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Polyphenols in the management of brain disorders: Modulation of the microbiota-gut-brain axis

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Abstract

The modulation of the microbiota-gut-brain axis with a view to preventing and treating brain disorders became recently a hot topic for the scientific community. Dietary polyphenols are multifaceted compounds that have demonstrated to be highly advantageous to counteract inflammation, oxidative stress, and neurodegeneration, among other pathological conditions, being useful in the prevention and treatment of several chronic disorders. The potential of these compounds to prevent and treat brain disorders has not been only related to their capacity to reach the brain, depending on their chemical structure, and interact directly with brain cells, but also to their ability to modulate the communication between the brain and the gut, interfering with multiple branches of this axis. Preclinical studies have demonstrated the potential of these food bioactive compounds in brain diseases, namely, neurodevelopmental, such as Down's syndrome and Autism spectrum disorder, neurodegenerative, such as Parkinson's disease and Alzheimer's disease, and psychiatric disorders, such as depression and anxiety. Until now, dietary polyphenols have been recognized as promising nutraceuticals to combat brain disorders. However, the impact of these compounds on the gut-brain interconnection remains poorly elucidated. Also, clinical assays are crucial to further support the beneficial effects of these compounds as demonstrated in preclinical research.

Keywords: Alzheimer's disease; Anxiety; Autism spectrum disorders; Brain; Depression; Down's syndrome; Gut microbiota; Gut-brain axis; Nutraceuticals; Parkinson's disease; Polyphenols.

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