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Probiotic formulation pretreatment (*Lactobacillus helveticus* R0052 and *Bifidobacterium longum* R0175) attenuates inflammation and memory impairment in lipopolysaccharide-induced rats

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In recent years, there is emerging evidence that oral bacteriotherapy with probiotics has been used not only to improve of gastrointestinal and systemic dysfunctions, but *Lactobacillus* and *Bifidobacteria* species can also beneficially impact the neurological functions and behavior in the brain via the gut-brain axis. The present study aimed to examine whether gut microbiota manipulation with probiotic pretreatment (*L. helveticus* R0052 + *B. longum* R0175) can effect inflammation and memory impairment induced by lipopolysaccharide (LPS). In male Wistar rats, maltodextrin (placebo) or probiotic (109 CFU/ml/rat) were administrated by gavage for 14 consecutive days and then saline or LPS (1 mg/kg, i.p, single dose) were injected. After four hours, animals were subjected to passive avoidance test to evaluate memory performance, subsequently blood and hippocampal samples were collected for molecular assessment by ELISA and Western Blotting. Our results showed that probiotic pretreatment significantly decreased both systemic and hippocampal levels of pro-inflammatory cytokines (TNF-α and IL1-β) induced by LPS. Prophylactic administration of *L. helveticus* R0052 and *B. longum* R0175 taken in combination also showed memory-improving effects through the behavior test and BDNF expression. These findings introduce health benefits of probiotics and suggest that modification of gut microbiota by this anti-inflammatory and neuroprotective probiotic can be a promising and feasible strategy to prevent or ameliorate neuroinflammation and subsequent neuronal dysfunctions that are related to some neurodegenerative disorders such as Alzheimer's.

Biography

Ghazaleh Mohammadi is a PhD student of Molecular Medicine, Department of Molecular Medicine, Qazvin University of Medical Sciences, Qazvin, Iran. She has been one of the top students during her BSc (2007), MSc (2011) and PhD (Present) and has also worked as a Researcher at Cellular and Molecular Research Center, Qazvin University of Medical Sciences from 2014 to date. She has served as a Member of the Scientific Committee for several Iranian congresses. She has published about 10 papers in reputed journals.

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