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Prevention of Brain Hypoperfusion-Induced Neurodegeneration in Rat's Hippocampus by Black Cumin Fixed Oil Treatment

By: [Azzubaidi, MS](#) (Azzubaidi, Marwan Saad)^[1]; [Al-Ani, IM](#) (Al-Ani, Imad Matloub)^[2]; [Saxena, AK](#) (Saxena, Anil Kumar)^[2]; [Faisal, GG](#) (Faisal, Ghasak Ghazi)^[3]

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Abstract

Introduction: The oil extract of black cumin seeds *Nigella sativa* (NSO) demonstrated considerable preservation of spatial cognitive functions in rats subjected to chronic brain hypoperfusion (CBH). The hippocampal CA1 region pyramidal cells are the earliest neurons suffering neurodegeneration following CBH. Objective: The current study was devoted to assess the protective effects of *Nigella sativa* (NSO) treatment on CA1 hippocampal pyramidal cells of rats subjected to chronic brain hypoperfusion (CBH) that was achieved through permanent two vessel occlusion (2VO) procedure. Methods: Twenty four rats were equally divided into three groups; sham control, untreated 2VO and NSO treated group (2VO with daily oral NSO treatment. After the 10th postoperative week coronal sections of the hippocampus were collected for histopathological and electron microscopical examinations. Results: The number of viable pyramidal cells within CA1 hippocampal region in sham control and NSO treated groups was significantly higher than that of untreated 2VO group, while the difference was not significant when comparing the viable pyramidal cells number of sham control with NSO treated groups. Furthermore, 2VO group showed marked intracellular ultrastructural distortions that were less pronounced in NSO treated group. Conclusion: NSO displayed a robust potential to protect hippocampal pyramidal cells from CBH induced neurodegeneration putting forward its prospective neuroprotective activity against age related cognitive decline of Alzheimer's disease and vascular dementia.

Keywords

Author Keywords: Cerebral hypoperfusion; neurodegeneration; 2VO; *Nigella sativa*; hippocampus; neuroprotection

KeyWords Plus: CHRONIC CEREBRAL HYPOPERFUSION; TRANSIENT FOREBRAIN ISCHEMIA; CAROTID-ARTERY OCCLUSION; NIGELLA-SATIVA; NEURONAL DAMAGE; WHITE-MATTER; THYMOQUINONE; PERMANENT; IMPAIRMENT; APOPTOSIS

Author Information

Reprint Address: Al-Ani, IM (reprint author)

- Int Islamic Univ Malaysia, Kulliyah Med, Dept Basic Med Sci, Kuantan 25200, Pahang, Malaysia.
Organization-Enhanced Name(s)
International Islamic University Malaysia

Addresses:

- [1] Univ Sultan Zainal Abidin, Fac Med, Pharmacol Unit, Campus Perbatam, Kuala Terengganu 20400, Malaysia
- [2] Int Islamic Univ Malaysia, Kulliyah Med, Dept Basic Med Sci, Kuantan 25200, Pahang, Malaysia
Organization-Enhanced Name(s)
International Islamic University Malaysia
- [3] Int Islamic Univ Malaysia, Kulliyah Dent, Dept Basic Med Sci, Kuantan 25200, Pahang, Malaysia
Organization-Enhanced Name(s)
International Islamic University Malaysia

E-mail Addresses: imad_alani@yahoo.com

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