National Institute on Drug Abuse

Traditional Chinese Acupuncture and Placebo (Sham) Acupuncture are Differentiated by their Effects on Mu-Opioid Receptors (MORs)

Zubieta and colleagues at the University of Michigan used PET receptor imaging to investigate whether acupuncture analgesia involves the activation of endogenous opioid antinociceptive systems and mu-opioid receptors (MORs). This is also a neurotransmitter system that mediates the effects of placebo-induced analgesia. This overlap in potential mechanisms may explain the lack of differentiation between traditional acupuncture and either non-traditional or sham acupuncture in multiple controlled clinical trials. The short- and long-term effects of traditional Chinese acupuncture (TA) were compared with sham acupuncture (SA) treatment on in vivo MOR binding availability in chronic pain patients diagnosed with fibromyalgia (FM). Patients were randomized to receive either TA or SA treatment over the course of 4 weeks. Positron emission tomography (PET) with C-11-carfentanil was performed once during the first treatment session and then repeated a month later following the eighth treatment. Acupuncture therapy evoked short-term increases in MOR binding potential in multiple pain and sensory processing regions including the cingulate (dorsal and subgenual), insula, caudate, thalamus, and amygdala. Acupuncture therapy also evoked long-term increases in MOR binding potential in some of the same structures including the cingulate (dorsal and perigenual), caudate, and amygdala. These short- and long-term effects were absent in the sham group where small reductions were observed, an effect more consistent with previous placebo PET studies. Long-term increases in MOR BP following TA were also associated with greater reductions in clinical pain. These findings suggest that divergent MOR processes may mediate clinically relevant analgesic effects for acupuncture and sham acupuncture, Harris R, Zubieta J, Scott D, Napadow V, Gracely R, Clauw D. Traditional Chinese acupuncture and placebo (sham) acupuncture are differentiated by their effects on mu-opioid receptors (MORs). Neuroimage. 2009 Sep 47;(3):1077-1085.