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Vagus nerve stimulation alters phase synchrony of the anterior cingulate cortex and facilitates decision making in rats**Ying Li**

City University of Hong Kong, China

Vagus nerve stimulation (VNS) can enhance memory and cognitive functions in both rats and humans. Studies have shown that VNS influenced decision-making in epileptic patients. However, the sites of action involved in the cognitive-enhancement are poorly understood. By employing a conscious rat model equipped with vagus nerve cuff electrode, we assess the role of chronic VNS on decision-making in rat gambling task (RGT). Simultaneous multichannel-recordings offer an ideal setup to test the hypothesis that VNS may induce alterations of in both spike-field-coherence and synchronization of theta oscillations across brain areas in the anterior cingulate cortex (ACC) and basolateral amygdala (BLA). Daily VNS, administered immediately following training sessions of RGT, caused an increase in 'good decision-maker' rats. Neural spikes in the ACC became synchronized with the ongoing theta oscillations of local field potential (LFP) in BLA following VNS. Moreover, cross-correlation analysis revealed synchronization between the ACC and BLA. Our results provide specific evidence that VNS facilitates decision-making and unveils several important roles for VNS in regulating LFP and spike phases, as well as enhancing spike-phase coherence between key brain areas involved in cognitive performance. These data may serve to provide fundamental notions regarding neurophysiological biomarkers for therapeutic VNS in cognitive impairment.

Biography

Ying Li has completed his MD from Beijing Medical University (1962–1968). He was a General Surgeon, and Oral-Maxillofacial Surgeon at Nanjing Medical School. He completed Post-doctoral fellowship in Department of Internal Medicine University of Michigan, where he was appointed as Research Scientist in 1997, and Research Professor in 2002.

yingli@cityu.edu.hk

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