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Effects of tianeptine on symptoms of fibromyalgia via BDNF signaling in a fibromyalgia animal model.

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Abstract

Previous reports have suggested that physical and psychological stresses may trigger fibromyalgia (FM). Stress is an important risk factor in the development of depression and memory impairments. Antidepressants have been used to prevent stress-induced abnormal pain sensation. Among various antidepressants, tianeptine has been reported to be able to prevent neurodegeneration due to chronic stress and reverse decreases in hippocampal volume. To assess the possible effect of tianeptine on FM symptoms, we constructed a FM animal model induced by restraint stress with intermittent cold stress. All mice underwent nociceptive assays using electronic von Frey anesthesiometer and Hargreaves equipment. To assess the relationship between tianeptine and expression levels of brain-derived neurotrophic factor (BDNF), cAMP response element-binding protein (CREB), and phosphorylated cAMP response element-binding protein (p-CREB), western blotting and immunohistochemistry analyses were performed. In behavioral analysis, nociception tests showed that pain threshold was significantly decreased in the FM group compared to that in the control group. Western blot and immunohistochemical analyses of medial prefrontal cortex (mPFC) and hippocampus showed downregulation of BDNF and p-CREB proteins in the FM group compared to the control group. However, tianeptine recovered these changes in behavioral tests and protein level. Therefore, this FM animal model might be useful for investigating mechanisms linking BDNF-CREB pathway and pain. Our results suggest that tianeptine might potentially have therapeutic efficacy for FM.