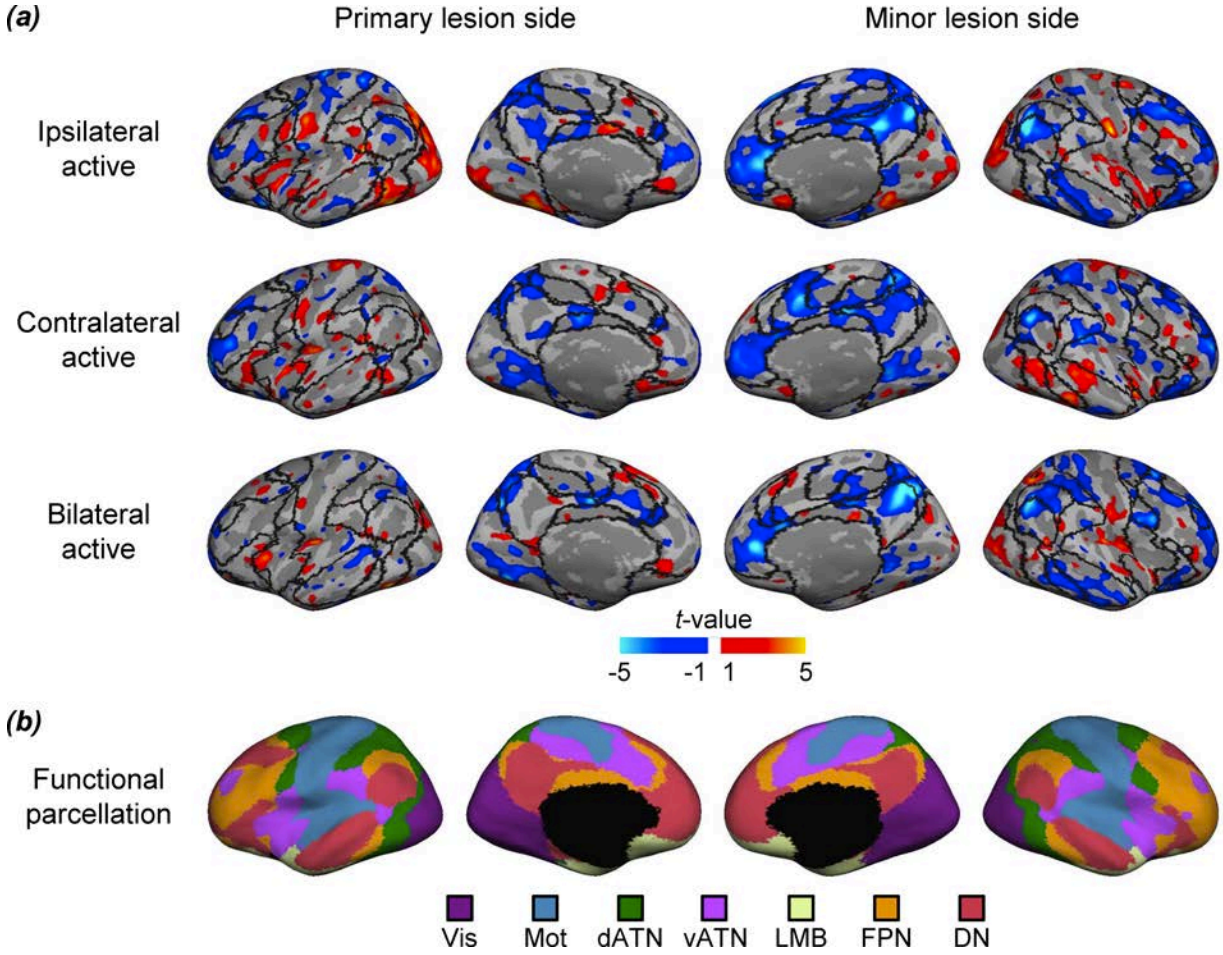
# Spring 2023 CBI Featured Image - Courtesy of

## Dr. Bashar Badran, Neuro-X Lab, Department of Psychiatry and Behavioral Sciences




Both implanted and noninvasive vagus nerve stimulation (VNS) have been primarily administered clinically to the unilateral-left vagus nerve. This left-only convention has proved effective in treating epilepsy, and more recently stroke rehabilitation. However, in stroke survivors, the presence of a lesion in the brain may disrupt afferent propagation of VNS-mediate signaling, and thus it is important to understand the laterality effects of VNS in stroke survivors to optimize this new intervention.

We aimed to understand whether active noninvasive VNS delivered to the ipsilesional ear differs in blood oxygenation level dependent (BOLD) signal propagation compared to the contralesional ear and whether bilateral ear stimulation may overcome any lesion interactions in a stroke. Our findings suggest laterality of noninvasive VNS relative to the lesion is a critical factor in optimizing the direct brain effects of taVNS and should be considered when designing studies in neurorehabilitation paradigms.

**taVNS active induced task activation changes compared to sham active in patients with chronic stroke (uncorrected).**

(a) Paired t-test were performed between task activations of taVNS active and sham. The maps of task activation changes of each taVNS modalities compared to shame were displayed (Paired t-test, uncorrected). All taVNS modalities showed increased activations in the anterior insular and sensorimotor regions, and reduced activations in the DN related areas. Black lines on the cortical surface represent the boundaries of (b) seven functional networks derived from a cortical parcellation, including the visual (Vis), sensorimotor (Mot), dorsal attention (dATN), ventral attention (vATN), limbic (LMB), frontoparietal control (FPN), and default (DN) networks.