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Brain derived neurotrophic factor (BDNF) inducer ameliorates pain-emotion by preventing decreased CREB/BDNF mRNA: Similar to magnetic stimulation

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Chronic pain is often complicated with pain-emotion that significantly affects the quality of life. Recent studies have revealed that a lack of brain-derived neurotrophic factor (BDNF) in anterior cingulate cortex (ACC) lead to pain-emotion. It is reasonable that BDNF can play an important role in limbic system. In facts, spinally transplanted cells containing BDNF reduced chronic pain. In addition, recent reports revealed that 4-methylcatechol (4-MC), inducer of BDNF, reduced chronic pain with depression. The magnetic stimulation (MS) to skin is used for treatment of neuropathic pain but no reliable mechanisms. Thus, we aimed to characterize the 4-MC on the CREB/ BDNF mRNA comparing with MS. S-D rats were subjected to chronic constriction injury (CCI). Then rats were received ICV inj 4-MC or MS for 7 days after the CCI. 4-MC reduced decrease in paw withdrawal latency associated with increase of immobility time (forced swim test). These analgesic and anti-depressant effects were reversed by K252a. Both 4-MC and MS reduced decreases in pCREB/BDNF mRNA in ACC, and that was reversed by K252a. We demonstrated that a lack of BDNF/CREB in ACC mediates pain-emotion. In addition, 4-MC and MS normalize derangements of CREB/BDNF synthesis, suggesting the possible induction of BDNF. These data suggest an important role of BDNF in pain-emotion.

Biography

K Fukuhara has completed her PhD at Yamaguchi University and is employed at Nipro co. R & D. She is the expert of Neurochemical and protein analysis.

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