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Dysbiosis in autoimmune diseases: Alterations of the gut microbiota in multiple sclerosis

Statement of the Problem: In humans, a complex interaction between the host immune system and commensal microbiota is required to maintain gut homeostasis. In this symbiotic relationship, the microbiota provides carbohydrate fermentation and digestion, vitamin synthesis and gut-associated lymphoid tissue development, as well as preventing colonization by pathobionts, whereas the host offers a niche and nutrients for the survival of the microbiota. However, when this mutualistic relationship is compromised and an altered interaction between immune cells and microorganisms occurs, the gut microbiota may contribute to the autoimmune diseases development. Researchers have made efforts to clarify the role of the microbiota in autoimmune disease and find new therapeutic approaches to treat immune-mediated diseases. However, the exact mechanisms involved in the gut dysbiosis and breakdown of the gut epithelial barrier are currently unknown. Findings: In our MS study, we observed prevalence of Bacteroidetes phylum, Bacteroides, Flavobacterium and Parabacteroides genera, and Bacteroides vulgatus. The Bifidobacterium and Enterobacter genera, essential for the vitamins B and K synthesis, were found exclusively in control group. Different from other studies, we found no significant differences in Firmicutes, Bacteroidetes and Proteobacteria phyla, and Akkermansia, Faecalibacterium and Methanobrevibacter genera in MS patients. No significant differences were found in the plasma concentrations of IL-2, -4, -6, -10, -17A, TNF and IFN- γ cytokines. Concerning dietary habits between patients and controls, significant differences ($P < 0.05$) were observed in the alcohol consumption, vegetables consumption, fresh fruits, protein consumption, milk and derivatives, carbohydrates, coffee/tea, and spicy food consumption. Conclusion & Significance: We concluded that diet habits play an important role in the microbial community determination in the human intestine. Further studies are necessary to determine the real role of intestinal microbiota in demyelinating diseases of the central nervous system, and whether there is a relationship between intestinal dysbiosis, vitamin deficiency and the pathophysiology of MS.

Biography

Gislane Lelis Vilela de Oliveira has her Graduation in Biological Sciences from the Paulista State University (UNESP), Sao Jose do Rio Preto, Sao Paulo, Brazil, in 2005. Her PhD degree in basic and applied immunology was obtained from the School of Medicine from Ribeirao Preto, University of Sao Paulo (USP), Brazil, in 2013. Since 2014, she is an Associate Professor at the School of Health Sciences Dr. Paulo Prata (FACISB), and she coordinates the Microbiome Study Group at the same institution. Her research group studies the interaction between the host immune system and commensal microbiota and its possible role in triggering autoimmune diseases.

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