Catecholaminergic Neuromodulation by Vagus Nerve Stimulation

March 18

Tuesday, 12:30 pm

Billings Building—Rosedale Room

SPEAKER:

Catherine Thorn, PhD

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The University of Texas at Dallas

Host: Dianna E. Willis, Ph.D.

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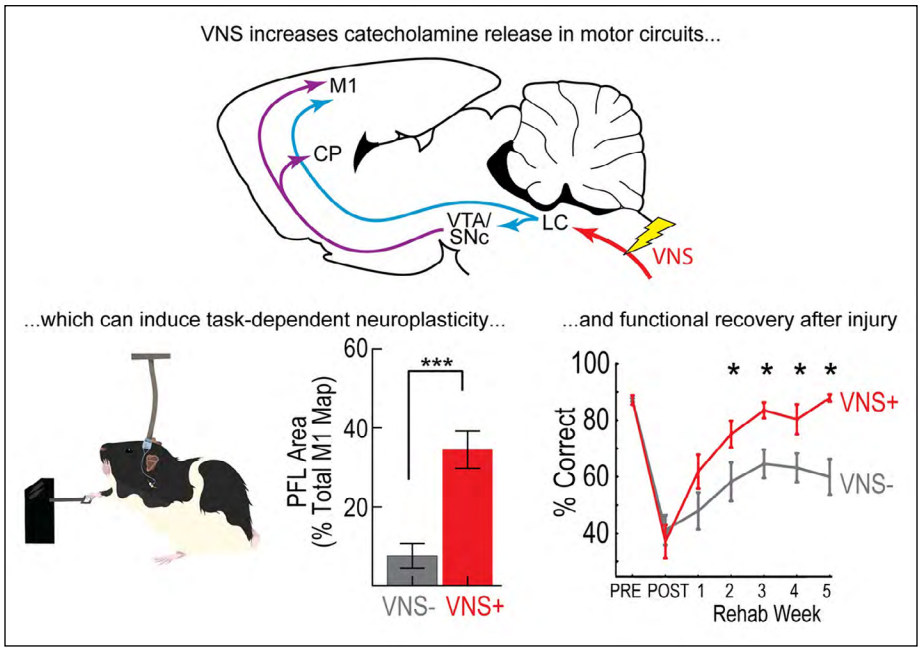
Abstract



Research in the Thorn Lab aims to understand the neurobiological mechanisms that underlie motor cortical plasticity and motor learning, in healthy subjects and in disease states. Our work combines neural recording and stimulation techniques with rodent behavior to characterize learning related changes in neural signaling at multiple levels of investigation—from single neurons to behaving animal. Our current studies seek to elucidate the catecholaminergic mechanisms by which vagus nerve stimulation (VNS) drives reinforcement of motivated behaviors. By specifying the functional connectivity between the vagus nerve and central noradrenergic and dopaminergic circuits, we aim to gain novel insights that clarify the link between visceral control of feeding behaviors and reinforcement of complex motor skills and habits. Our studies have broad clinical relevance for the expanding use of VNS to treat diseases and disorders associated with catecholaminergic dysfunction, including depression, obesity, addiction, Parkinson's disease, and stroke recovery.

Publications:

1. Tseng et al (2024) *Frequency Specific Optogenetic Stimulation of the Locus Coeruleus Induces Task-Relevant Plasticity in the Motor Cortex.*

2. Brougher et al (2021) *Self-Administration of Right Vagus Nerve Stimulation Activates Midbrain Dopaminergic Nuclei.*

3. Tseng et al (2021) *Local activation of alpha-2 adrenergic receptors is required for vagus nerve stimulation induced motor cortical plasticity.*