Handout 5.2 (PATIENT VERSION)

An introduction to gastrointestinal microbiota

Stress and the brain-gut axis across the spectrum of digestive disorders

The intestinal tract lives in symbiotic harmony with the organisms (called microbiota) contained within. It is estimated that the total number of bacterial living in the human colon is approximately 3.8×10^{13} (that's 38 quadrillion bacteria!). And though bacteria are the main components of the gut microbiota, there also are millions of non-bacterial entities, such as viruses and protozoa also residing within the gastrointestinal (GI) tract. The amount of genetic material represented by this complex microbiome is thought to be 50-100-fold greater than the human host.

These organisms not only play an important role in the metabolism of intestinal content, including facilitating digestion and the production of some vitamins and neurotransmitters, but can also influence bodily functions outside of the GI tract, including the development and balance of the immune and nervous systems in health. See Figure 5.2 for an overview of the bi-directional interactions, key effectors, and functions of the brain-gut-microbiota axis.

Dysbiosis, or the imbalance of GI microbiota with unfavorable organisms, can lead to illness, including IBS, cancer, obesity, and neuropsychiatric disease such as depression. The increased understanding of these relationships presents an opportunity to favorably alter GI tract microbiota as a treatment of these related conditions.

Several ways that this can be achieved include the use of probiotics (good bacteria supplements) or prebiotics (nondigestible substances that act as food for the favorable GI microbiota). Occasionally, the microbiota may need to be "reset" through the use of antibiotic treatments. The understanding of which strategy to use in achieving microbiota balance to maintain or re-establish health currently is an area of intense study.[2]

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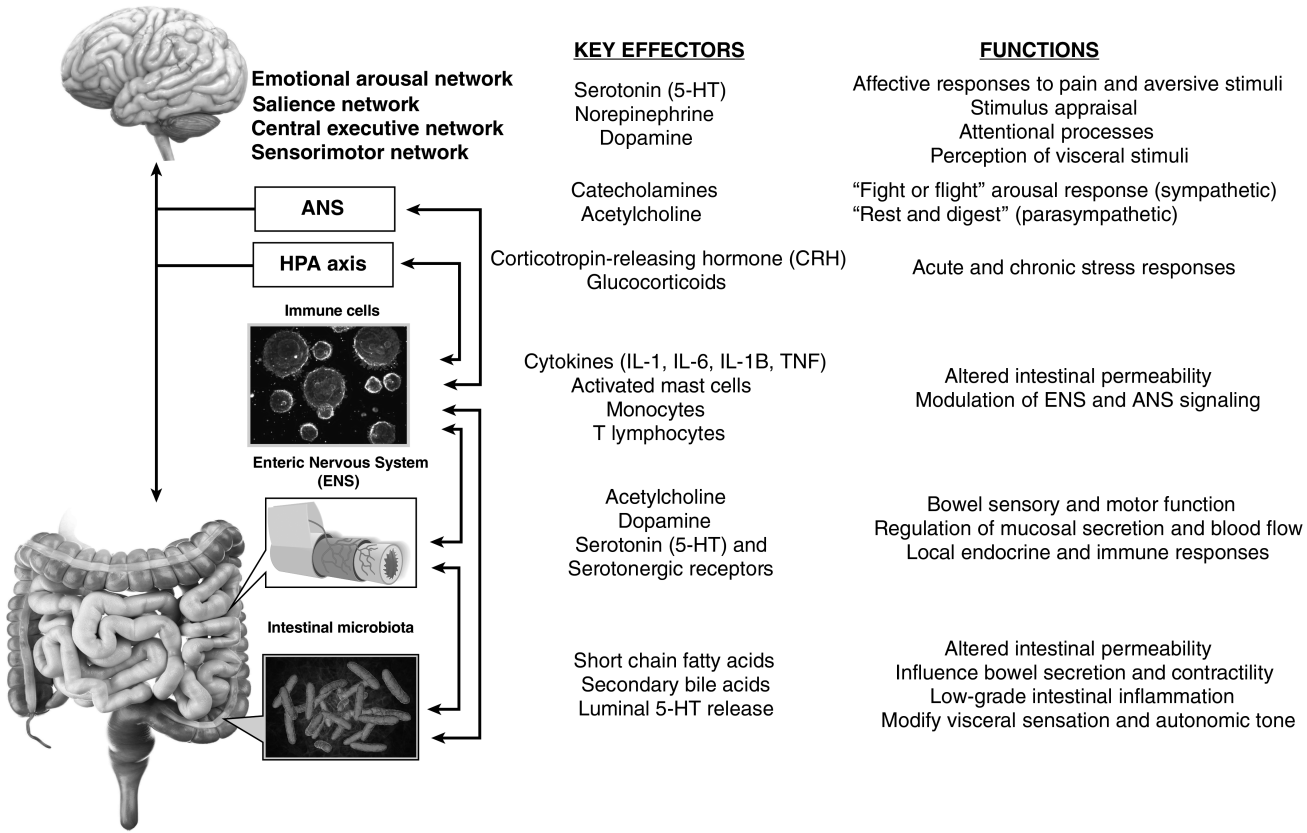


Figure 5.1 The bi-directional interactions, key effectors, and functions of the brain-gut-microbiota axis (*Source*: Author)

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References for Handout 5.2

1. Drossman, D.A., *Functional Gastrointestinal Disorders: History, Pathophysiology, Clinical Features and Rome IV*. Gastroenterology, 2016.
2. Kho, Z.Y. and S.K. Lal, *The Human Gut Microbiome – A Potential Controller of Wellness and Disease.* Front Microbiol, 2018. **9**: p. 1835.

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