BURKE MEDICAL RESEARCH INSTITUTE Weill Cornell Medicine

Weekly Colloquium

Monday, 6/12/2017, 11:30pm, Billings Building – Rosedale Conference Room

"A Systems Neuroscience Approach to Motor Recovery"

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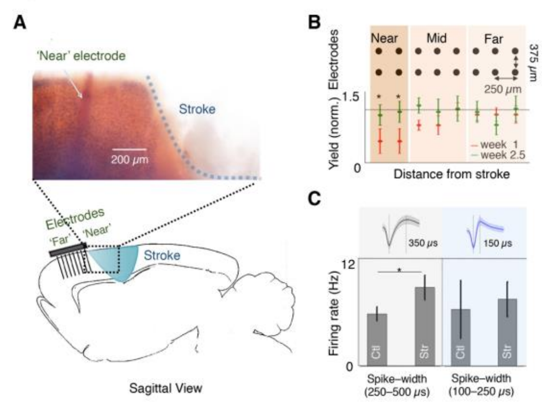
Abstract

It is commonly hypothesized that restoration of normal neural dynamics in the injured brain can improve function. However, we lack a precise neurophysiological framework for such an approach. Here we show that low-frequency oscillatory (LFO) dynamics play a critical role in the execution of skilled behaviors in both the intact and injured brain. We chronically recorded local field potentials and spiking during motor training in both healthy and post-stroke rats. Interestingly, we found that task-related LFOs emerged with skilled performance under both conditions and were a robust predictor of recovery. We further hypothesized that boosting LFOs might improve function in animals with persistent deficits. Strikingly, we found that direct current stimulation could boost LFOs, and when applied in a novel, task-dependent manner, significantly improved function in those with chronic deficits. Together, our results demonstrate that LFOs are essential for skilled controlled and represent a novel target for modulation after injury.

Figure 1.



Publications:

Gulati T, Ramanathan DS, Wong CC and Ganguly K. Reactivation of emergent task-related ensembles during slow-wave sleep after neuroprosthetic learning. Nature Neuroscience. (2014).

Gulati T, Won S -J, Ramanathan DS, Wong, CS, Bodepudi A, Swanson RA, Ganguly K. Robust neuroprosthetic control from the stroke perilesional cortex Journal Of Neuroscience (2015). Jun. 35:22:8653-8661.

Wong CC, Ramanathan DS, Gulati T, Won, SJ and Ganguly K. An automated behavioral box to assess forelimb function in rats. Journal of Neuroscience Methods (2015)

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