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# Probiotics

## What's the Bottom Line?

### How much do we know about probiotics?

Although a great deal of research has been done on probiotics, much remains to be learned.

### What do we know about the usefulness of probiotics?

Some probiotics may help to prevent diarrhea that is caused by infections or antibiotics. They may also help with symptoms of irritable bowel syndrome. However, benefits have not been conclusively demonstrated, and not all probiotics have the same effects.

### What do we know about the safety of probiotics?

In healthy people, probiotics usually have only minor side effects, if any. However, in people with underlying health problems (for example, weakened immune systems), serious complications such as infections have occasionally been reported.

## What Are Probiotics?

Probiotics are live microorganisms that are intended to have health benefits. Products sold as probiotics include foods (such as yogurt), dietary supplements, and products that are not used orally, such as skin creams.

Although people often think of bacteria and other microorganisms as harmful "germs," many microorganisms help our bodies function properly. For example, bacteria that are normally present in our intestines help digest food, destroy disease-causing microorganisms, and produce vitamins. Large numbers of microorganisms live on and in our bodies. In fact, microorganisms in the human body outnumber human cells by 10 to 1. Many of the microorganisms in probiotic products are the same as or similar to microorganisms that naturally live in our bodies.

## Probiotics

### The History of Probiotics

The concept behind probiotics was introduced in the early 20th century, when Nobel laureate Elie Metchnikoff, known as the “father of probiotics,” proposed that consuming beneficial microorganisms could improve people’s health. Researchers continued to investigate this idea, and the term “probiotics”—meaning “for life”—eventually came into use.

### What Kinds of Microorganisms Are In Probiotics?

Probiotics may contain a variety of microorganisms. The most common are bacteria that belong to groups called *Lactobacillus* and *Bifidobacterium*. Each of these two broad groups includes many types of bacteria. Other bacteria may also be used as probiotics, and so may yeasts such as *Saccharomyces boulardii*.

### Probiotics, Prebiotics, and Synbiotics

Prebiotics are not the same as probiotics. The term “prebiotics” refers to dietary substances that favor the growth of beneficial bacteria over harmful ones. The term “synbiotics” refers to products that combine probiotics and prebiotics.

### How Popular Are Probiotics?

Data from the [2012 National Health Interview Survey \(NHIS\)](#) show that about 4 million (1.6 percent) U.S. adults had used probiotics or prebiotics in the past 30 days. Among adults, probiotics or prebiotics were the third most commonly used dietary supplement other than vitamins and minerals, and the use of probiotics quadrupled between 2007 and 2012. The 2012 NHIS also showed that 300,000 children age 4 to 17 (0.5 percent) had used probiotics or prebiotics in the 30 days before the survey.

### What the Science Says About the Effectiveness of Probiotics

Researchers have studied probiotics to find out whether they might help prevent or treat a variety of health problems, including:

- Digestive disorders such as diarrhea caused by infections, antibiotic-associated diarrhea, irritable bowel syndrome, and inflammatory bowel disease
- Allergic disorders such as atopic dermatitis (eczema) and allergic rhinitis (hay fever)
- Tooth decay, periodontal disease, and other oral health problems
- Colic in infants
- Liver disease
- The common cold
- Prevention of necrotizing enterocolitis in very low birth weight infants.

There’s preliminary evidence that some probiotics are helpful in preventing diarrhea caused by infections and antibiotics and in improving symptoms of irritable bowel syndrome, but more needs to be learned. We still don’t know which probiotics are helpful and which are not. We also don’t know how much of the probiotic people would have to take or who would most likely benefit from taking probiotics. Even for the conditions that have been studied the most, researchers are still working toward finding the answers to these questions.

## Probiotics

Probiotics are not all alike. For example, if a specific kind of *Lactobacillus* helps prevent an illness, that doesn't necessarily mean that another kind of *Lactobacillus* would have the same effect or that any of the *Bifidobacterium* probiotics would do the same thing.

Although some probiotics have shown promise in research studies, strong scientific evidence to support specific uses of probiotics for most health conditions is lacking. The U.S. Food and Drug Administration (FDA) has not approved any probiotics for preventing or treating any health problem. Some experts have cautioned that the rapid growth in marketing and use of probiotics may have outpaced scientific research for many of their proposed uses and benefits.

## How Might Probiotics Work?

Probiotics may have a variety of effects in the body, and different probiotics may act in different ways.

Probiotics might

- Help to maintain a desirable community of microorganisms
- Stabilize the digestive tract's barriers against undesirable microorganisms or produce substances that inhibit their growth
- Help the community of microorganisms in the digestive tract return to normal after being disturbed (for example, by an antibiotic or a disease)
- Outcompete undesirable microorganisms
- Stimulate the immune response.

