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Gut Microbiome–Neuroinflammation Crosstalk in Anxiety and Depression: Molecular Mechanisms, Biomarkers, and Therapeutic Opportunities

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Backgrounds

Anxiety and depression are common psychiatric disorders and there are significant limitations in existing pharmacological treatments in addition to significant disability. The microbiota–gut–brain axis has been linked to immune, neural, and metabolic systems and is emerging as a mechanism by which the gut microbiota may participate in the pathophysiology of these disorders..

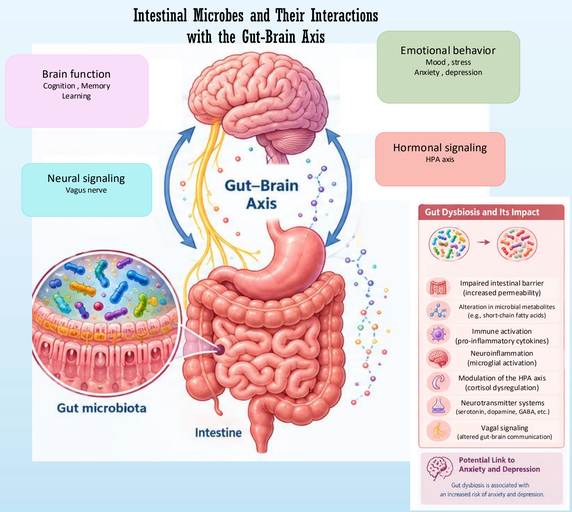
Methods

A narrative review was conducted by searching major scientific databases, such as PubMed. The search was performed using keywords related to Gastrointestinal Microbiome, Brain-Gut Axis, and Neuroinflammatory Diseases.

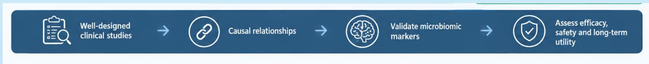
Searched : Gastrointestinal Microbiome, Brain-Gut Axis, Neuroinflammatory Diseases, Anxiety Disorders, Depressive Disorder

Findings

Gut dysbiosis may affect integrity of intestinal barrier, and lead to greater systemic exposure to microbial products (e.g. lipopolysaccharides) that boost inflammatory signaling and microglial activation. Communication between the gut and brain may involve microbial production of short-chain fatty acids such as butyrate, microbial modulation of gut peptides, hypothalamo-pituitary-adrenal axis, and vagal signaling. Changes in the composition of microbes, production of microbial metabolites and inflammatory mediators have thus been suggested as markers for neuropsychiatric conditions. Modulation of the gut microbiota through therapeutic interventions such as probiotics and psychobiotics, prebiotics, dietary changes, lifestyle change, and fecal microbiota transplantation may have potential in the modulation of neuroinflammation and mood-related symptoms.







Conclusion

There is a significant link between alteration of gut microorganisms, immune dysfunction, neuroinflammation and anxiety and depression that is supported by available evidence. Considering the microbiota–gut–brain axis is a new therapeutic avenue to be

explored; however, new well-designed clinical trials are required to determine efficacy and safety, identify reliable biomarkers, and build causal links.



References

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