



Neural Prosthesis Seminar

“Strengthening Corticospinal Synaptic Transmission After Spinal Cord Injury”

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Biomedical Research Building 105

Case Western Reserve University



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Abstract

The corticospinal tract is an important target for motor recovery after spinal cord injury (SCI) in animals and humans. Voluntary motor output depends on the efficacy of synapses between corticospinal axons and spinal motoneurons, which can be modulated by the precise timing of neuronal spikes. Using noninvasive techniques, we developed tailored protocols for precise timing of the arrival of descending and peripheral volleys at corticospinal-motoneuronal synapses of an intrinsic finger muscle in humans with chronic incomplete SCI. We found that arrival of presynaptic volleys prior to motoneuron discharge enhanced corticospinal transmission and hand voluntary motor output. Modulation of residual corticospinal-motoneuronal synapses may present a novel therapeutic target for enhancing voluntary motor output in motor disorders affecting the corticospinal tract.

For more information, please contact Cheryl Dudek at (216) 231-3257.

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