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Berberine confers neuroprotection in coping with focal cerebral ischemia by targeting inflammatory cytokines

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Highlights

Berberine reduces brain edema and infarct volume through regulation of inflammatory responses in focal cerebral ischemia.

Berberine increases the expression of anti- inflammatory cytokines after ischemic stroke.

Berberine contributes to recovery of motor function after focal cerebral ischemia.

Abstract

Scope: Existing research indicates that anti-inflammatory and antioxidant properties of berberine play major roles in coping with oxidative stress in neurodegenerative diseases, but it is not known if this isoquinoline alkaloid affects inflammatory cytokines such as interleukin 10 in focal cerebral ischemia.

Methods and results: Male Wistar rats (10 weeks old) were treated with 40mg/kg concentration of berberine 1h after focal cerebral ischemia and the anti-inflammatory properties of berberine were evaluated by immunohistochemical analysis, water content measure and behavioral tests. Evaluation of infarct volume was performed by TTC staining. Immunohistochemistry and behavioral assessment indicated recovery in treatment group compared to only ischemia group. The infarct volume decreased in treatment group compared to ischemia group. Berberine administration significantly decreased brain edema and contributed to the restoration of motor function. Moreover, berberine potently contributed to neuroprotection in motor area through downregulation of pro-inflammatory cytokines and upregulation of anti-inflammatory cytokines.
Conclusions: These findings confirm the validity of berberine as a potent anti-inflammatory agent in treatment of ischemic stroke.

Keywords: Berberine, inflammatory cytokines, MCAO model, neuroprotection