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New Natural Product, Usnic Acid Can Protect after Cerebral Ischemia by Reduction of Glia-mediated Inflammation and Antioxidant Properties

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Article Info	ABSTRACT
<i>Article type:</i> Original article	 Background and Aim: Cerebral ischemia/reperfusion causes complex pathological mechanisms such as increased uncontrolled and excessive microglial and astrocyte activation, expression of cytokines, reactive oxygen species (ROS), and other neuro inflammatory process that lead to brain tissue damage.Usnic acid is a lichen secondary metabolite found in different lichen species, that has many different biological properties such as anti-inflammatory and antioxidative activities.Since the usnic acid being isolated easily, and high purity of the isolated product make it an suitable base for producing novel pharmaceutical agent.In this study, the neuroprotective effects of usnic acid on neuroinflammation, antioxidant enzyme activities and oxidative stress levels after transient cerebral ischemia/ reperfusion,were examined. Materials and Methods: 42 male Wistar rats were randomly selected and allocated in 3 groups (sham, ischemia/reperfusion, and ischemia/reperfusion+usnic acid). Ischemia was induced considering 20 min occlusion of common carotid arteries. Usnic acid (25mg/kg, intraperitoneally) and saline, as vehicle, were injected at the beginning of the reperfusion period. Immunohistochemical staining methods were used to determine glial fibrillary acid protein (GFAP) and ionized calcium-binding adaptor protein-1(Iba-1)proteins expression levels in rat's brains. Spectrophotometric assay was performed to determine the levels of malondialdehyde (MDA), superoxide dismutase(SOD) and glutathione (GSH). Results: Usnic acid significantly decreased GFAP and Iba-1-positive cells (P<0.001) and In addition, treatment with usnic acid improves effects in antioxidant system followed by cerebral ischemia (P<0.05), and also usnic acid has effective role in the inhibition of lipid peroxidation process(P<0.01). Conclusion: Usnic acid has protective biological activities effects via antineuroinflammatory and antioxidative mechanisms and can be as a natural bioresource for treatment cerebral i
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