

You Probably Don't Need That Probiotic. Here's Why

Probiotic supplements are touted as a way to make the trillions of microbes in our gut healthier

By Simon Spichak

Back in 2013, Dr. Satish Rao, who's been a practicing gastroenterologist for more than 35 years, met a patient with a combination of unusual symptoms.

The woman showed him “an alarming [cell phone] video of something that I've never seen before,” he says.

Rao's patient complained that a minute or so after eating a meal, she'd experience bloating. In the video, the woman's flat belly quickly ballooned, making her look like she was many months pregnant. “I see gas and bloating, I see infection, but I have never seen someone blow up like that,” Rao recalls. These confounding symptoms were accompanied by brain fog: the woman experienced diminished cognitive capacity, including confusion, that impacted how she performed at work.

Soon after, Rao saw another patient with similar symptoms, and he set out to investigate. His 2018 observational study found that these troubling symptoms were linked to common over-the-counter health products: probiotics intended to treat gastrointestinal symptoms such as gas, bloating, diarrhea and even fatigue. The small observational study examined 38 patients, 30 of whom had brain fog; all were taking probiotics. It turned out that those with brain fog had an overgrowth of bacteria in their small bowel. When a majority of these patients took antibiotics to kill the bacteria and stopped taking probiotics, their gas, extreme bloating and

other gut issues—as well as their brain fog—resolved.

It begs the question: Does anyone actually need to take probiotics? And do these supplements do more harm than good?

For the uninitiated, probiotics are live bacteria and yeasts that naturally live in the body. Probiotic supplements are touted as a way to make the community of trillions of microbes in our gut “healthier.” These products—which aren't drugs and therefore don't need to be approved by the U.S. Food and Drug Administration (FDA)—are readily available at grocery stores and pharmacies. Probiotics are even touted by some doctors at prominent institutions. But experts say the side effects of these products, which are understudied, may be greater than any promised benefits, and they're not necessary for most people.

“The excitement about probiotics has grown exponentially without large-scale data to prove that supplements are beneficial,” says Dr. Rabia De Latour, an assistant professor with the department of medicine at the NYU Grossman School of Medicine.

Still, under the guise of improving the gut microbiome—and, as a result, our overall health—an enormous



Studies of dietary supplements found that they often contain prohibited or even dangerous ingredients

market has emerged in North America promising wellness via poorly regulated and mischaracterized supplements. Four million Americans report regularly ingesting probiotic products. Using a combination of technical terms in commercials and on labels, such as *antioxidants* or *short-chain fatty acids*, many supplement companies and some practitioners convince otherwise healthy people to purchase their products, which may be fraudulent, misleading or mislabeled. In addition to a lack of federal regulation, there are no quality-assurance standards to ensure probiotics are safe for consumers. Often, these supplements are promoted as being “clinically tested,” but that lingo doesn’t mean much—only that at least one trial or test has occurred.

Some manufacturers have paid a price for advertising that their products can ameliorate indigestion or boost overall gut health. In 2009, for example, Dannon Co. Inc. paid a \$35 million settlement after landing at the center of a class-action lawsuit for falsely claiming that its Activia and DanActive yogurts contained exclusive strains of bacteria and were “clinically proven to help regulate your digestive system in two weeks” if consumed daily.

What do we actually know about the healthy gut microbiome?

Implicit within the promise of supplements like probiotics is the idea that we can improve the function of the microbiome, which refers to the billions of bacteria that live inside the human digestive tract.

“During the past two decades, there’s been a revival of studying the gut microbiome,” says Fredrik Bäckhed, a renowned microbiome expert and professor at the department of molecular and clinical medicine at the University of Gothenburg. “There are links between an altered gut microbiome and several diseases [such as depression, irritable bowel syndrome and colon cancer]. However, it is unclear if the microbiome contributes to disease, or if the disease affects the microbiome.”

Many factors influence which microbes form your microbiome, including diet, genetics, exercise and stress. Bäckhed says that “the ‘healthy’ microbiome appears to have higher microbial diversity,” with many kinds of microbial species, some of which will digest fibers to form molecules that are important for gut health. However, Bäckhed notes that there isn’t any evidence that probiotics are necessary to maintain a healthy gut microbiome.

