[IMAGE]

Healthy Bacteria

By Joe Leonard

With outbreaks of *E. coli* and *Salmonella* reported in the news on a near-weekly basis, you might be surprised to learn that not all bacteria is bad.

In fact, your intestines are literally brimming with thousands of species of bacteria that actually provide a variety of important health benefits.

It sounds somewhat disturbing, but there are many types of bacteria that are essential to good human health. Humans co-evolved with beneficial intestinal bacteria, and we live in a symbiotic relationship with them. The intestinal environment is a perfect habitat for bacteria; they have a constant supply of food, warmth and moisture. In return, the "good bacteria" provide us with valuable health benefits including the following:

- They are a source of important nutrients like vitamin K and short-chain fatty acids.
- They secrete factors that fight pathogenic microbes.
- They boost immunity.
- They aid in absorption of minerals like calcium, iron and magnesium.
- They reduce the amount of toxic and carcinogenic substances in the gut.
- They promote colon health.

Most of these microbes live in a harmonious balance with each other and with us much of the time. However, sometimes this balance is disrupted by factors such as stress, antibiotic therapy or poor diet. Populations of good bacteria may decrease or disappear, depriving the intestine of the benefits they provide and often leading to overgrowth of pathogenic microbes that can then do us harm.

- Copyright â Stock Photo / Register Mark Prebiotics and probiotics help restore and sustain a healthy microbial balance. They have a long history of safe consumption without any major harmful side effects to human health. Let’s take a closer look at these healthy bacteria and the benefits they provide.

Prebiotics: Fermentable Fiber

If you eat a healthy, whole-food diet with lots of fiber-rich fruits, vegetables and nuts, you are consuming prebiotics all the time. They occur commonly in many plant foods such as onions, bananas, wheat, artichokes, garlic, almonds, and other whole foods. The beneficial bacteria thrive when we eat many of these foods. This is part of the reason why eating a fruit- and vegetable-rich diet is so beneficial to health.

Although prebiotics are often equated with "fiber," not all fiber is prebiotic. Prebiotics are specifically nondigestible, fermentable fibers that promote the growth and activity of beneficial intestinal bacteria. Humans cannot digest prebiotic fiber from food directly, but it can be consumed (or fermented) by the beneficial microbes. These bacteria, primarily species of *Bifidobacteria* and *Lactobacillus*, digest the fiber and produce byproducts with various health benefits.

For healthy people, eating a healthy fruit- and vegetable-rich diet can provide ample prebiotics to support long-term health. The problem is that some people are not healthy, and many people don't eat as many nutritious foods as they should to stay healthy. This is where supplementation with prebiotics may be beneficial.

Certain isolated prebiotics called "fructooligosaccharides" (or "fructans" for short) encourage the growth of specific types of beneficial bacteria. Inulin, commonly added to foods, is one such prebiotic fiber, usually extracted from the root of the chicory plant. Fructans such as inulin are the major source of prebiotics in the U.S. food supply.

Consumers are at a disadvantage when it comes to consuming prebiotic supplements beyond diet alone, because products vary considerably in the amount and quality of health information that are provided on labels. Some of this has to do with government regulation of the industry. For example, some prebiotic products may contain quite high amounts of fermentable fiber, yet do not provide any health claim information on the labeling because of government rules. This can be confusing, and that is when consulting your doctor and/or other nutrition professional, such as a dietician or a clinical nutritionist, may be prudent. Typically, the amount of prebiotic associated with health benefits is between 3 and 8 grams per serving. It is difficult to get this much prebiotic from a pill (although such products exist), so many prebiotic products are presented as cereals, snack bars or powdered shake mixes.

Probiotics: Living Microorganisms

Probiotics are indeed living microorganisms (typically bacteria, but also some yeasts) that have health benefits in humans when consumed in adequate amounts. A probiotic is not the same thing as a "live culture," which is a microorganism added to food primarily as a fermenting agent. While some live cultures are probiotics (yogurt cultures, for example), many organisms are never used as food additives, such as certain species of *E. coli*.

