

*Drug Delivery Therapeutic*

## Therapeutic Protein Delivery Across the Blood-Brain Barrier

### Brief Description of Technology

A delivery mechanism which allows large molecule therapeutics to transcytose the blood-brain barrier for treatment of neurological disorders.

#### TECHNOLOGY ID

2010-1203

#### BUSINESS OPPORTUNITY

Exclusive License

#### TECHNOLOGY TYPE

Natural/Modified Protein

#### PATENT INFORMATION

Nationalized

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### Technology Overview

The blood-brain barrier prevents large molecular weight substances from transcytosing into the CNS. This technology surmounts this barrier by fusing the receptor-binding domain (Rb) of apolipoprotein E with potentially therapeutic proteins that can bind to LDL receptors on the BBB. Proof of concept was demonstrated using lysosomal enzyme  $\alpha$ -L-iduronidase (IDUA) in a mouse model. Testing showed desirable receptor-mediated binding, endocytosis, and transendothelial transport of the fusion protein, as well as appropriate lysosomal enzyme flow and biological function, and led to 2% to 3% of normal brain IDUA activities 5 months after long-term delivery. The technology can be used to deliver therapeutic treatment for lysosomal storage diseases, with potential application in other brain diseases.

### Applications

- Drug delivery mechanism that allows protein therapeutics to cross the blood-brain barrier
- Proof of concept tested in Hurler Syndrome
- Cell therapies
- Protein therapies

### Advantages

- Non-invasive
- Global delivery of protein therapeutics to brain and central nervous system tissue
- Only limited activity required for significant benefit

### Market Overview

There are over 50 lysosomal storage diseases (LSD), and enzyme replacement therapy has been largely unsuccessful in improving CNS manifestations of LSDs due to difficulty penetrating the blood-brain barrier.

### Investigator Overview

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