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Ambrosin: a possible alternative for curcumin in alleviation of lipopolysaccharide induced memory impairment

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Abstract

Despite its poor bioavailability, curcumin is a promising natural polyphenol targeting NF-κβ. NFκβ is a target for new therapeutics because it plays a pivotal role in the pathophysiology of Alzheimer disease (AD). In contrast, ambrsoin which is a potent NF-κβnhibitor, is scarcely studied in AD models. The current work aims to assess the efficacy of ambrosin as a possible remedy for AD. In silico studies showed that bioavailability and BBB permeability could be favorable for ambrosin over curcumin. Ambrosin was isolated and purified from extract of the traditional herb Ambrosia maritima. Memory impairment was induced in mice by single intraperitoneal injection of LPS (0.4 mg/kg). Treated groups received curcumin (100 mg/kg) or ambrosin at doses (5 or 10 mg/kg) for 7 days. Mice in treated groups showed a significant improvement in memory functions during Morris water maze and object recognition tests. Curcumin and ambrosin (10 mg/kg) inhibited the upsurge of NF-κβ65 transcript and protein levels. Consequently, downstream pro-inflammatory and nitrosative mediators were inhibited, namely, TNFα IL-1βCOX-2 and iNOS. BACE1 was inhibited, thereby reducing amyloid plaques (Aβ) deposition and eventually reducing inflammation and apoptosis of neurons as revealed by immunohistopathological examination. In conclusion, ambrosin can be repurposed as AD remedy after further pharmacokinetic/pharamacodynamic assessments. It could serve as an additional lead drug for AD therapeutics.

Biography

Dr. Mohammed Khalil is specialized in field of natural products chemistry. His experience encompassed the classical isolation and structure elucidation of natural products along with their analysis using modern analytical techniques, e.g. HPLC and GC. He got his PhD in Braunschweig Institute of Technology, Germany where his experience is expanded to the fields of plant tissue culture and elucidation of biosynthesis of natural products on both the biochemical and molecular levels. Successfully, he contributed in gene isolation, cloning and functional characterization of O-methyltransferases involved in biosynthesis of phytoalexins produced by Rosaceae species. His work got published in highly ranked Journals, e.g., Plant Journal, Food Chemistry and Phytochemistry. After returning to his home university, Cairo University, he is involved in projects dealing with metabolomics analysis of medicinal plants using LC-QTOF-Ms and LC-MS/MS techniques and the production of valuable natural products using tissue culture techniques.

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