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Electro-acupuncture and laser acupuncture alleviate knee osteoarthritis pain in rats

Ruixin Zhang

University of Maryland, USA

Treatment of knee osteoarthritis (OA) pain remains as serious challenge. Mechanisms of OA pain have been studied in rodent models. The aim of this study was to investigate effects and mechanisms of electro-acupuncture and laser acupuncture on OA-caused pain in an OA rodent model produced by monosodium iodo-acetate (MIA). MIA (3 mg/50 μ l/rat) was injected into the knee joint cavity in male and female rats. Electro-acupuncture, 10Hz, 2 mA, and 0.4 ms pulse width for 30 min, was applied bilaterally at the acupoint GB30 once a day on days 2-9 post-MIA injection. Laser acupuncture was conducted on acupoint Dubi (ST 35) for 5 min per treatment, once a day; on days 1-7. Pain was measured with a battery of tests. Functional magnetic resonance imaging (fMRI) was used to study the effect of electro-acupuncture on brain network connectivity during the resting state after electro-acupuncture treatments. Electro-acupuncture treatment increased body weight bearing in ipsilateral hind limb in male and female rats. It inhibited mechanically and thermally evoked pain and improved rat motion distance and speed. Electro-acupuncture treated rats showed conditioned place preference to the electro-acupuncture-paired chamber. fMRI data shows an increased anterior cingulate cortex (ACC)/motor/sensory (M1/S1) connectivity in MIA-injected rats but not in naive or electro-acupuncture-treated rats. This suggests that MIA-induced pain affects connectivity between the nucleus accumbens and ACC/motor/sensory cortex and that electro-acupuncture modulates OA-induced brain activity. The 200 mW laser treatment significantly improved body weight bearing in the ipsilateral hind limb. Electro-acupuncture and laser acupuncture may alleviate knee OA pain.

Biography

Ruixin Zhang has completed his PhD from Shanxi Medical University in China and Postdoctoral studies from National Institute of Health and Yale University. He has been serving as an Editorial Board Member for seven professional journals. He is an Assistant Professor in Center for Integrative Medicine, School of Medicine and University of Maryland.

RZhang@som.umaryland.edu

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