**Docket #:** S23-107

# Targeting cerebrovascular mucins to improve brain health in age-related diseases

The blood-brain barrier (BBB) lumen is coated by a carbohydrate-rich meshwork known as the brain endothelial glycocalyx layer. Stanford researchers have shown that the brain endothelial glycocalyx is highly dysregulated during aging and neurodegenerative disease. They furthermore identified that a class of glycans known as mucins are highly downregulated on the brain endothelium during aging and in neurodegenerative diseases, which in turn leads to increased BBB leakiness and brain bleeds. Finally, they show brain-endothelial specific viruses (AAVs) can be therapeutically used to overexpress the mucin biosynthetic genes and restore BBB function (less leakiness) and decrease neuroinflammation.

**Stage of Development**
In vivo: mouse models

## Applications

- Neurodegenerative diseases: Alzheimer's, Parkinson's, multiple sclerosis, ALS, traumatic brain injury (TBI), stroke, etc.

## Advantages

- Novel way of treating blood brain barrier dysfunction and inflammation

## Publications

- Shi, S.M., Suh, R.J., Shon, D.J. et al. Glycocalyx dysregulation impairs blood–brain barrier in ageing and disease. *Nature* (2025).
- Borthwick, Lindsay. Changes in brain's 'sugar shield' could be key to understanding effects of aging. *StanfordReport.* February 2025.


## Patents

- Published Application: WO2024192242
- Published Application: 20260241037

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