## Government Regulation of Probiotics

Government regulation of probiotics in the United States is complex. Depending on a probiotic product's intended use, the FDA might regulate it as a dietary supplement, a food ingredient, or a drug.

Many probiotics are sold as dietary supplements, which do not require FDA approval before they are marketed. Dietary supplement labels may make claims about how the product affects the structure or function of the body without FDA approval, but they cannot make health claims (claims that the product reduces the risk of a disease) without the FDA's consent. (For more information about dietary supplements, see the National Center for Complementary and Integrative Health's fact sheet [Using Dietary Supplements Wisely](#).)

If a probiotic is marketed as a drug for specific treatment of a disease or disorder in the future, it will be required to meet more stringent requirements. It must be proven safe and effective for its intended use through clinical trials and be approved by the FDA before it can be sold.

## Probiotics

### What the Science Says About the Safety and Side Effects of Probiotics

Whether probiotics are likely to be safe for you depends on the state of your health.

- In people who are generally healthy, probiotics have a good safety record. Side effects, if they occur at all, usually consist only of mild digestive symptoms such as gas.
- On the other hand, there have been reports linking probiotics to severe side effects, such as dangerous infections, in people with serious underlying medical problems.
  - The people who are most at risk of severe side effects include critically ill patients, those who have had surgery, very sick infants, and people with weakened immune systems.
  - Some experts advise against using probiotics in patients with critical illnesses.

Even for healthy people, there are uncertainties about the safety of probiotics. Because many research studies on probiotics haven't looked closely at safety, there isn't enough information right now to answer some safety questions. Most of our knowledge about safety comes from studies of *Lactobacillus* and *Bifidobacterium*; less is known about other probiotics. Information on the long-term safety of probiotics is limited, and safety may differ from one type of probiotic to another. For example, even though a National Center for Complementary and Integrative Health (NCCIH)-funded study showed that a particular kind of *Lactobacillus* appears safe in healthy adults age 65 and older, this does not mean that all probiotics would necessarily be safe for people in this age group.

### Quality Concerns About Probiotic Products

Some probiotic products have been found to contain smaller numbers of live microorganisms than expected. In addition, some products have been found to contain bacterial strains other than those listed on the label.

### NCCIH-Funded Research

NCCIH is sponsoring a variety of research projects related to probiotics.

Topics of recent NCCIH-funded studies include:

- Whether a specific probiotic is helpful for irritable bowel syndrome
- The mechanisms by which certain probiotics may enhance the response to vaccines
- How prebiotics influence probiotic bacteria
- Whether a yogurt beverage can be used as a way of giving probiotics to children.

NCCIH participates in the National Institutes of Health (NIH) Probiotic and Prebiotic Working Group, a joint effort by several NIH agencies to identify gaps and challenges in research on probiotics and prebiotics. NCCIH also partially funded an Agency for Healthcare Research and Quality review of the safety of probiotics.

## Probiotics

### More To Consider

- Don't replace scientifically proven treatments with unproven products and practices. Don't use a complementary health product, such as probiotics, as a reason to postpone seeing your health care provider about any health problem.
- If you're considering a probiotic dietary supplement, consult your health care provider first. This is especially important if you have health problems. Anyone with a serious underlying health condition should be monitored closely while taking probiotics.
- If you're pregnant or nursing a child, or if you're considering giving a child a dietary supplement, such as probiotics, it's especially important to consult your (or your child's) health care provider.
- Tell all your health care providers about any complementary or integrative health approaches you use. Give them a full picture of what you do to manage your health. This will help ensure coordinated and safe care.

### For More Information

#### NCCIH Clearinghouse

The NCCIH Clearinghouse provides information on NCCIH and complementary and integrative health approaches, including publications and searches of Federal databases of scientific and medical literature. The Clearinghouse does not provide medical advice, treatment recommendations, or referrals to practitioners.

Toll-free in the U.S.: 1-888-644-6226

TTY (for deaf and hard-of-hearing callers): 1-866-464-3615

Web site: [nccih.nih.gov](http://nccih.nih.gov)

E-mail: [info@nccih.nih.gov](mailto:info@nccih.nih.gov)

#### PubMed®

A service of the National Library of Medicine (NLM), PubMed contains publication information and (in most cases) brief summaries of articles from scientific and medical journals.

Web site: [www.ncbi.nlm.nih.gov/pubmed](http://www.ncbi.nlm.nih.gov/pubmed)

#### MedlinePlus

To provide resources that help answer health questions, MedlinePlus (a service of NLM) brings together authoritative information from NIH as well as other Government agencies and health-related organizations.

Web site: [www.nlm.nih.gov/medlineplus/](http://www.nlm.nih.gov/medlineplus/)

## Probiotics

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