



Blood-Brain Barrier Targeting Antibodies to Improve Drug Delivery

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WARF: P140126US02

Inventors: Eric Shusta, Angela Jones, Charles Stutz

The Wisconsin Alumni Research Foundation (WARF) is seeking commercial partners interested in developing BBB-selective antibodies with enhanced binding specificity.

Overview

Even though therapeutic compounds have been developed for neurologic disorders such as Alzheimer's disease, these conditions remain difficult to treat in large part because of the blood-brain barrier (BBB). The BBB is a natural defense mechanism that unfortunately interferes with drug delivery, allowing few molecules to enter the brain from the bloodstream. More than 98 percent of small molecule pharmaceuticals and nearly 100 percent of protein and gene therapeutics cannot pass through this barrier.

One promising delivery method involves antibodies that target receptor-mediated systems at the BBB. Drug molecules can be attached to the antibodies and transported into brain tissue. Antibodies that target the transferrin and insulin receptor systems currently are available, but these systems are expressed throughout the body, leading to the mistargeting of expensive pharmaceuticals.

The search continues for new antibodies capable of targeting and/or transporting therapeutic payloads into the brain.

The Invention

UW-Madison researchers have identified a pair of single-chain antibody fragments (scFv15 and scFv38) that may help drugs cross the BBB. The two promising new antibodies are capable of binding antigens expressed at the BBB *in vivo*.

The researchers panned a human scFv library to identify candidates that specifically bind to brain endothelial cell receptors and may pass through the BBB. Drugs or drug carriers could be attached to these fragments and then transported into the brain.

Applications

- Delivering therapeutics to the brain
- May lead to new methods of treating disorders such as Alzheimer's disease, Parkinson's disease, Huntington's disease, ALS, autism, multiple sclerosis, brain cancer and stroke

Key Benefits

- Provides a non-invasive method of specifically delivering drugs to the brain
- Selective and efficient
- May minimize side effects that can result when drugs are mistargeted

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WARF
Wisconsin Alumni Research Foundation

| info@warf.org | 608.960.9850

Stage of Development

The researchers have identified the two scFv antibody fragments with enhanced binding specificity for the BBB and plan further work *in vivo*.

Additional Information

For More Information About the Inventors

- [Eric Shusta](#)

Related Technologies

- [WARF reference number P06056US describes several other antibody fragments previously identified by the researcher.](#)
- [WARF reference number P130017US02 describes an improved *in vitro* model of the BBB for screening compounds and researching brain function.](#)

Tech Fields

- [Drug Delivery : Other drug delivery technologies](#)

For current licensing status, please contact Jennifer Gottwald at jennifer@warf.org or 608-960-9854

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