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Effect of thymoquinone and Nigella sativa seeds oil on lipid peroxidation level during global cerebral ischemia-reperfusion injury in rat hippocampus

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Abstract

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It has been previously reported that Nigella sativa oil (NSO) and thymoquinone (TQ), active constituent of N. sativa seeds oil, may prevent oxidative injury in various models. Therefore, we considered the possible effect of TQ and NSO on lipid peroxidation level following cerebral ischemia-reperfusion injury (IRI) in rat hippocampus. Male NMRI rats were divided into nine groups, namely, sham, control, ischemia and ischemia treated with NSO or TQ. TQ (2.5, 5 and 10 mg/kg), NSO (0.048, 0.192 and 0.384 mg/kg), phenytoin (50 mg/kg, as positive control) and saline (10 ml/kg, as negative control) were injected intraperitoneally immediately after reperfusion and the administration was continued every 24 h for 72 h after induction of ischemia. The transient global cerebral ischemia was induced using four-vessel-occlusion method for 20 min. Lipid peroxidation level in hippocampus portion was measured as malondialdehyde (MDA) based on its reaction with thiobarbituric acid (TBA) following ischemic insult. The transient global cerebral ischemia induced a significant increase in TBA reactive substances (TBARS) level ($p < 0.001$), in comparison with sham-operated animal. Pretreatment with TQ and NSO were resulted a significant decrease in MDA level as compared with ischemic group (66.9 ± 1.5 vs. 297 ± 2.5 nmol/g tissue for TQ, 10 mg/kg; $p < 0.001$ and 153.5 ± 1.3 nmol/g tissue for NSO, 0.384 mg/kg; $p < 0.001$). Using a reversed-phase HPLC system, the amount of TQ in NSO was also quantified and was 0.58% w/w. These results suggest that TQ and NSO may have protective effects on lipid peroxidation process during IRI in rat hippocampus. © 2006 Elsevier GmbH. All rights reserved.

Reaxys Database Information

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Author keywords

ischemia-reperfusion; lipid peroxidation; Nigella sativa; rat; thymoquinone

Indexed Keywords

EMTREE drug terms: malonaldehyde; Nigella sativa extract; phenytoin; sodium chloride; thiobarbituric acid; thiobarbituric acid reactive substance; thymoquinone

EMTREE medical terms: animal experiment; animal model; article; blood vessel occlusion; brain ischemia; controlled study; drug effect; hippocampus; lipid peroxidation; male; nonhuman; nuclear magnetic resonance imaging; priority journal; rat; reperfusion injury; reversed phase high performance liquid chromatography

MeSH: Animals; Benzoquinones; Brain Ischemia; Dose-Response Relationship, Drug; Hippocampus; Lipid Peroxidation; Male; Neuroprotective Agents; Nigella sativa; Phytotherapy; Plant Oils; Rats; Rats, Inbred Strains; Seeds

Medline is the source for the MeSH terms of this document.

Species Index: Animalia; Nigella sativa; Rattus

Chemicals and CAS Registry Numbers: malonaldehyde, 542-78-9; phenytoin, 57-41-0, 630-93-3; sodium chloride, 7647-14-5; thiobarbituric acid, 504-17-6; thymoquinone, 490-91-5; Benzoquinones; Neuroprotective Agents; Plant Oils; thymoquinone, 490-91-5

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