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## The New Frontier of Medicine: The Brain and the Gut

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**Abstract:**

The gut microbiome must maintain homeostasis as it protects us from harmful pathogens and helps our brain work through the gut-brain axis. According to new studies, the microbes found in our gut can modify how we think and feel as well as how we grow. Problems with gut microbes may be followed by problems with the brain or the mind. For example, the person may feel depressed or anxious. Or they may have issues with autism. This article will discuss how the gut and brain talk with the microbiome and major channels, including metabolites, vagus nerve, immune system, and more. The potential treatments include prebiotics, probiotics, and fecal microbiota transplantation. A significant gut bacterium is likely crucial for maintaining neurological health, conclude researchers. It encompasses future pathways for using gut microbes effectively for a preferable purpose. Microbes in the gut influence the brain's growth and its activities.



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## INTRODUCTION

The human gut microbiome has trillions of microorganisms that help in digestion and immune functions (Cryan *et al.*, 2020; Shahzad *et al.*, 2017). Studies have now shown that the microbiota of the gut can communicate to the brain as a two-way entity, called the gut-brain axis (Alkhatib, 2019; Mayer *et al.*, 2015). These systems work hand in hand to control how the body functions, including the mind. Our gut can have an impact on our mood and how well our brains work (Alkhatib, 2018).

### Mechanism of the Gut-Brain Axis

The gut-brain axis functions through multiple pathways. Gut bacteria create neurotransmitters like serotonin and GABA that help control how we feel and think. Microbes affect the signals that travel along the vagus nerve, which, as you know, is a pathway between the gut and the brain (Bonaz *et al.*, 2018). The gut flora of an individual impacts the functioning of the immune system. Problems may occur which can cause multiple sclerosis disease (Yadav *et al.*, 2023; Zhang *et al.*, 2024b).

### Gut Microbiome and Neurological Disorders

Dysbiosis is having a connection with many ailments according to studies. Microbial composition in the gut of microbes differs in depressed patients from that of normal. When the brain gets inflamed, it affects chemical production which is important for mental health (Ouabbou *et al.*, 2020). The experts suggest that autistic children have a variety of microbiome profiles that likely impact behavior through metabolic and immune pathways. According to research, the gut bacteria of those affected by Parkinson's disease and Alzheimer's disease are not as before. One potential reason is possible gut permeability improvement and neuroinflammation (Alkhatib, 2022; Nandwana *et al.*, 2022).

### Therapeutic Interventions

Therapies would be assessed that affect the brain as the microbiome would help patients.

Gut health may also improve mood and cognition. Beneficial microbes such as *Lactobacillus* and *Bifidobacterium* have shown promise (Madabushi *et al.*, 2023; Miller *et al.*, 2017). Fecal microbe transplanting can improve gut and mental health by transferring healthier microbiota (Vendrik *et al.*, 2020; Zhang *et al.*, 2024a). Eating the right foods can help in the growth of important bacteria in our gut which can lead to improvement in mental health and overall well-being.

## CONCLUSION

It's so fascinating how scientists are discovering that gut health can affect the brain. Knowing these connections offers possibilities for newer treatments. Different research that is going on should center on microbe-based personalized therapies for mental and brain disorders. The gut microbiome can help improve the treatment of mental and neurodegenerative disorders.

## CONFLICT OF INTEREST

Author hereby declare no conflict of interest.

## REFERENCES

- Alkhatib, A.J., 2018. New Perspectives of Autoimmunity Diseases and Microbiome: Etiology and Treatment. *Acta Sci. Pharm. Sci.*, 2: 12-14.
- Alkhatib, A.J., 2019. Neurobiological and physiological aspects of disease: Brain as a key with multiple links, a new medical hypothesis. *ProBiologists*, pp. 1-2.
- Alkhatib, A.J., 2022. Parkinson's Disease: A Comprehensive Overview of the Disease. *Parkinson's Disease-Animal Models, Current Therapies and Clinical Trials*.
- Bonaz, B., Bazin, T., Pellissier, S., 2018. The vagus nerve at the interface of the microbiota-gut-brain axis. *Front. Neurosci.*, 12: 336468.
- Cryan, J.F., O'Riordan, K.J., Sandhu, K., Peterson, V., Dinan, T.G., 2020. The gut

- microbiome in neurological disorders. *Lancet Neurol.*, 19(2): 179-194.
- Madabushi, J.S., Khurana, P., Gupta, N., Gupta, M., 2023. Gut Biome and Mental Health: Do Probiotics Work? *Cureus*, 15(6): e40293.
- Mayer, E.A., Tillisch, K., Gupta, A., 2015. Gut/brain axis and the microbiota. *J. Clin. Invest.*, 125(3): 926-938.
- Miller, A.H., Haroon, E., Felger, J.C., 2017. The Immunology of Behavior-Exploring the Role of the Immune System in Brain Health and Illness. *Neuropsychopharmacol.*, 42(1): 1-4.
- Nandwana, V. et al., 2022. The role of microbiome in brain development and neurodegenerative diseases. *Mol.*, 27(11): 3402.
- Ouabbou, S., He, Y., Butler, K., Tsuang, M., 2020. Inflammation in Mental Disorders: Is the Microbiota the Missing Link? *Neurosci. Bull.*, 36(9): 1071-1084.
- Shahzad, M.I., Ashraf, H., Iqbal, M.N., Khanum, A., 2017. Medicinal Evaluation of Common Plants against Mouth Microflora. *PSM Microbiol.*, 2(2): 34-40.
- Vendrik, K.E.W. et al., 2020. Fecal Microbiota Transplantation in Neurological Disorders. *Front. Cell. Infect. Microbiol.*, 10: 98.
- Yadav, S.K., Ito, K., Dhib-Jalbut, S., 2023. Interaction of the Gut Microbiome and Immunity in Multiple Sclerosis: Impact of Diet and Immune Therapy. *Int. J. Mol. Sci.*, 24(19).
- Zhang, Q. et al., 2024a. Current landscape of fecal microbiota transplantation in treating depression. *Front. Immunol.*, 15: 1416961.
- Zhang, W., Wang, Y., Zhu, M., Liu, K., Zhang, H.L., 2024b. Gut flora in multiple sclerosis: implications for pathogenesis and treatment. *Neural. Regen. Res.*, 19(7): 1480-1488.