



TECHNOLOGY

TWEAK as a Therapeutic Target for Treating Stroke and Other Central Nervous System Diseases

OVERVIEW

Research shows that a TNF-related cytokine known as TWEAK is a causative agent for some of the effects seen in ischemic stroke. When TWEAK binds to a receptor called Fn14 on the surface of neuronal, glial and endothelial cells in the brain, it causes three main effects which result in brain tissue damage: (1) release of pro-inflammatory factors; (2) induction of programmed cell death; and (3) development of cerebral edema. Dr. Winkles and Dr. Yepes devised an Fn14-Fc decoy receptor which binds TWEAK, thereby preventing it from binding to its cell surface receptor and inhibiting its damaging effects. The inventors utilized a mouse model of ischemic stroke to demonstrate the important protective outcomes for the brain following treatment with the Fn14-Fc decoy receptor. Amongst these outcomes demonstrated in mice following treatment for stroke are: (1) 41% decrease in the volume of tissue damaged by the stroke; (2) 70% percent reduction in brain edema; and (3) significantly faster recovery of motor activity compared to non-treated mice. Additional experiments showed that these outcomes are enhanced with higher doses.

APPLICATIONS

According to the American Stroke Association, about 780,000 Americans each year suffer a new or recurrent stroke, and stroke kills more than 150,000 people a year, making it the third most important cause of death following heart disease and cancer. The majority are ischemic strokes, caused by a blockage of blood supply to the brain, and can result in paralysis, sensory loss, language dysfunction and impairment of other functions. Fewer than 5% of stroke patients benefit from the currently approved clot-busting drug tPA, and there remains a critical need for new treatments that can minimize the potentially disabling effects of stroke.

ADVANTAGES

- Novel inhibitor of TWEAK activity
- Proven to minimize tissue damage caused by stroke
- Proven to enhance recovery from stroke

STAGE OF DEVELOPMENT

The inventors are currently conducting additional tests in animals to optimize the dose, time, and mode of administration of the Fn14-Fc decoy receptor following stroke and will also test how various formulations of the decoy receptor may enhance its stability

R&D REQUIRED

Additional translational research followed by clinical development.

LICENSING POTENTIAL

UMB seeks partners for licensing, clinical development, and/or sponsored research to advance this technology into the healthcare field.

CONTACT INFO

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Additional Information

INSTITUTION

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PATENT STATUS

U.S. PATENT 7,939,490, issued May 10, 2011, titled "TWEAK as a Therapeutic Target for Treating Central Nervous System Diseases Associated with Cerebral Edema and Cell Death"

CATEGORIES

- Therapeutics

INVESTIGATOR(S)

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EXTERNAL RESOURCES

- [TWEAK-Fn14 pathway inhibition protects the integrity of the neurovascular unit during cerebral ischemia.](#)
- [Inhibition of TWEAK activity as a new treatment for inflammatory and degenerative diseases.](#)
- [Tumor necrosis factor-like weak inducer of apoptosis increases the permeability of the neurovascular unit through...](#)
- [A soluble Fn14-Fc decoy receptor reduces infarct volume in a murine model of cerebral ischemia.](#)

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