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Should You Take Probiotics if You Must Take Antibiotics?

Analysis by Dr. Joseph Mercola Fact Checked | September 11, 2023

STORY AT-A-GLANCE

- Research casts doubt on the standard recommendation to reseed your gut with probiotics after taking a course of antibiotics, finding Lactobacillus bacteria actually inhibits the recovery of your gut microbiome
- Spore-based probiotics do not contain any live Bacillus strains, only its spores, which means antibiotics cannot kill them. Sporebiotics may therefore be able to reestablish your gut microbiome more effectively than regular probiotics when taken in conjunction with antibiotics
- There's only a 20% correlation between the microbiome of the gut and that of stool. Hence, stool samples cannot accurately assess the composition of your gut microbiome
- When you take an oral probiotic, the effect is transient, but still provides benefits by up- and downregulating hundreds of genes, many of which are related to immune system function
- Your gut microbiome tends to be rather resistant to change; commensal bacteria inhibit colonization of added probiotics. Some people have a "permissive microbiome," meaning they're more likely to accept colonization of new bacteria, whereas others have more resistant microbiomes

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Your intestinal bacteria are part of your immune system, and researchers are discovering that microbes of all kinds play instrumental roles in countless areas of your

health. For example, beneficial bacteria, also known as probiotics, have been shown to:

- Modulate your immune response[1] and reduce inflammation[2]
- Produce vitamins,[3] absorb minerals[4] and break down indigestible dietary fiber, turning it into beneficial short-chain fatty acids[5]
- Eliminate toxins[6] from your body
- Benefit your mood and mental health
- Boost weight loss[7,8,9]

Beneficial bacteria also control the growth of disease-causing bacteria by competing for nutrition and attachment sites in your colon. This is of immense importance, as pathogenic bacteria and other less beneficial microbes can wreak havoc with your health if they gain the upper hand.

Antibiotics, of course, indiscriminately destroy bacteria of all kinds; it's a bit of a "scorched Earth" approach, which is one of the reasons why antibiotics should only be used when absolutely necessary. The question is, what's the best way to rebalance your gut microflora when taking antibiotics?[10] Should you take a probiotic (healthy bacteria) supplement and, if so, what kind?

Stool Samples May Not Reveal the Whole Story

A standard way of determining your gut health has been to identify the types of bacteria and amount in your stool. However, research[11] suggests the bacteria in your stool might not be a good indicator after all, and throws doubt over the recommendation to take oral probiotics after a round of antibiotics.

What they discovered was that the microbiome found in your stool and that found in the gut lumen — the space inside your intestinal space — and the mucosal layer of your intestinal wall differ, which means that stool does not offer a good representation of what's actually inside your intestines.

Overall, they found there was only a 20% correlation between the microbiome of the gut and that of stool. Hence, while stool samples are great for identifying the presence of pathogens, they cannot accurately assess the composition of your **gut microbiome**.

Probiotic Effects Are Transient, but Still Induce Benefits

The study also confirmed that when you take an oral probiotic, the effect it has is transient. That does not mean probiotics are useless, however. As noted by Mailing, "There are certainly many probiotics that have been shown in randomized controlled trials to have beneficial effects." The take-home message is that they may not work exactly the way previously thought. Mailing explains:

> *"They found that there wasn't really significant colonization. They did this in both mice and humans … There wasn't any significant colonization in mice. In humans, it was very individual.*
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> *So, some people did have some colonization, and those people … turn into permissive colonizers. Other people were completely resistant to the probiotic colonization … but it didn't really matter because when they lumped them all together and looked overall, there were significant changes in the gene expression in the small intestine in those that were taking the probiotic.*
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> *This is in alignment with many studies we've seen before, where probiotics don't really colonize the gut, but they're having really beneficial effects in transit, including modifying gene expression, eating and digestion, lots of these different things, stimulating the immune system."*

In all, probiotic supplementation was found to result in a wide variety of genetic changes, with 19 genes being downregulated and 194 being upregulated. Many of these genetic changes were related to improvements in **immune system function**.

Your Gut Microbiome Resists Change

A third finding, which is not entirely new, is that your gut microbiome tends to be rather resistant to change, and that it is your commensal[12] microbiome (microorganisms that work together in a symbiotic relationship where they neither benefit nor harm each other) that works to inhibit colonization of any added probiotic strains.

This highlights the importance of being colonized with beneficial bacteria right after birth, via vaginal birth and breastfeeding, as this early colonization tends to be a dominant force long-term, and can be difficult to change.

There are individual differences, however. Some people have what's called a "permissive microbiome," meaning they're more likely to accept colonization of new bacteria, whereas others have more resistant microbiomes. At present, the cause for these individual differences is unknown.

