Food-Friendly Bugs Do the Body Good

Trillions of bacteria naturally occur in your gut, but don’t be alarmed! Many of the bacteria are good and may help protect the body from certain diseases. A number of factors can upset the balance between the levels of good and bad bacteria. However, there is evidence that consuming foods that have “good” bacteria, called probiotics, and food that aid the function of probiotics, called prebiotics, may help maintain a healthy balance of bacteria in the body and help improve certain disease conditions.

“Food-Friendly Bugs”

Our bodies have four lines of defense against infection: skin, mucosal lining, immune system, and gut microflora, sometimes referred to as gut microbiota. Research has shown that adding “friendly” bacteria to your diet will improve the health of your gut microflora, and may help protect both the lining of your intestinal tract and your immune system. An article written by Nagesh Shah, associate professor of food science at the School of Life Sciences and Technology, Victoria University of Technology, Australia, in the November 2001 issue of Food Technology, highlights the common practice of adding probiotics, similar to bacteria already present in your body, to fermented foods such as yogurt. Probiotics are defined as live microbial food ingredients that have a beneficial effect on human health, when ingested live and in sufficient numbers.

Knowledge of the health benefits of probiotics can be traced back many years when a Nobel Prize winning scientist and director of the Pasteur Institute, Elie Metchnikoff, hypothesized that Bulgarian peasants owed their health and longevity to the consumption of fermented milk products containing lactobacillus, a probiotic bacterium. By 1997, the use of probiotics was becoming well established in Europe, with fermented dairy products accounting for 65 percent of the European “functional food” market. According to an article by Catherine Stanton and colleagues in the American Journal of Clinical Nutrition in 2001, health-conscious Americans are realizing the potential health benefits of supplementing their diets with good bacteria and are the fastest growing segment of consumers of probiotic foods.

Different Types of Probiotics

The two most common bacteria added in the production of probiotic foods are lactobacilli and bifidobacteria. According to an article by Fooks and Gibson, published in a supplement of the British Journal of Nutrition in 2002, there are numerous species of lactobacilli and bifidobacteria; the main species thought to have probiotic characteristics are L. casei, B. lactis, L. johnsonii, B. breve, L. bulgaricus, B. animalis, L. rhamnosus, B. infantis, L. reuteri, B. longum, and L. acidophilus.

Today there are more than 70 lactic acid bacteria-containing products worldwide, including sour cream, buttermilk, yogurt, powdered milk, and frozen desserts. According to Shah, more than 53 different types of probiotic milk products are marketed in Japan alone. In an article published in the American Journal of Clinical Nutrition in 2000, Belgian expert Marcel Roberfroid states that probiotics have traditionally been consumed as fermented dairy products such as yogurt but have also recently been incorporated into drinks, and in the future may be found in fermented vegetables and meats. They are also being marketed as dietary supplements in tablet, capsule, and freeze-dried preparations.

Health Effects of Probiotics

The health of the gut largely relies on the balance between good and bad bacteria, and probiotics may help the gut prevent an imbalance in which there are too many harmful bacteria. Most of the research on probiotics has been conducted through small clinical studies or epidemiological (observational) studies. This research has shown that probiotics may be promising as treatments for a number of diseases and conditions including: lactose intolerance, diarrhea secondary to antibiotic use or E. coli infections, other gastrointestinal infections, vaginal candida (yeast) infections, and lactose malabsorption due to chemotherapy. Research has reasonably well established that probiotics improve the body's ability to resist intestinal infection and improve digestion. Only limited evidence, however, suggests that probiotics have cholesterol-lowering benefits, reduce the risk of cancer, produce vitamins, and reduce the risk of urogenital infections other than candida. Although there is relatively little harm in taking probiotics, more research is necessary to establish a firm basis for using probiotics for specific health benefits.
Prebiotics, The Companion Nutrient

Gut microflora need an environment in which to thrive. Dennis T. Gordon, Ph.D., professor and chair of the department of cereal science at North Dakota State University, explains, “Fermentable dietary fiber is a source of prebiotics and the necessary energy source for our intestinal microbiota.” According to an article by Christopher Duggan of Children’s Hospital in Boston, Mass., published in the American Journal of Clinical Nutrition in 2002, inulin and oligofructose are the two most commonly studied prebiotics. Both inulin and oligofructose are found naturally in many fruits and vegetables as well as in whole-grain foods. They are also widely used commercially to add fiber to foods without adding bulk.

Health Effects of Prebiotics

Most of the research on the potential health benefits of prebiotics has been done in studies with animals or in vitro (in a test tube). Studies of inulin have shown that it may have a promising role to play in providing relief from constipation and suppressing diarrhea. Some studies also suggest a possible benefit for reduced risk of osteoporosis through increased calcium absorption, reduced risk of atherosclerosis through decreased cholesterol and triglycerides and improved insulin response, obesity and possibly type 2 diabetes (Robertson, American Journal of Clinical Nutrition, 2000).

The Lowdown on Consuming Probiotics and Prebiotics

Probiotics and prebiotics are safe to eat and have many positive health benefits. Eating a combination of pre- and probiotic foods, or symbiotic foods, those that contain both pre- and probiotics, may provide the most health benefits. Probiotic and prebiotic products are now widely available. Manufacturers formulate their products with different types and amounts of probiotic bacteria. Most work best when refrigerated or vacuum-packed to preserve the freshness of the bacteria.

Currently, there are no established recommended consumption levels of pre- and probiotics for beneficial effects. More research is needed to determine who will benefit most from consumption of those foods, and who should potentially avoid them. For example, as stated by Sanders in an article published in the November 1999 issue of Food Technology, immunocompromised individuals (e.g., young, elderly, patients with AIDS, Crohn’s Disease or enteric infection, etc.) should check with their doctor before consuming probiotics and prebiotics. As always, it is important that individuals not self-diagnose any health condition and speak to their healthcare professionals for advice on the nutritional component of any treatment plan.

The Future of Probiotics and Prebiotics

Pre- and probiotics are exciting areas of food and nutrition research; however, more studies are needed to substantiate some of the links between these nutrients and health. Dr. Gordon sums up the current state of the science by saying, “Probiotics are helping us to not only understand but also improve intestinal health. Emerging research is also revealing an important supporting role for prebiotics.” The determination of specific strains of beneficial bacteria may help address various gastrointestinal diseases including Crohn’s disease and ulcerative colitis, irritable bowel syndrome, and infections in the stomach and small intestine. Research may also find ways for probiotics to improve tube feedings and infant formula as well as improve the nutritional health of the elderly.