

Driving Neural Activity to Rapidly Control Inflammation, Protein, and Gene Expression in the Brain

Brain inflammation can negatively influence neurodegenerative diseases

Inflammation and dysregulation of protein and gene expression is thought to play a critical role in multiple diseases, including neurodegenerative disease, traumatic brain injury, aging, Schizophrenia, and autism, among others. Identification of new methods to rapidly, precisely, and non-invasively, control brain inflammation and protein and gene expression would radically transform our ability to study brain functions, treat diseases, and promote healthy aging.

New method to rapidly control diverse cellular functions in the brain non-invasively

Inventors at Georgia Tech have discovered that precise driving of neural activity can be used as a novel method to rapidly and transiently stimulate central pathways in neurons which regulate diverse cellular functions in multiple cell types of the brain. These pathways control production of factors that promote neuronal health, synaptic plasticity, and healthy immune activity. Importantly, this manipulation can be done non-invasively. This will lead to controlling the brain's neural and immune responses by driving neural activity non-invasively, and could be used to treat many brain diseases, brain injury, infection, and the effects of normal brain aging.

Summary Bullets

- Novel non-invasive method utilizing neural activity to swiftly control inflammation, protein, and gene expression in the brain.
- The technology enables rapid and precise modulation of brain functions, potentially revolutionizing treatment for various neurological conditions.
- Commercial applications include treating Alzheimer's, schizophrenia, autism, epilepsy, and more, offering faster, non-invasive, and targeted therapeutic options.

Solution Advantages

- **Faster** – 5-30 minutes versus hours
- **Non-invasive**
- **Targeted treatment for different conditions**

Potential Commercial Applications

- Treat neurological conditions such as:
 - Cognitive loss with normal aging
 - Alzheimer’s disease
 - Schizophrenia
 - Autism
 - Infection
 - Epilepsy
 - Depression and anxiety disorders
 - Other disorders that involve inflammatory signaling, the brain’s immune response, and neural activity

Inventors

- Annabelle Singer
Assistant Professor – Georgia Tech School of Biomedical Engineering
- Levi Wood
Assistant Professor – Georgia Tech School of Mechanical Engineering

IP Status

<p>Patent has issued</p>: US11964109B2

Publications

, -

Images

Visit the Technology here:

[Driving Neural Activity to Rapidly Control Inflammation, Protein, and Gene Expression in the Brain](#)

<https://s3.sandbox.research.gatech.edu//print/pdf/node/4301>