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Take Control of Your Health

How Lactobacillus Protects Your Health

Analysis by Dr. Joseph Mercola | December 14, 2023

STORY AT-A-GLANCE

- Several studies have found that different strains of the Lactobacillacea family are diminished in people with anxiety and depression, and others have confirmed that different species of Lactobacillus can help prevent and/or treat these conditions
- Researchers at the University of Virginia School of Medicine discovered that Lactobacillus bacteria — found in many fermented foods, including yogurt — helps dampen stress responses and prevent depression and anxiety by modulating levels of an immune mediator called interferon gamma (IFNγ). In other words, these beneficial bacteria help "tune" your immune system
- Another recent paper describes how Lactobacillus inhibits the growth of gram-negative endotoxin-producing bacteria through a process known as competitive inhibition, and eliminating endotoxin is crucial for health
- Endotoxin is one of several factors that impairs mitochondrial function, promotes glycolysis and, ultimately, promotes cancer metabolism
- Lactobacilli also benefit your health by breaking down dietary fiber into beneficial short-chain fatty acids, breaking down phytonutrients such as polyphenols, which have anti-inflammatory and antioxidant benefits, promoting the growth of other beneficial gut microbes, and maintaining an appropriate pH level in your gut

I've often recommended traditionally fermented foods for their ability to "reseed" your gut with healthy bacteria. A healthy gut microbiome, in turn, can help ameliorate or

reverse many chronic health conditions, as so much of your health is dependent on and can be traced back to your gut.

Even many mental health problems have in recent years been linked to gut health. Several studies[1] have found that different strains of the Lactobacillacea[2] family in particular are diminished in people with anxiety and depression. Others have confirmed that different species of Lactobacillus can help prevent and/or treat these conditions. So much so, Lactobacillus has been dubbed a "psychobiotic."[3]

For instance, one 2011 study[4] found that the probiotic Lactobacillus rhamnosus has a marked effect on GABA levels in certain brain regions and lowers the stress-induced hormone corticosterone, resulting in reduced anxiety- and depression-related behavior.

How Lactobacillus Regulates Your Mood

Most recently, researchers at the University of Virginia School of Medicine discovered[5] that Lactobacillus bacteria — found in many fermented foods, including yogurt — helps dampen stress responses and prevent depression and anxiety by tuning your immune system. As reported by SciTech Daily:[6]

> *"The new research from UVA's Alban Gaultier, Ph.D., and collaborators is notable because it pinpoints the role of Lactobacillus, separating it out from all the other microorganisms that naturally live in and on our bodies ...*
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> *Our guts are naturally home to countless bacteria, fungi, and viruses ... scientists have increasingly realized that these tiny organisms and their endless interactions are critical to our immune systems' health, our mental health, and many other facets of our well-being.*
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> *Disruptions of the microbiota, whether from illness, poor diet, or other causes, are known to contribute to many diseases and even help cancer spread ...*
>
> *Early attempts to manipulate the gut flora with beneficial bacteria, called probiotics, have produced mixed results. A big part of the problem has been the*

sheer complexity of the microbiome ... Gaultier and his team took an innovative approach to hone in on Lactobacilli ...

Gaultier and his team decided to continue their depression research using ... two strains of Lactobacillus [L. intestinalis and L. murinus] ... Gaultier and his colleagues were able to explain exactly how Lactobacilli influence behavior, and how a lack of the bacteria can worsen depression and anxiety."

According to these findings, one of the primary ways in which Lactobacillus helps prevent depression and regulate your body's response to stress is by modulating levels of an immune mediator called interferon gamma (IFNγ). As explained by the authors:[7]

"... we found that the Lactobacillus species themselves, and not the disrupted microbial communities, are protective from environmental stressors. Further, we determine that Lactobacillacea are maintaining homeostatic IFNγ levels which are mediating these behavioral and circuit level responses ...

By utilizing mice lacking Lactobacilli from birth, we found that Type 1 adaptive immunity is important as a primary mediating factor in stress resistance.

Building off a body of work showing that Lactobacillus is necessary for the maintenance of systemic IFNγ, we further demonstrate that both Lactobacilli and IFNγ are necessary for resilience to environmental stressors."

