

A HEALTHY MICROBIOME: A CLINICIAN'S GUIDE

What Is The Microbiome?

Trillions of microorganisms – mostly bacteria, and over 30,000 different species – live in our gut. Which ones live there can have a marked effect on health. You can support a healthy microbiome through your diet as well as by taking various dietary supplements.

Probiotics are living organisms that offer benefits to their host. Prebiotics are the food they need to survive, and postbiotics are their metabolic byproducts (which can include vitamins other nutrients). They are usually identified by their species. Common examples include *Lactobacillus acidophilus* and *Bifidobacterium bovim*.

How Does It Work?

New roles for the gut microbiome are being discovered all the time. Some of the roles we know of so far include direct DNA signaling, vitamin production, interacting with the immune system, protecting the gut from the attachment of harmful microbes and impeding their growth, and modulating central nervous system function.

In order to be effective, probiotic foods and supplements should actually contain organisms that can make it through the stomach acid and bile, and they should be able to effectively colonize once they reach the appropriate part of the gastrointestinal (GI) tract.

How Do I Use Probiotic Foods and Supplements?

Nutrition and the Microbiome. Diets with the most fiber, vegetables, and fruits are the best at helping the gut keep a healthy mix of microbes. Avoiding red meat and animal fats is also helpful. Common probiotic foods clinicians can encourage patients to eat include yogurt, milk (if not overly processed), kefir, kombucha tea, sauerkraut, miso and tempeh (forms of soy), and pickles. Frozen foods tend not to have viable bacteria.

Probiotic Supplements. Capsules containing beneficial organisms are dosed based on colony forming units (CFUs). These are normally dosed in powers of 10. Standard doses are 10^9 CFUs, or 10^{10} . There are many brands available, and some of them contain specially patented mixtures or species.

Some of the most-researched strains of probiotics include:

- *B. bifidum* Malyoth strain
- *B. longum*
- *Bifidobacterium lactis* BB12 (abbreviated as *B. lactis* BB12)
- *L. acidophilus* DDS1
- *L. acidophilus* NAS (sometimes just called Acidophilus)
- *L. bulgaricus* LB-51
- *L. gasseri*
- *L. plantarum*

- *Lactobacillus rhamnosus* GG (available as the brand Culturelle)
- *Saccharomyces boulardii*—this is actually a yeast that has been found to have several benefits. Keep it in mind for recurrent *Clostridium difficile* (“*C. Diff*”) colitis and inflammatory bowel problems.

Have patients take probiotics on an empty stomach, and if they are taking an antibiotic, separate them by 2 hours. If they are heat-dried, they should be kept in the fridge, but if they are lyophilized, they can be kept at room temperature. It is unclear how long they should be taken, but 2 weeks to 2 months is typical, or longer if people have Crohn’s or irritable bowel syndrome (IBS).

When Should I Use It?

Antibiotics, bowel preps, proton pump inhibitors, and exposure to pathogens (e.g., viral gastroenteritis) can all alter bowel flora. Many integrative health clinicians will use it whenever they prescribe antibiotics or anytime a person has been through an infectious GI illness. They also seem to reduce inflammation, so they should be considered in any inflammatory process. Other indications include vulvovaginal candidiasis, eczema, IBS, respiratory infections, and augmentation of *H. pylori* treatment.

What Should I Watch Out For?

Probiotics tend to be quite safe. There are a few case reports about them translocating to cause abscesses, or infecting people with severe immunocompromise. Untested strains should not be used, nor should strains that are usually classed as pathogens. One study found negative outcomes in patients with severe acute pancreatitis when given probiotics.

Any Other Tips?

- A number of clinicians report that the probiotic yeast, *Saccharomyces boulardii*, can be helpful.
- More FMRI studies are showing probiotic supplementation can alter brain function.
- There is a connection between gut flora and obesity as well.
- Lactobacilli (L) tends to work in the small intestine, and Bifidobacteria (B) in the colon.

Additional Resources

Rakel D. Promoting a Healthy Microbiome with Food and Probiotics: Clinical tool, Digestive Health Module Whole Health Library Website. Available at: <http://projects.hsl.wisc.edu/SERVICE/curriculum/index.html>. Accessed August 8, 2016.

Rindfleisch, A. Prescribing Probiotics. In: Rakel, D, ed. *Integrative Medicine*. 3rd ed. Philadelphia, PA: Elsevier Saunders; 2012: 906-912.

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