

The Effect of Manual Acupuncture-induced Injury as a Mechanism Contributing to Muscle Regeneration

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Abstract : This study aims to further improve our understanding of the underlying mechanism of local injury that occurs after manual acupuncture needle manipulation, and that initiates the muscle regeneration process, which is essential for muscle maintenance and adaptation. Skeletal muscle is maintained by resident stem cells called muscle satellite cells. These cells are normally in quiescent state, but following muscle injury, they re-enter the cell cycle and execute a myogenic program resulting in muscle fiber regeneration. Our previous work in young rats demonstrated that acupuncture treatment induced injury that activated resident satellite (stem) cells, which leads to muscle regeneration. Skeletal muscle regeneration is an adaptive response to injury that requires a tightly orchestrated event between signaling pathways activated by growth factor and intrinsic regulatory program controlled by myogenic transcription factor. We identified several gene expressions uniquely important for muscle regeneration in response to acupuncture treatment at different time course using different biological techniques, including Immunocytochemistry, western blotting, and Real Time PCR. This study uses a novel but non-invasive model of injury induced by manual acupuncture to further our current understanding of regenerative mechanism of muscle stem cells. From a clinical perspective, this model of injury induced by manual acupuncture may be easily translatable into a clinical tool that can be used as an alternative to physical exercise for patients challenged by bed rest or forced inactivity. Finally, the knowledge gained from this research could be useful for studies of the local effects of various modalities of induced injury, such as the traditional method of healing by cupping (hijamah), which may enhanced muscle stem cells and muscle fiber regeneration.

Keywords : acupuncture, injury, regeneration, muscle stem cells

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