There isn’t a specific list of species that define the “healthy” microbiome. Think of microbial diversity in ecological terms: high diversity indicates that many kinds of microbes are present. A rain forest and a savanna may both be highly diverse, even though they harbor vastly different species. Two individuals with high microbial diversity can both have a healthy microbiome even if the species and strains of microbes within their guts are vastly different.

Adding a new species, such as the microbial strains in gut-health supplements, could have disastrous consequences. In Rao’s study, the probiotics did not



Robust research on common probiotic brands is lacking



4 million Americans report regularly ingesting commercial probiotic products



The probiotic industry, which lures consumers with promises of better gut health, is worth a massive \$54.77 billion

pass through the gastrointestinal tract as intended, instead settling down in the small intestines. These bacteria then produced excess amounts of D-lactic acid; it takes time for the kidneys to clear this chemical, which allows it to be absorbed through the blood. If enough of this chemical accumulates in the brain, it can cause confusion and cognitive difficulties—which is what happened to some of Rao’s patients.

“The challenge is that there is no good, solid, systematic work done [on common probiotic brands],” says Rao. “Until such research is done, we will not know whether probiotics are beneficial or harmful.”

The ‘science-ploitation’ of the microbiome

“One of the reasons that people use this phrase, *microbiome*, is to give their products legitimacy,” says Timothy Caulfield, a University of Alberta law professor and public-health expert. “There’s been some interesting research to back that up, if you use that sort of sciency language—it gives whatever you’re selling this veneer of scientific legitimacy.”

Nascent scientific fields are especially prone to this effect; Caulfield adds that it’s happened across multiple other fields, such as genetics and stem-cell science. “I call this science-ploitation,” Caulfield says. “Taking an exciting area of science—microbiome research—and leveraging that language to push products or build a brand.”

Caulfield recently conducted research looking at the pseudoscience of “immune-boosting” supplements advertised on the web and social media platforms like Instagram, and found that about 30% of these websites referenced the microbiome. Other researchers have also noticed that the microbiome has become a new calling card for supplements. “Anything ‘new’ immediately gets co-opted by someone trying to make a quick buck. Even things that have nothing to do with health, like quantum mechanics, get co-opted,” says Alex Berezow, a microbiologist and executive editor

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Caulfield adds that there's a compelling narrative element to microbiome research: "It is kind of a fascinating story about these ... organisms that live in our body, and we have this relationship with these organisms in a way that's relevant to our health, our well-being and even our mental health."

In addition, many of these gut-health products are promoted as treating general malaise such as constipation, diarrhea and even low energy, which makes them appealing.

There's also an enormous financial incentive driving the market for gut-health supplements. The probiotic industry has ballooned to a massive \$54.77 billion market size, while other supplements aimed at gut health took home \$37.93 billion in 2020.

The International Scientific Association for Probiotics and Prebiotics defines probiotics as "live microorganisms that, when administered in adequate amounts, confer a health benefit on the host." While probiotics and other microbiome supplements lack sufficient evidence of efficacy, or even safety, some health care practitioners directly profit by selling these supplements. "It is rare to find a doctor or any medical professional who promotes supplements on social media who doesn't have some financial ties with the product," notes Dr. Jen Gunter, a gynecologist and author of *The Vagina Bible*, who regularly debunks dubious medical claims and pseudoscience on social media. "As there is no requirement to publicly declare financial ties between supplement companies and medical professionals, the consumer has no idea about the financial bias."

Hope among the hype?

Rao believes that understanding the gut microbiome will be an important avenue for developing better therapeutics. Already, for example, researchers are studying whether certain probiotics could treat common disorders such as anxiety or depression. He occasionally prescribes these products to patients with specific conditions, such as antibiotic-resistant diarrhea. There are probiotics that are developed in a careful, quality-controlled manner that might work as intended to reduce diarrhea or bloating, but there are so many on the market that it's difficult for consumers to zero in on these trustworthy products, Rao says.

In the future, Caulfield predicts, probiotics might become more heavily regulated by agencies such as the FDA. We'll likely see improvements in requirements regarding how probiotics and other gut-health supplements are labeled.

For now, many of the products in your local grocery store that claim to improve your gut health might actually be snake oil. Unless you're prescribed a probiotic by your doctor, experts agree, it's probably best to avoid them altogether. There's little evidence that they improve gut health for the average person, and in many cases, the risk of side effects simply outweighs the benefits. □