Circuits in Motion: Mapping and Modulating Neural Pathways in Stroke, Spinal Cord Injury and Parkinson's Disease

June 17

Tuesday, 12:30 pm

Billings Building—Rosedale Room

SPEAKER:

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Abstract

Neurological injury and/or disease can result in multiple maladaptive mechanisms that can limit rehabilitation efficacy. To improve rehabilitation efforts, it is critical not only to evaluate the mechanisms that influence recovery but also capitalize on tools that can harness the systems potential. Here, I will discuss my team's focus on addressing these areas directly in populations with Stroke, Spinal Cord Injury and recently, Parkinson's Disease. During the presentation data will be shared highlighting the use of therapeutic adjuncts, including non-invasive brain stimulation and temporary deafferentation, to enhance rehabilitation programs in stroke and spinal cord injury populations. We will also outline how we are using advanced neuroimaging and neuroimaging analysis methods to quantify pathway-level changes that occur following neurological injury/disease in a clinical setting. Finally, we will outline how we have begun to integrate our findings to build machine-learning algorithms that can be used to predict disease severity, with the goal of improving disease diagnosis and treatment in rural areas.
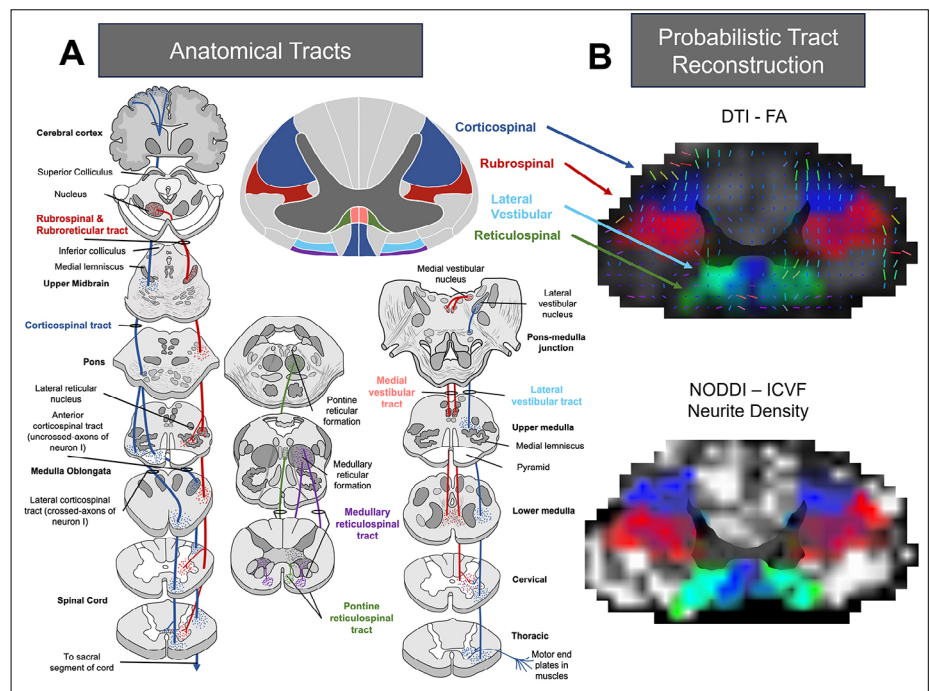
Publications

1. Lin YL, Potter-Baker KA, Sankarasubramanian V, Cunningham DA, Li M, O'Laughlin K, Conforto AB, Wang X, Sakaie K, Knutson J, Machado AG, Plow EB. Stratification algorithm for repetitive TMS in stroke (START): *Results from an exploratory crossover study.* J Neurol Sci. 2025 Jun 15;473:123478. doi: 10.1016/j.jns.2025.123478. Epub 2025 Mar 28. PMID: 40209285.

2. Arora T, O'Laughlin K, Potter-Baker K, Kirshblum S, Kilgore K, Forrest GF, Bryden AM, Wang X, Henzel MK, Li M, Perlic K, Richmond MA, Pundik S, Bethoux F, Frost F, Plow EB. *Safety and efficacy of transcranial direct current stimulation in upper extremity rehabilitation after tetraplegia: protocol of a multicenter randomized, clinical trial.* Spinal Cord. 2022 Sep;60(9):774-778. doi: 10.1038/s41393-022-00768-z. Epub 2022 Mar 5. PMID: 35246620; PMCID: PMC8896974.

3. Oquita R, Cuello V, Uppati S, Mannuru S, Salinas D, Dobbs M, Potter-Baker KA. *Moving toward elucidating alternative motor pathway structures post-stroke: the value of spinal cord neuroimaging.* Front Neurol. 2024 Feb 14;15:1282685. doi: 10.3389/fneur.2024.1282685. PMID: 38419695; PMCID: PMC10899520.

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