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Involvement of Akt/GSK3 β /CREB signaling pathway on chronic omethoate induced depressive-like behavior and improvement effects of combined lithium chloride and astaxanthin treatment

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Abstract

Chronic organophosphorus pesticides (OP) exposure is associated with an increased risk of depression, and there is an urgent need to find an effective treatment for the depressive-like symptoms caused by OP. The main purpose of this study was to investigate whether combined lithium chloride (LiCl) and astaxanthin (AST) treatment would manifest synergistic antidepressant effects on mice with chronic OP exposure, and to determine the role of the Akt/GSK3 β /CREB signaling pathway. Our results showed that chronic omethoate exposure significantly increased immobility time in behavioral tests and induced neuron damage in HE staining. The expression of p-GSK3 β , p-CREB, p-PI3K and p-Akt in hippocampus after OP exposure were significantly down-regulated, while the influences were reversed by LiCl and AST treatment. Moreover, the combined application of AST and LiCl had synergistic therapeutic effects compared to LiCl and AST treatment alone, the expression of p-GSK3 β , p-CREB, p-PI3K and p-Akt after combined LiCl-AST treatment were significantly higher than that with single drug application. These results showed that the combination of LiCl and AST could efficiently ameliorate depressive-like

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