

Gut-Microbiota-Brain-Axis, Leaky Gut, Leaky Brain: Pathophysiology of Second Brain Aging and Alzheimer's Disease- A Neuroscientific Riddle

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Abstract : Alzheimer's disease (AD) is one of the most common neurodegenerative illnesses. However, how Gut-microbiota plays a role in the pathogenesis of AD is not well elucidated. The purpose of this literature review is to summarize and understand the current findings that may elucidate the gut microbiota's role in the development of AD. Methods: A literature review of all the relevant papers known to the author was conducted. Relevant articles, abstracts and research papers were collected from well-accepted web sources like PubMed, PMC, and Google Scholar. Results: Recent studies have shown that Gut-microbiota has an important role in the progression of AD via Gut-Microbiota-Brain Axis. The onset of AD supports the 'Hygiene Hypothesis', which shows that AD might begin in the Gut, causing dysbiosis, which interferes with the intestinal barrier by releasing pro-inflammatory cytokines and making its way up to the brain via the blood-brain barrier (BBB). Molecular mechanisms lipopolysaccharides and serotonin kynurenine (tryptophan) pathways have a direct association with inflammation, the immune system, neurodegeneration, and AD. Conclusion: The studies helped to analyze the molecular basis of AD, other neurological conditions like depression, autism, and Parkinson's disease and how they are linked to Gut-microbiota. Further, studies to explore the therapeutic effects of probiotics in AD and cognitive enhancement should be warranted to provide significant clinical and practical value.

Keywords : gut-microbiota, Alzheimer's disease, second brain aging, lipopolysaccharides, short-chain fatty acids

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