REVIEW

THE GUT-BRAIN AXIS: THE CORRELATION BETWEEN STRESS AND GUT MICROBIOME

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Abstract. *Although it was thought that the gut microbiome affects gut physiology only locally, it becomes clearer that these trillions of organisms that reside in the gastrointestinal tract of a human being have a more complex function. Preclinical studies have shown that the microbiome has the ability to interact with the brain in various ways. There have been at least three different channels of communication that favour bidirectional interaction between the brain and the gut. The aim of this review is to summarize the connection between the gut microbiome and the brain, highlighting the process in which stress, in its various forms, can affect the homeostasis of the gastrointestinal tract. Modifications in the gut-brain-microbiome interactions have been analysed and determined in several rodent models of digestive and neurological disorders. The manner in which this information can apply to human beings, is yet to be discovered. Taking all things into account, it is clear that a better understanding of this means of communication could open the door for future therapies for gastrointestinal conditions.*

Keywords: *gut microbiome, gut-brain interactions, microbial signalling, stress-induced alterations.*

DOI https://doi.org/10.56082/annalsarscimed.2023.1.20

Abbreviations: GB= Gut-Brain; GI= Gastro-intestinal; IBS= Irritable bowel syndrome; ENS= Enteric nervous system; CNS= Central nervous system; ANS= Autonomic nervous system; SCFAs= Short-chain fatty acids; 2Bas= Secondary bile acids; TLRs= Toll-like receptors; MAMPs= Microbe-Associated Molecular Patterns; HPA= Hypothalamic pituitary-adrenal; SPF= Specific pathogen-free; GF= Germ free; BMI= Body-mass index; CFU= Colony forming unit; MODS= Multiple organ dysfunction syndrome; SIRS= Systemic inflammatory response syndrome; L/D test= Light-Dark box test.

1. Introduction

Discussions revolving around the importance of the human microbiome have recently gained great popularity among scientists. Although questions regarding the subject continue to emerge, there is yet not sufficient information to define the exact mechanisms and pathophysiology of how the gut microbiome influence general health. As in present days, the mental health of the human population has become extremely valued, as a great number of people struggle with problems in day-to-day life. For that reason, it is imperative to learn more about the correlation between stress and the gut microbiome, as well as the latent issues that