

# Upregulation of GABA Signaling for the Treatment of Acquired Cognitive Deficits

## Lead Inventor:

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## Background & Unmet Need

- Loss of organized sleep electrophysiology is a characteristic finding after severe brain injury
- Acquired cognitive deficits may lead to loss of autonomy and independence and significantly impact patient quality of life
- Recent studies have implicated daytime brain activation as a modulator of sleep architecture in the severely injured brain
- **Unmet Need:** Novel therapeutics for patients who experience continued cognitive deficits following brain injury

## Technology Overview

- **The Technology:** Treatment of acquired cognitive deficits through upregulation of GABA<sub>B</sub> signaling
- **The Discovery:** Administration of sodium oxybate (SO) in mice right before sleep generated an increase in the delta oscillations (1-4Hz) LFP power in the non-REM
- Administration of SO at night increased beta (20-40Hz) and gamma (>40Hz) LFP during the subsequent wakeful period
- An increase in beta and gamma frequency power is associated with the recovery of complex behaviors in a wakeful state

## Inventors:

Nicholas D. Schiff  
Jackie Gottshall  
Diany P. Calderon

## Patents:

PCT Application Filed

## Publications:

[Gottshall et al.](#) *Front Neurol.* 2019.

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## Cornell Reference:

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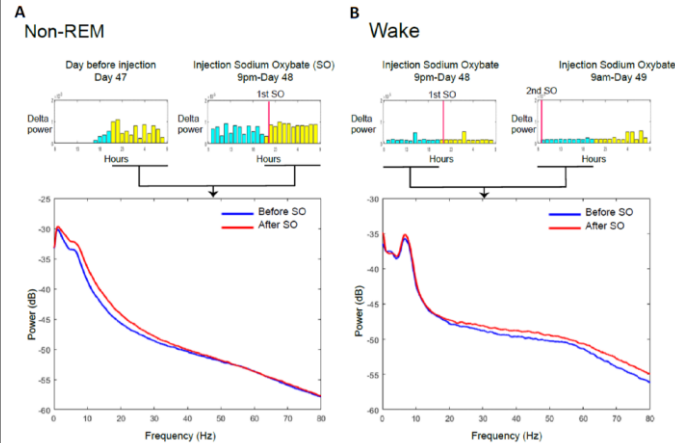
## Technology Applications

- Treatment of cognitive deficits following brain injury, or in association with chronic disease or psychiatric disturbance
- Improvement of wakeful function

## Technology Advantages

- Upregulation of GABA<sub>B</sub> signaling at night may be coupled with anterior-forebrain stimulating therapy when the subject is awake
- Several upregulators of GABA signaling are already approved for other indications (e.g., baclofen, tiagabine, zolpidem, midazolam)

## Supporting Data / Figures



**Figure 1:** Administration of sodium oxybate (SO) injection to mice during the night results in elevation of delta (1-5Hz) local field potential (LFP) power and increases the subsequent wakeful period in beta (15-30Hz) and gamma (>30Hz) LFP.

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