

Healthy Gut: Prebiotics and Probiotics

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Nearly 100 trillion bacteria live in the human gastrointestinal tract. This collection of organisms is called the gut microbiota, and it is vital for human health. Nutrition plays an important role in shaping the composition and function of the gut microbiota. A plant-based eating pattern contributes to a healthy gut, which improves overall health and helps prevent disease.¹

Basics of a Healthy Microbiota

Bacteria first begin to colonize the intestine early in life and continue to change throughout the life span.² There are hundreds of unique species of microbes in each human gut. Many of these bacteria are beneficial, but some can be harmful. Two things are important when measuring gut health: the total number of bacteria and how much you have of certain types. Good bacteria crowd out bad bacteria.¹

Benefits of a Healthy Microbiota

Bacteria in the gut have many benefits: They help break down food, strengthen the intestinal wall, and produce some essential vitamins.³ A healthy microbiota also protects against disease by competing with germs for nutrients, stimulating immune cell responses, and producing substances that prevent harmful growth.⁴ However, antibiotics or a poor diet can cause problems. This is called dysbiosis and can increase risk of infection. Dysbiosis can even contribute to obesity, diabetes, and inflammatory bowel disease.² Undesirable gut profiles also increase a person's risk for cardiovascular and autoimmune diseases when compared with healthy gut profiles.¹

Diet Quality Makes a Difference

Diets that are high in insoluble fiber help maintain a healthy gut microbiota. Insoluble fiber, also called dietary fiber, is a prebiotic. Prebiotics are foods that only your gut bacteria can digest. When a person eats prebiotic foods, bacteria in the large intestine digest the fiber and then produce short-chain fatty acids (SCFAs). SCFAs have many benefits, including strengthening the intestinal lining, helping with mineral absorption, balancing blood sugar, increasing feelings of fullness, contributing to weight loss, reducing inflammation, and influencing gene expression.⁵⁻⁷

Research suggests that low-fat, high-fiber diets produce a better-

balanced gut microbiota than diets high in fat and low in fiber. High-fat, meat-rich diets (like the Standard American Diet or Western diet), however, promote growth of bacteria that increase inflammation.

When gut bacteria process animal protein, toxins are produced. Diets high in animal protein increase the risk of diseases of the digestive, cardiovascular, and central nervous systems. They also increase the risk of type 2 diabetes and obesity.⁸ For example, gut bacteria digest nutrients like choline, betaine, and L-carnitine. These are mostly found in animal products and produce a compound called trimethylamine-N-oxide (TMAO). TMAO leads to inflammation that increases the risk of cardiovascular disease and nonalcoholic fatty liver disease.^{9,10}

Lifestyle Guidelines for a Healthy Microbiota

Diet is responsible for influencing the majority of your gut microbiota.⁷ You can give your health and the health of your gut a boost by following these eating patterns.

- 1. Focus on fiber and prebiotics.** Build meals around healthful plant-based foods: vegetables, fruits, whole grains, and legumes. These high-fiber foods are rich in prebiotics that promote healthy bacteria and provide health benefits to the whole body. Eating them will allow your gut bacteria to produce short-chain fatty acids and other metabolites that improve immune function, nutritional status, inflammation, chronic disease risk, and even mood. Most recommendations advise consuming between 25 and 35 grams of fiber daily, but we suggest aiming as high as 40 grams; more is almost always better. Only about 5% of Americans currently consume adequate fiber.¹¹ High-prebiotic foods include leafy greens, beans, artichokes, chicory root, raw dandelion greens, leeks, onions, garlic, asparagus, whole wheat, bananas, and oats.



- 2. Include probiotics.** Probiotics can easily be added to your diet in small amounts and may help the growth of healthy gut bacteria. Fermented foods are a natural source of probiotics, though their health benefits are still being studied.¹² Dietary sources include sauerkraut, kimchee, miso, tempeh, kombucha, and water kefir.



3. Avoid these foods. Red meat, high-fat dairy products, fried foods, food additives, and advanced glycation end products (AGEs) all reduce the growth of healthy bacteria and enhance the growth of undesirable species linked to chronic disease. AGEs include proteins and fats exposed to high heat, such as sausage, and sugar molecules found in candy bars.

4. Limit fats. Fat intake should be limited, especially if you have or are at risk for type 2 diabetes. Instead of animal fats, opt for healthful sources, including an ounce of nuts or seeds or a small amount of avocado.



5. Be cautious with antibiotic use. Antibiotic overuse has been shown to cause a loss of healthy bacteria and genetic diversity in the gut.¹³ There are times when a prescription is necessary, but avoiding excessive antibiotic use when possible will keep your gut healthy and should be discussed with a health care provider. Animal agriculture is responsible for 65% of all antibiotic use, with some estimates ranging higher.¹⁴ Avoiding animal products will reduce dietary exposure to antimicrobial agents.



6. Other lifestyle factors. Evidence suggests that exercising, getting enough sleep, and avoiding or managing stress will also have a positive impact on the health of the microbiota.¹⁵⁻¹⁷



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