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Oxidative stress has been implicated in the pathophysiology of many neurodegenerative disorders including Alzheimer's and Parkinson's diseases. Baicalein, baicalin and wogonin, the major constituents of Scutellaria baicalensis, have been reported to exhibit antioxidant properties in many different bioassay systems. The present study evaluated neuroprotective effects of these flavonoids on various neuronal injuries induced in primary cultured rat cortical cells by oxidative stress, NMDA, oxygen-glucose deprivation, and Aβ(25-35). Baicalein dramatically inhibited the oxidative neuronal cell injuries induced by xanthine/xanthine oxidase, and hydrogen peroxide. Wogonin and baicalin moderately inhibited the oxidative injuries. Baicalein and baicalin considerably attenuated the neuronal damage induced by a GSH depleting agent DL-buthionine-(S,R)-sulfoximine, whereas wogonin had no effect at the concentrations of 1 and 3 μg/ml. The NMDA-induced excitotoxicity was also inhibited by baicalein, and to a less extent, by wogonin or baicalin. In addition, baicalein was capable of protecting neurons from injuries generated by oxygen-glucose deprivation or Aβ(25-35). Taken together, baicalein was the most potent and efficacious neuroprotectant among the three antioxidative flavonoids originating from Scutellaria baicalensis against the neuronal injuries induced by various oxidative insults.

[PB3-3] [10/17/2002 (Thr) 13:30 - 16:30 / Hall C]

Neuroprotective Mechanisms of Aloesin against Focal Ischemic Brain Injury

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Recent studies have suggested that the cerebral ischemia induced the neuronal cell death by mediating multiple mechanisms with necrosis and/or apoptosis. The present study examined neuroprotective mechanism of aloesin against transient focal cerebral ischemia. Aloesin, main component of aloe possesses various biological activates such as wound healing, anti-gastric ulcer, and chemopreventive activity. Transient focal cerebral ischemia was induced by 120 min MCAO. Aloesin (10 mg/kg, i.v.) was administered 3 times at 0.5, 2 and 4 hr after onset of ischemia. Mutiple treatments with the doses of 10 mg/kg significantly reduced infarct compared with the vehicle-treated control group, producing remarkable behavioral recovery effect. Caspase-3 mediated the cleavage of proteins that are essential for cell stability, DNA repair and activation of DNase. Neuroprotective mechanisms by aloesin in 120 min MCAO was studied using fragmentation of DNA, western blot and immunohistochemistry. DNA laddering and activated caspase-3 were decreased in infarct region by aloesin. The results suggest that aloesin can serve as neuroprotective agents by providing neuroprotection through inhibiting activation of caspase-3 in transient focal ischemic brain injury.

[PB3-4] [10/17/2002 (Thr) 13:30 - 16:30 / Hall C]

Neuroprotective effect of wogonin in a rodent model of permanent focal cerebral ischemia

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Wogonin, a flavonoid originated from the root of Scutellaria baicalensis Georgi, is known to exhibit potent anti-inflammatory effects and variable degrees of antioxidant and free radical scavenging effects depending on the experimental systems. In addition, wogonin has been reported to protect neurons from excitotoxic and oxidative injuries in primary cultured rat cortical cells. In the present study, we evaluated the effect of wogonin in a rat model of permanent focal cerebral ischemia induced in male Sprague-Dawley rats by insertion of a nylon monofilament to the origin of middle cerebral artery (MCA). Twenty-four hours after surgery, areas of the cerebral infarction were measured by image analyses of the seven coronal slices stained with 2,3,5-triphenyltetrazolium chloride. Wogonin (20 mg/kg), intraperitoneally administered at 30 min before and 4 h after the surgery, was found to reduce the volume of infarction in the cerebral cortex as well as in the striatum. The volume of ischemic