

THE GUT-BRAIN CONNECTION AND NEURODEGENERATIVE DISEASES: RETHINKING TREATMENT OPTIONS

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ABSTRACT

Recent research has shed light on the complex relationship between the gut and the brain, revealing a bidirectional communication system known as the gut-brain axis. This connection is critical for maintaining homeostasis and influencing brain functions. Emerging evidence suggests that disruptions in the gut microbiome may play a pivotal role in the development and progression of neurodegenerative diseases such as Alzheimer's, Parkinson's, and amyotrophic lateral sclerosis (ALS). These conditions, traditionally viewed through a neurological lens, are now being re-examined with a focus on gut health as a potential therapeutic target.

The gut-brain axis involves a variety of pathways, including the vagus nerve, immune system responses, and microbial metabolites like short-chain fatty acids (SCFAs) that can influence neuroinflammation and neural degeneration. The dysbiosis of the gut microbiota has been linked to increased neuroinflammation, oxidative stress, and the misfolding of proteins, all of which contribute to neurodegeneration. These findings have prompted researchers to explore novel treatment strategies that integrate gut health restoration through probiotics, dietary interventions, and microbiota-modulating therapies as potential avenues to slow or prevent the onset of these diseases.

This paper explores the emerging understanding of the gut-brain connection in neurodegenerative diseases, highlighting the mechanisms involved and rethinking traditional treatment options. By leveraging this integrative approach, new avenues for therapeutic interventions could lead to improved outcomes in managing neurodegenerative conditions, providing a paradigm shift in how these diseases are treated.

KEYWORDS: Gut-Brain Axis, Neurodegenerative Diseases, Microbiome Dysbiosis, Neuroinflammation, Alzheimer's, Parkinson's, Short-Chain Fatty Acids, Gut Microbiota, Therapeutic Interventions, Probiotics, Brain Health

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