A common misconception about probiotics is that eating them helps to establish colonies of these same microbes in the body. That is a myth not supported by science. After consuming probiotics, there is a temporary increase in concentrations of the specific ingested organisms in the gut, but levels typically drop back down after the person stops ingesting them. These probiotics simply create more favorable conditions so that colonies of healthy bacteria already living in the gut can thrive and compete against pathogenic bacteria that may cause illness. Probiotics do this in part by lowering the pH of the gut and secreting factors that support growth of beneficial bacteria while inhibiting pathogens.

In generally healthy people, probiotics can support the health of gastrointestinal tract and the immune system, as well as help prevent certain health conditions, including diarrhea and colds. Probiotics support the immune system by enhancing the body’s immune response to pathogens and decreasing inflammation.

As with prebiotics, there are plenty of common foods that contain probiotics. Yogurt, some cheeses and fermented milk products, such as kefir, are examples. The most common commercial probiotics found in foods are species of *Lactobacillus* and *Bifidobacteria,* and occasionally the yeast *Saccharomyces cerevisiae*. Other types of bacteria may be found in probiotic supplements, but rarely in foods.

Healthy people may be tempted (or persuaded by manufacturers) to try probiotic supplements known to enhance immune function and reduce the risk of common illnesses such as colds, flu and even diarrhea. But they may be better off trying to increase their consumption of common probiotic foods instead. While probiotic-rich diets have not been specifically tested for their health benefits, there is evidence that including a variety of probiotic foods in the diet is beneficial.

Probiotic supplements have captured the interest of consumers and health practitioners because they are inexpensive, have few side effects, and are easy to consume. These supplements appeal to two kinds of people. The first group includes generally healthy people who believe probiotics will help them stay healthy. As my mom likes to say, "They can’t hurt, and they might help." The second group includes people with a health condition for which probiotics have shown some benefit in human clinical studies. These

people may benefit from probiotic supplements beyond diet alone. However, such supplements must provide the desired outcome - the person should feel better and experience fewer symptoms of their condition. To help ensure this, it is essential that the products used have been scientifically tested in humans and shown to address the specific health issue.

One difficulty with probiotic supplements is how to deliver them to the end part of the digestive tract, the colon, where they have most of their documented effects. A probiotic has to survive the digestive process to get there. When delivered in foods, the food matrix may protect the probiotic as it travels through the stomach and small intestine. In supplements, microencapsulation and coating technologies have achieved considerable success in overcoming this challenge.

Ask Your Doctor

What's the take-away message here? In short, prebiotics and probiotics are useful in supporting the growth of beneficial microbes that can promote health and prevent disease. So, for generally healthy people, foods rich in pre- and probiotics may suffice to improve nutritional status, GI function, resistance to illness, and overall health. For people with certain health conditions, supplementation with specific strains of probiotic organisms may offer additional benefits beyond diet.

Remember that when it comes to pre- and probiotic products, there is tremendous variation in the amount of health information provided on the label by manufacturers. As a result, it is up to you to separate the marketing hype from the nutritional facts. Talking with your doctor is always a good option, too, particularly before taking any supplement or product.

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Specific Health Benefits of Prebiotics and Probiotics

Prebiotics	Probiotics
Improve colon function and metabolism.	Prevent and reduce GI disorders.
Increase production of short chain fatty acids, which helps prevent cancer.	Prevent and reduce duration of infectious diarrhea in infants.
Decrease pH of the colon, which inhibits growth of harmful microbes.	Provide tolerance to antibiotic therapy.
Reduce cancer-causing chemicals.	Help control symptoms of lactose intolerance.
Reduce cancer-promoting enzymes.	Support the immune system.
Increase mineral absorption.	Produce antimicrobial substances that inhibit pathogenic bacteria.
Support the immune system.	Enhance calcium absorption.
	Reduce serum cholesterol.
	Retard tumor growth.

Prebiotics and probiotics help restore and sustain a healthy microbial balance in the gut, which is important because stress, antibiotic therapy and poor diet can disrupt this balance.

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