



## Effect of Probiotics on Neuroinflammatory Markers in Children: A Preliminary report

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### Abstract

The inflammation in the central nervous system (CNS), also known as neuroinflammation, plays an important role in the development and progression of neurodegenerative diseases in both adults and children. Possible mechanisms of neuro diseases involve the quinolinic acid (QA), which is a neurotoxic metabolite of the indoleamine-2,3-dioxygenase (IDO) pathway that can exert neurotoxicity and subsequently induces cognitive impairment. Furthermore, 5-hydroxyindoleacetic acid (5-HIAA) is the main urinary metabolite of the neurotransmitter serotonin, which affects cognitive function. However, Probiotics are officially known as helpful bacteria that, when consumed in adequate amounts, provide beneficial effects on human health. This preliminary study investigated the effects of probiotics on neuroinflammatory markers in children. Five healthy subjects had received  $8.0 \times 10^9$  CFU/ day of the probiotic supplementation (containing  $2.0 \times 10^9$  CFU of *Lactobacillus rhamnosus* and  $6.0 \times 10^9$  CFU of *Bifidobacterium animalis* subsp. *lactis*) once per day for 12 weeks. The study was conducted upon the subjects to investigate the parameters associated with neuroinflammatory markers such as quinolinic acid and 5-HIAA. All parameters were evaluated before and after the probiotic supplementation. The preliminary study results suggested that the level of quinolinic acid was significantly reduced from  $7.957 \pm 0.542$  to  $6.093 \pm 0.320$  ng/ml, and 5-HIAA was significantly increased from  $2.548 \pm 0.390$  to  $3.908 \pm 0.688$  mg/L after the intervention. Our findings supported that probiotics play an essential role in the improvement of neuroinflammatory markers in children.

**Keywords:** Probiotics, Neuroinflammation, Quinolinic acid, 5-hydroxyindoleacetic acid, Children

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