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Effect of electroacupuncture on expression of CREB and its ability to bind to synaptic proteins in rats with post-traumatic stress disorder

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Objective: To observe the effects of electroacupuncture on the expression of CREB and its ability to bind to synaptic key proteins in rats with post-traumatic stress disorder (PTSD), thus to lay the foundation for further study of the mechanism of electroacupuncture treatment of PTSD (*i.e.*, electroacupuncture promotes the interaction between synaptic plasticity and BDNF-TRKB signaling pathway).

Methods: SD male rats were randomly divided into blank group, model group and electroacupuncture treatment group, with 8 rats in each group. The model of PTSD was established by single continuous stress method (this modeling method is dominated by forced drowning, and tropical disasters are also mostly related to drowning). After modeling, the treatment group received electroacupuncture therapy, followed by retaining the needles for 20 min. The treatment was conducted once daily for 21 d. The behavioral changes were evaluated by spontaneous activity and conditional fear reaction. The expression of CREB was detected by immunohistochemistry and Western Blot. The binding ability of CREB to synaptic protein was verified by CHIP.

Results: Compared with the model group, the spontaneous activity distance of the treatment group rats increased ($P < 0.01$) and the percentage of stiffness time decreased ($P < 0.01$), the expression of CREB protein in the treatment group was significantly increased ($P < 0.01$), the binding ability of CREB to PSD95 protein was increased in treatment group ($P < 0.05$).

Conclusions: Electroacupuncture regulates the interaction mechanism between synaptic plasticity and BDNF-TrkB signaling pathway of the rat model of PTSD, most likely by increasing the binding ability of CREB to the key synaptic protein-PSD95.

Keywords: Single continuous stress; Drowning; Electroacupuncture; Post-traumatic stress disorder; CREB; PSD95; Binding ability

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