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Poster Presentation

Effects of Dimethyl Sulfoxide on NLRP3 Inflammasome and Alzheimer's Disease

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Abstract

Alzheimer's disease (AD), the most ordinary form of dementia and extracellular accumulation of Amyloid-β (Aβ) in senile plaques, is an important and a main event in the pathogenesis of AD. Deposition of Aβ Peptide initiates a spectrum of cellular responses that are interposed by the resident neuroimmune cells of the brain, the microglia. Recently, a novel inflammasome signaling pathway has been uncovered and Aβ can activate the NLRP3 inflammasome in microglia, which is fundamental for the secretion of pro-inflammatory cytokines and subsequent inflammatory events .More importantly , the activation of NLRP3 inflammasome has demonstrated a serious role in AD pathogenesis by interposing a harmful chronic inflammatory response, while inhibition of NLRP3 mainly protected from loss of spatial memory and decreased Aβ deposition in an AD mouse model. Dimethyl Sulfoxide (DMSO) is an amphipathic molecule that is widely used as a solvent for biological compounds .In addition, DMSO has been studied as a medicine for the treatment of inflammation, cystitis, and arthritis. Based on the anti-inflammatory characteristics of DMSO, the effects of DMSO on activation of inflammasomes has elucidated, which are cytoplasmic multi-protein complexes that interpose the maturation of interleukin (IL)-1β by activating caspase-1 (casp1). The aim is discussing about effects of DMSO on NLRP3 inflammasome and AD. It has proved that DMSO attenuates IL-1β maturation, casp1 activity, and ASC pyroptosome formation by NLRP3 inflammasome activators. DMSO is a selective inhibitor of the NLRP3 inflammasomes. The anti-inflammatory effect of DMSO was further proved in animal studies, LPS-endotoxin sepsis, and inflammatory bowel disease models. DMSO shows anti-inflammatory characteristics, attenuates NLRP3 inflammasome activation. According to studies, it is hypothesized that DMSO inhibits activation of inflammasomes, NLRP3, CASP1 in Alzheimer's disease that are pathogenesis by mediating a harmful chronic inflammatory response.

Keywords: Alzheimer's disease, NLRP3, Casp1, Inflammasome, DMSO

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