

The role of AMPK in the hippocampus of the olfactory bulbectomized mice.

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AMP activated protein kinase (AMPK), metabolic regulating enzyme, distributes whole of body including brain. Although physical exercise ameliorates depressive-like behaviors via AMPK activation, the underlying mechanism is remains unclear. Therefore, we investigated whether an AMPK activator AICAR has antidepressant effect in olfactory bulbectomized (OBX) mice.

OBX mice were administered AICAR for 14 days and then conducted tail-suspension test (TST). Hippocampal proteins were assessed by western blotting and neurogenesis was measured by immunohistochemical method.

AICAR subchronic treatment for OBX mice decreased immobility time in TST. Phosphorylated AMPK, protein kinase C (PKC) ζ , nuclear factor-kappa B (NF- κ B), cAMP response element-binding protein (CREB) and the expression level of brain derived neurotrophic factor (BDNF) in OBX mice were elevated by AICAR. Hippocampal neurogenesis in OBX treated with AICAR promoted. Some of the effect of AICAR were attenuated by co-administration of PKC ζ inhibitor. Activated AMPK was detected in mature and immature neuron and microglia.

In this study, we showed that AMPK activation may exert antidepressant effect via PKC ζ /NF- κ B/BDNF/CREB signaling pathways, suggesting that AMPK activator may become a therapeutic target of new anti-depressant.