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ORIGINAL RESEARCH

Evodiamine Inhibits Lipopolysaccharide (LPS)-Induced Inflammation in BV-2 Cells via Regulating AKT/Nrf2-HO-1/NF-κB Signaling Axis

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Abstract

Neuroinflammation is caused by excessive activation of microglia and plays an essential role in neurodegenerative diseases. After activation, microglia produce several kinds of inflammatory mediators, trigger an excessive inflammatory response, and ultimately destroy the surrounding neurons. Therefore, agents that inhibit neuroinflammation may be potential drug candidates for neurodegenerative diseases. Evodiamine (EV) has anti-inflammatory functions in peripheral tissues. However, whether EV exerts the same function in neuroinflammation is not known. In the present study, the aim was to explore whether EV attenuates microglial overactivation and therefore suppresses the development of neuroinflammation in lipopolysaccharide (LPS)-stimulated BV-2 cells. It was found that EV effectively inhibited expression of proinflammatory mediators (cyclooxygenase-2 (COX-2), inducible nitric oxide synthase (iNOS), interleukin-6 (IL-6), and tumor necrosis factor-α (TNF-α)) via AKT/Nrf2/HO-1 activation and suppressed NF-κB p65 phosphorylation. In addition, EV could suppress LPS-induced inflammatory response and loss of dopaminergic neuron in mouse mesencephalic neuron--glia cells. Hence, these findings demonstrate that EV suppresses neuroinflammation caused by overactivated microglia via regulating the AKT/Nrf2/HO-1/NF-κB signaling axis.

Keywords Evodiamine · Microglia · Neuroinflammation · Neurodegenerative disease

Abbreviations

EV	Evodiamine
LPS	Lipopolysaccharide
AKT	Protein kinase B
Nrf2	Nuclear factor erythroid 2-related factor 2
HO-1	Heme oxygenase-1
NF-κB	Nuclear transcription factor-κB

Tianyu Meng, Shoupeng Fu, Dewei He, and Guiqiu Hu have contributed equally to this work.

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