monoclonal antibodies blocked CHIKV infection in multiple cell types including primary human cells. In mice, administering MXRA8-Fc protein or MXRA8 blocking antibodies reduced CHIKV or ONNV infection. Further studies identified species-specific differences in MXRA8 binding, resulting in the design of further optimized chimeric receptors.

Publications

- Mxra8 is a receptor for multiple arthritogenic alphaviruses. Nature 2018
- Cryo-EM Structure of Chikungunya Virus in Complex with the Mxra8 Receptor. Cell 2019
- Expression of the Mxra8 receptor promotes alphavirus infection and pathogenesis in mice and Drosophila. Cell Reports 2019
- Vertebrate-class-specific binding modes of the alphavirus receptor MXRA8. Cell 2023

Applications

Treatment of arthritogenic alphavirus infection

Key Advantages

- Solves an unmet need by providing potential therapeutics to treat many arthritogenic alphavirus infections
- New target for therapeutic development to prevent alphavirus infection

Patents

US Patent issued 10/21/2025 with additional IP pending.

Related Web Links – Michael Diamond Profile; Diamond Lab