



Functional GI Disorders, Microbes, and Brain-Gut Interactions

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Key Points

- The gut contains trillions of microorganisms (the gut microbiota) that help maintain health
- The gut microbiota helps with digestion, maintaining the immune system, and protecting from pathogens
- A person's diet affects the health of their gut microbiota
- Overall, a Mediterranean-style diet supports gut microbiota health
- Stress can make symptoms worse, and can be alleviated by strategies like exercise, abdominal breathing, and progressive relaxation.

Scientists are making exciting discoveries about the connection between the gut (digestive system) and brain and how that link affects a person's health. One of the discoveries is how vital the bacteria that live in the gut, the gut microbiota, are. The gut microbiota helps with digestion, maintaining the immune system, and protecting from pathogens.

If the gut microbiota is disturbed, it might lead to symptoms; for example, taking antibiotics sometimes leads to diarrhea.

The brain and the gut talk to each other

There is a connection between what gut microbes produce and brain activity, function, and structure.

This connection begins during fetal development and is established by about three years of age. If there is an imbalance in the types of microbes in the gut, a person could be vulnerable to a functional gastrointestinal (GI) disorder. A person's diet affects the types of metabolites

gut microbes make. These **microbial metabolites** may influence the nervous system in the gut (the enteric nervous system) and the brain. Diet becomes an essential factor, not only for its direct effect on health but also for what it does to the microbes, what they produce, and how these metabolites affect the nervous system.

Microbial metabolites are substances produced by gut microbes by fermenting food that the human GI system cannot process or absorb. Hundreds of thousands of these metabolites are made in the gut.

The low FODMAP diet is not the best diet for people with IBS

FODMAPs are types of carbohydrates found in foods like wheat and beans. Followers of the low FODMAP diet eat less of the fiber that supports beneficial microbes in the gut. In the short term, a diet like this may lessen symptoms for some IBS patients. Still, these diets are difficult to maintain for a long time, and they may even have adverse effects on gut microbiota. Moreover, it appears that a healthy, balanced microbiota also can alleviate symptoms. So, a low FODMAP diet may not be the best choice for managing IBS.

There is new evidence that suggests that the benefits of a particular diet depend on the gut microbial composition. We need a better idea of what a specific diet does to the gut microbes and microbial metabolites, and how these substances affect the nervous system in the gut and brain.

The optimal diet is a Mediterranean style

Eating a mix of complex carbohydrates, protein, and fats is essential to growing healthy gut microbes. The Mediterranean diet or similar diets probably come closest to this, with a high proportion of complex carbohydrates from plant-based foods, minimal animal fat, a relatively

small amount of protein mainly from fish and chicken, and few refined sugars.

Stress can affect the GI tract

State of mind is a factor in creating and prolonging IBS symptoms. For example, we know that feeling anxious or sad while eating affects how the gut contracts or secretes enzymes to digest food. In addition, we know that stress can affect the behavior of gut microbiota directly. An acutely stressed person or one chronically affected by sad emotions will have a different set of microbes. It seems that a balanced mind and a proper diet go hand in hand because if one constantly feels stressed, no matter how healthy the diet is, they will not gain the same benefits as a less stressed person.

Gut microbes may help maintain a balance between the brain and the gut

A person can take care of what, when, and how they eat to promote healthy diversity in the gut microbiome. Maintaining a positive emotional state and, as much as possible, relaxing, and enjoying mealtime will help support the gut microbes. Many simple forms of stress reduction, such as exercise, abdominal breathing, or progressive muscle relaxation, can reduce pain.

Eating a sensible diet, reducing stress, and working toward a balanced body and mind are steps to improving well-being.

Glossary

- **Enteric nervous system:** Autonomic nervous system within the walls of the digestive tract. The ENS regulates digestion and the muscle contractions that eliminate solid waste.
- **Functional GI disorders:** Disorders that occur because of abnormal functioning of the GI tract, which can affect motility, sensation, and brain–gut communication.
- **Gut microbiota:** All of the bacteria in the intestines. Essential for healthy digestion.
- **Microbial metabolites:** Substances produced by the gut microbes by fermenting food components that the human intestine cannot process or absorb.
- **Microbiome:** The collection of genomes from all the microorganisms in an environment

- **Microbiota:** The collective community of microorganisms, or microbes, such as bacteria or viruses, that live on or within different parts of our bodies, like the skin, mouth, and gut.

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- 101: IBS Brochure
- 108: Are You a Gut Responder? Hints on Coping with an Irritable Bowel
- 124: IBS: The Pathophysiologic Links to More Effective Future Therapy
- 130: Quality of Life Assessment
- 140: An 8-Step Approach to Chronic Pain Management
- 164: Using Relaxation in Coping with GI Disorders
- 205: Understanding the Quality of Life Impact of Functional GI Disorders
- 257: Be an Active Member of Your Health Care Team

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