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Oral Administration of Probiotic Improves Social Behaviors in Autistic Children and May Modulate

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Abstract

Autism spectrum disorder (ASD) is a neurodevelopmental disorder characterized by impairments in social interaction, deficits in communication and the presence of restricted and repetitive behaviours. Despite its high prevalence and impact on affected individuals and their families, treatments that effectively improve the core symptoms of ASD remain elusive. Thus, the development of novel therapeutic strategies is an urgent priority. The gut-microbiota-brain axis is emerging as a potential new therapeutic target for the treatment of central nervous system disorders. More specifically, preclinical studies show that probiotics selectively reversed social deficits in mouse models of ASD. However, whether it improves social functioning in individuals with ASD remains unknown. Thus, we tested the effects of probiotic in children with ASD aged 2-8 years. Importantly, we found that probiotic, compared to placebo, significantly improved social functioning of ASD children. In order to explore potential mechanisms mediating the beneficial prosocial effect in ASD children, we investigated whether probiotic supplementation modulate fecal microbiota composition and peripheral immune response in ASD children. Indeed, we analyzed immune system from blood, and microbiota from stool of ASD children randomized to receive either probiotic or placebo, at baseline, and after 3-6 months of treatment. As expected, we observed in stool of children treated with probiotic compared to placebo a significant enrichment of bacteria contained in the probiotic. We investigated whether consumption of probiotic significantly induces anti-inflammatory properties of both microbiota and immune system. Collectively, our findings indicate that probiotic treatment may promote anti-inflammatory processes and enhances social abilities in children with ASD, thereby warranting larger trials.