The 1st International Neuroinflammation Congress and 1st Student Festival of Neurosience

Shefa Neuroscience Research Center, Tehran, Iran, 11-13 April, 2017

The Neuroscience Journal of Shefaye Khatam

Volume 5, No. 2, Suppl 2

Poster Presentation

Curcumin anti-Inflammatory Effect in Neuroinflammatory Disorders: Prospective and Challenges

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Published: ***11 April, 2017***

Abstract

Curcumin is a hydrophobic polyphenol and major bioactive component of turmeric with known anti-inflammatory, neurogenesis, antioxidant, and anti-carcinogenic effect. Curcumin antagonizes many steps in the inflammatory cascade, including Inhibition of NF-κB (nuclear factor kappa-light-chain-enhancer of activated B cells), activator protein-1 transcription and iNOS (induced Nitric oxide synthases). Inhibition of NFkB is believed to be the central pathway of curcumin's mechanism. Curcumin induced the antioxidative protein HO-1 which reduced the microglial pro-inflammatory cytokines such as TNF α, IL 1β and IL 6. All these mechanisms indicate the anti-inflammatory effect and neuroprotective action of this chemical against neuroinflammation also Neuroinflammation is implicated in the pathogenesis of many neurodegenerative diseases. Curcumin administration has been reported to attenuate neuroinflammation.in contrast to nonsteroidal anti-inflammatory drugs whose adverse side effects includes gastrointestinal ulceration and liver or kidney toxicity, curcumin seems to be relatively safe but Despite its multi anti-inflammatory properties, curcumin's clinical use is limited because its poor oral absorption, rapid systemic elimination, rapid metabolism and limited blood brain barrier permeability but the most challenging factor is curcumin's low aqueous solubility. Clinical studies on humans and rodents have reported low bioavailability of curcumin shown by the lower level of serum and tissue curcumin.in this study we aim to overview the prospective and challenges on curcumin use as an anti-inflammatory drug. Curcumin's anti-inflammatory effect is well-established but clinical administration of this chemical is limited due to its poor bioavailability, so approaches to enhance the bioavailability of curcumin is needed and maybe using the structural analogues of curcumin, adjuvants like piperine, phospholipids and biodegradable nanoparticle mediated delivery of curcumin are the best ways to increase curcumin's bioavailability.

Keywords: Curcumin, Turmeric, Drug delivery, Anti-inflammatory, Bioavailability

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