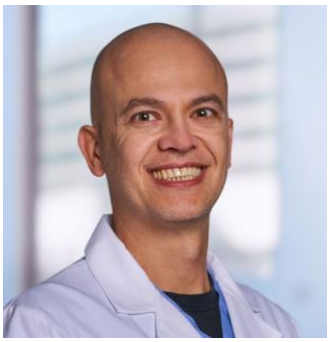
University of Houston - Biomedical Engineering Seminar
Friday, March 25, 2022, 12 noon
Via Zoom:

https://uh-edu-cougarnet.zoom.us/j/97219977403?pwd=V0lRTGhJMTdDQ1dwUDRJcGhYNTVFZz09

Neuromodulation Of Spinal Networks To Regain Sensorimotor Function After Paralysis



Dimitry Sayenko, M.D., Ph.D.

Abstract

The mammalian spinal cord can generate rhythmic or tonic motor output even in the absence of input from the brain. This evidence led to the hypothesis that if similar spinal circuits exist in humans, then electrically stimulating the lumbosacral spinal cord in combination with motor activity could facilitate motor function and mobility in patients with spinal cord injury (SCI). Adults with chronic motor complete paraplegia underwent epidural spinal stimulation therapy, could maintain minimally assisted standing, and revealed significant levels of voluntary control of the lower limbs during stimulation. Similar functional outcomes can be obtained using transcutaneous spinal stimulation. Activation of sub-functional longitudinal fibers across the lesion, and emerging responsiveness of spinal networks below the lesion to descending commands and proprioception is considered the main mechanism for both invasive and non-invasive spinal stimulation to restore function after paralysis.

Biosketch

Dr. Dimitry Sayenko received his MD from the Russian State Medical University. At the Institute for Biomedical Problems, he specialized in biomedical aspects of spaceflights. For his PhD in Aerospace Medicine, he studied the effect of microgravity on postural control. After periods at the National Rehabilitation Center in Japan and the Toronto Rehabilitation Institute, Dr. Sayenko was a faculty member at the University of Louisville, where he investigated the mechanisms of neuromodulation induced by epidural spinal stimulation. From 2014 to 2018, Dr. Sayenko worked at the UCLA, and utilized spinal stimulation in individuals with spinal cord injury to recover sensorimotor function in the upper and lower limbs. Dr. Sayenko's research at the Houston Methodist Research Institute focuses on the mechanisms and effects of spinal neuromodulation in the sensorimotor recovery after neurological disorders and injuries, including multiple sclerosis and spinal cord injury.