

Weekly Colloquium

Tuesday, 3/13/2018, 12:30pm, Billings Building – Rosedale Conference Room

"Motor and sensory adaptation in pediatric hemiplegia"

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Research statement:

Skilled movement requires motor commands to move muscles and sensory feedback to gauge fidelity of actual movement with intended movement. Injury of the developing nervous system affects the motor and sensory pathways differently. In the motor system, injury to one cerebral hemisphere causes persistence of bilateral connections from the uninjured hemisphere. In contrast, there are few bilateral connections in the touch and proprioception system, which provides key sensory feedback. In addition, one common developmental brain injury (periventricular lesion) spares these sensory connections, while another (middle cerebral artery infarction) usually compromises these connections. Both types of injury usually affect the corticospinal system, the principal motor pathway for skilled movement. This lecture presents evidence from animal models and humans that identifying the sensory and motor connections spared by injury is critical to understanding hand function. It will also advance the hypothesis that this understanding can be used to target therapies to neural circuits.

Publications:

Effect of Sensory and Motor Connectivity on Hand Function in Hemiplegic Children. Gupta D, Barachant A, Gordon AM, Kuo AC, Ferre C, **Carmel JB*** (co-last author), Friel KM*. *Annals of Neurology*. 2017 Oct 16.

The right stimulation of the right circuits: Merging understanding of brain stimulation mechanisms and systems neuroscience or effective neuromodulation in children **Carmel JB**, Friel KM. *Pediatric Brain Stimulation*. 1st ed. Kirton, Gilbert, editors. Calgary, AB, Canada: Academic Press; 2016; p.195-208.

Plasticity in One Hemisphere, Control from Two: Adaptation in Descending Motor Pathways after Unilateral Corticospinal Injury in Neonatal Rats. Wen T, Lall S, Pagnota C, Markward J, Hill NJ, Ratnadurai-Giridharan S, **Carmel JB**. Revision submitted.