Probiotics May Impede Microbiome Recovery After Antibiotics

The most surprising and counterintuitive finding of all, however, is that taking probiotics after a round of antibiotics may actually hamper your microbiome's natural recovery,[13] which is the complete converse of previous thinking. To evaluate the effects of probiotics after antibiotics, they divided the subjects — both mice and humans — into three groups:

1. Group 1 received no probiotics and were left to recover unaided after a course of broad-spectrum antibiotics (ciprofloxacin and metronidazole, two very potent antibiotics)
2. Group 2 received an 11-strain probiotic supplement for four weeks following the end of their antibiotic treatment
3. Group 3 underwent an autologous fecal microbiota transplant — a fecal transplant using the patient's own stool, obtained prior to administration of antibiotics, opposed to using stool from a healthy donor

Curiously, the probiotic group fared worse than those left to spontaneously recover. While probiotics helped prevent antibiotic-associated diarrhea, the addition of probiotics

actually delayed the return of normal microbiota for up to five months after they stopped taking the supplement. Even then, microbial diversity remained significantly lower than it was originally.

Meanwhile, the microbiomes in the spontaneous recovery group, which did not receive any kind of probiotics, were back to pre-antibiotic levels within 21 days. This flies in the face of studies that have found a course of antibiotics can alter your gut microbiome for up to two years. Here, only a few of the bacterial strains failed to recover within two years.

The third group fared the best, recovering their original microbiome in as little as one or two days after the first infusion. You may find that banking a sample of your stool at a time when you're quite healthy can be a good insurance policy for the future, should you need antibiotic treatment or develop a more serious health condition such as an autoimmune disease.

Lactobacillus as a Primary Inhibitor of Microbiome Recovery

So, what might explain this surprising result? What is the mechanism behind this inhibitory effect? Mailing explains:

> *"They did a really cool follow-up study to this, where they essentially took the probiotic pill and they cultured it in a bunch of different growth conditions that each supported the growth of the … four different genera in the 11-strain probiotic.*
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> *And so, they cultured it in such a way that one of the cultures had a lot of Lactobacillus and one of them had a lot of Bifidobacterium. After 24 hours of culture they collected the supernatants, or kind of the soups … surrounding the probiotics on the dish.*
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> *They took that and … added it to a vat of a culture of human fecal microbiota. And they found that the soups, if you will, that had come from the plate … with a lot of Lactobacillus showed the strongest inhibition of the native human*

microbiome. This … points to Lactobacillus [acidophilus] in particular might be preventing this recovery."

Future studies will be needed to ascertain whether other types of probiotics might have a better or worse impact following antibiotic use, such as the use of sporebiotics or Saccharomyces boulardii, a beneficial yeast, both of which I (still) recommend taking after antibiotics.

The delivery system could potentially make a difference as well. Some companies have developed novel delivery systems to ensure survival of the bacteria as they move through your digestive system and upper intestines.

Yet another question is whether probiotic supplementation would inhibit microbiome recovery after a milder antibiotic. Here, they used a combination of two of the most potent antibiotics available. We also do not know whether the result might be impacted if you start taking the probiotic at the same time as the antibiotic, rather than waiting until the antibiotic treatment is finished.

The Case for Spore-Based Probiotics

There are at least 2,500 species of microbes living in your gut and most, if not all of them, serve your body in a symbiotic way. They either produce something you need, metabolize toxic products so they can be safely eliminated, or help reset or balance your immune system and immune tolerance, which goes deeper than fighting inflammation.

Spore-based probiotics, or sporebiotics, which are part of a group of derivatives of the microbe called Bacillus, have been shown to dramatically increase your immune tolerance.

Spore-based probiotics do not contain any live Bacillus strains, only its spores (the cell wall or protective shell around the DNA and the working mechanism of that DNA). As a consequence of this, they are not affected by antibiotics and may be able to reestablish your gut microbiome more effectively when taken in conjunction with the antibiotic.

What's more, in your gut, the Bacillus species also convert sugar into vitamin C, a nutrient well-known for its anti-infectious effects and, according to Klinghardt, sporebiotics also massively increase reproduction of acidophilus, bifidus and other beneficial microbes in your gut via the electromagnetic messages they send out.

This is entirely unique. When you take a regular probiotic, they primarily take care of themselves. Bacillus spores, on the other hand, actually enhance many of the other beneficial microbes. Bacillus spores also create 24 different substances that have strong antimicrobial properties. But they do not kill indiscriminately. They specifically suppress pathogens that do make a valuable contribution to the whole.

Recommendations and Basic Guidance

For these reasons, I still lean toward recommending the use of sporebiotics when taking antibiotics, until or unless scientific findings disprove their benefits. I also recommend taking the beneficial yeast Saccharomyces boulardii after you've finished your antibiotics, to prevent secondary complications of antibiotic treatment, such as diarrhea.

Last but certainly not least, consider adding more traditionally fermented and cultured foods to your diet — whether you're taking antibiotics or not. Your diet is a major if not primary microbiome influencer, and fermented foods are well-known to support and optimize your gut flora.

It's also a far less expensive strategy than taking a probiotic supplement, and if you eat a variety of fermented or cultured foods, you'll expose yourself to a wide variety of beneficial bacteria, and typically at far higher amounts than what you'll find in any given supplement.

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