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Short Communication

Brain-Gut Axis: Psychobiotics as an Alternative to Assist in Mental Health?

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Abstract

Recent evidence has shown that bilateral brain-gut communication exists and plays an important role in neurological and neuropsychiatric conditions. Thus, research on the reallocation of bacteria known as psychobiotics has gained prominence. This review focused on identifying studies that correlate the use of psychobiotics with mood disorders, anxiety and depression. The results indicate that the intestine in balance is able to produce neurotransmitters essential to the treatment of certain mental diseases, in addition, five bacterial strains were identified with functions in the CNS and mood. More studies are needed to identify the mechanisms as they occur and methodological standardization to disseminate more homogeneous results.

Introduction

It is already known that there is bilateral communication between intestinal microbiota and central nervous system [1]. More recently, studies suggest that the intestinal microbiota modulates neuroimmune and neuroendocrine activity and may therefore be associated with psychological disorders [1,2]. Bacterial strains producing short chain fatty acids are decreased in patients with mental disorders when compared to healthy individuals. These intestinal microbiome changes have a potential inflammatory effect and oxidative stress in the Central Nervous System (CNS), favoring a variety of neuropsychiatric diseases, which includes mood disorder, Autism Spectrum Disorder (ASD) and schizophrenia, among others [3,4]. In order to reverse these risks, the use of probiotics has been shown to be beneficial to the treatment of several organic problems, not only directly linked to the intestine but also, such as atherosclerosis, diabetes, obesity, functional intestinal diseases and neuropsychological diseases. More recently, studies have shown bacterial genera known as psychobiotics, which demonstrate to be able to interfere with the central nervous system, modulating the activity of various mental diseases [5].

Methodology

This work is a mini-review to identify how psychobiotics can contribute to the complementary treatment of mood disorders and/or mental problems. The articles were found in PubMed, Scielo and Web Science databases and searched between November 2022 and January 2023. Clinical studies and meta-analyses were included in this study.

Results and Discussion

Depression and anxiety are significantly associated with advanced biological aging [6]. The causes described are mainly changes in the hypothalamic-pituitary axis and low serotonin production. The gut microbiota can secrete a number of neurotransmitters, including Y-Aminobutyric Acid (GABA), histamine, serotonin, acetylcholine and dopamine. Under normal conditions, approximately 95% of serotonin is produced in the intestine. Thus, in the existence of changes in the intestinal microbiota its production can be affected and consequently the regulation of emotions and mood as well [2]. Certain bacterial strains have an immunomodulatory effect on the intestinal microbiota, interfering with the barrier role and inflammatory status [7]. Among these strains are: *Akkermansia muciniphila*, *Lactobacillus*

plantarum, *Bifidobacterium* breve CCFM1025, *Lactobacillus Plantarum* 299v (LP299v) and *Lactobacillus helveticus* R0052, which seem to benefit patients under these conditions, and may reverse the inflammatory condition, neuroendocrine and increase serotonin production, also acting as an alternative to minimize the risks associated with mood disorders [8,5,9].

In fact, there are studies that reveal with promising results for the treatment of mood disorders, the benefits of intestinal modulation in the gut-brain axis, due to the use of two psychobiotics (*Lactobacillus helveticus* R0052 and *Bifidobacterium longum* R0175). Other interventions such as gluten-restricted diets have also been evaluated [10]. The results on the use of probiotics in mood disorders are still conflicting, mainly because most probiotics are marketed as supplements and not drugs, and in addition, the strains used are not standardized. This situation is likely to interfere with the dissemination of more robust dose-response results [11].

Conclusion

In general, recent studies indicate that probiotics can influence the CNS. However, there is great heterogeneity among the methodologies used to evaluate the role of intestinal modulation with psychobiotics in the treatment of stress, anxiety and depression. More studies with qualitative-quantitative approaches and follow-up of official protocols are necessary to verify promising effects of psychobiotics in mood disorders.

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