Easing Chronic Pain: Electrical Stimulation of Deep Brain Structures Under Cortex

A University of Texas (UTA) at Arlington research team has been working on an alternative solution to addressing chronic pain: electrical stimulation of deep brain structures under the cortex.

The group of investigators, led by UTA psychology professor Yu-Eun Bong, PhD, examined the process, which also triggers the release of dopamine, a neurotransmitter known to reduce the emotional distress associated with long-term pain.

This is the first study to use a wireless electrical device to alleviate pain by directly stimulating the ventral tegmental area (VTA) of the brain,” Dr Yu-Eun Bong said in a statement. “While still under laboratory testing, this new method provide hope that in the future we will be able to alleviate chronic pain without the side effects of medications.

The study investigators analyzed the effects of direct electrical stimulation of the VTA on mechanical, thermal and carrageenan-induced chemical nociceptive thresholds in Sprague-Dawley rats using our custom-designed wireless stimulator. VTA stimulation alone did not show any change in mechanical or thermal thresholds, the researchers found. VTA stimulation reversed decreased mechanical and thermal thresholds induced by carrageenan injection in the hind paw contralateral to the stimulation site.

The investigators additionally recorded spinal cord dorsal horn neuronal responses to graded mechanoechemical stimuli. They found that VTA stimulation significantly increased dorsal horn neuronal activity in response to pressure and pinch from the paw, but not brush, which indicates that VTA stimulation may have exerted its analgesic effect through its connections with brain stem structures and cerebral cortex areas.

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