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Neurological mechanisms underlying the effects of mechanoacupuncture in the treatment of drug abuse disorders

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H^{T7} mechanoacupuncture has been shown to reduce drug-seeking behavior. However, aspects of its mechanism remain elusive. In these studies, we demonstrate that a portion of the neurological pathway mediating HT7's effects begin with activation of peripheral mechanoreceptors in the ulnar nerve. These receptors send signals through the dorsal column medial lemniscal (DCML) pathway and synapse in the nucleus cuneatus, then, progressively, to the thalamus and lateral habenula before arriving at the ventral tegmental area (VTA). There, activation of delta opioid receptors produces a transient decrease in GABA neuron firing rate resulting in a net disinhibition of VTA dopaminergic projections to the nucleus accumbens (NAc), producing an ephemeral increase in DA neurotransmission. We further show that these effects are specific to frequency, but not region of stimulus.

Biography

Kyle Bruce Bills completed his graduate Summa Cum Laude from Parker University in 2009 with his Doctor of Chiropractic (DC) degree. He started a private practice in Tracy, CA and practiced for seven years, including serving as an appointee by the State of California to serve a Qualified Medical Evaluator and Subject Matter Expert in the workers' compensation system. In 2016, he began Post-Doctoral Research Training at Brigham Young University. He is currently earning a PhD in Neuroscience focusing on the underlying neurological mechanism of mechanoacupuncture in the treatment of drug-abuse disorders.

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