Lactobacillus Prevents Endotoxin Production

Another recent paper,[8] published in April 2022, describes how Lactobacillus inhibits the growth of gram-negative endotoxin-producing bacteria through a process known as competitive inhibition, and eliminating endotoxin is crucial for health in several respects.

Endotoxin, also known as lipopolysaccharide (LPS), is produced by gram-negative bacteria in your gut. As explained in several recent articles, endotoxin is one of several factors that destroys mitochondrial function, promotes glycolysis and, ultimately, cancer metabolism.

When complex carbs aren't digested in your stomach, they travel down to the intestine where they feed these gram-negative bacteria, and as the bacteria grow, multiply and die, they release LPS, which can result in leaky gut, allergic reactions, organ dysfunction and even sepsis.

Endotoxin also catalyzes a series of metabolic reactions that convert tryptophan in your gut to serotonin. Most people think serotonin is good, but mostly, especially higher levels, it is not good for your health. You do not want high levels of serotonin because it's an antimetabolite.

This means it suppresses your body's ability to create energy in your mitochondria in the electron transport chain, so you become tired and fatigued, your metabolic rate slows and you gain weight.

To address this vicious cycle, you need to heal and seal your gut. Beneficial bacteria such as Bifidobacteria and Lactobacillus, and beneficial yeast like Saccharomyces boulardii, can all help rein in the endotoxin production through competitive inhibition.

Probiotics such as these also strengthen your intestinal barrier (the "seal" part of "heal and seal your gut") by increasing mucus production, stimulating release of antimicrobial peptides and increasing tight junction integrity.[9]

Additionally, they tend to crowd out the gram negative bacteria by occupying space and territory and displacing them in the gut. In microbiology this is termed competitive inhibition and is one the reasons they help decrease endotoxin as there are simply less gram-negative bacteria.

> **"Beneficial bacteria such as Bifidobacteria and Lactobacillus, and beneficial yeast like Saccharomyces boulardii, can all help rein in the endotoxin production through competitive inhibition."**

At the same time, you also want to strictly limit your intake of refined sugar and most starches, as **these types of carbs tend to feed the bacteria that produce endotoxin, especially if your microbiome is less than optimal**. Alcohol is also best avoided, as it too can promote the growth of gram-negative bacteria and the accumulation of endotoxin.

As explained in a 2008 study,[10] when gram-negative bacteria metabolize alcohol, they can also produce acetaldehyde, which increases intestinal permeability to endotoxin. In other words, the acetaldehyde facilitates the endotoxins' entry into your blood circulation.

Other Benefits of Lactobacilli

Lactobacilli also benefit your health by:

- Breaking down dietary fiber into beneficial short-chain fatty acids.
- Breaking down phytonutrients such as polyphenols, which have anti-inflammatory and antioxidant benefits.
- Promoting the growth of other beneficial gut microbes, including bacteria that produce butyrate, which is a fuel source for the cells in your gut lining and inhibits inflammation.[11]
- Maintaining an appropriate pH level in your gut by producing lactate and acetate from dietary fiber. And, by balancing the acidity in your gut, they encourage the proliferation of beneficial and harmless (commensal) bacteria while minimizing the harmful ones.

Specific strains have also been shown to be particularly beneficial for specific health conditions. For example:[12]

L. acidophilus is recommended in the treatment of ulcerative colitis.

L. plantarum may ameliorate irritable bowel disease (IBD), irritable bowel syndrome (IBS), heart disease, cancer and gastrointestinal problems. It's also been shown to

decrease pathological hallmarks of Alzheimer's, including amyloid plaques and tangles.[13]

L. reuteri can be useful in the treatment of infant colic and leaky gut, and for the prevention of urogenital disease, dental caries and food sensitivities.

L. casei can help prevent antibiotic-associated diarrhea and clostridium difficile infections, and improve your body's glucose response.

Preliminary animal research suggests L. paracasei might be able to prevent Type 2 diabetes by influencing genes involved in glucose metabolism.[14]

L. rhamnosus has been shown to help women lose weight.[15]

A probiotic milk product containing L. acidophilus, L. casei, Bifidobacterium bifidum and L. fermentum was shown to lower highly sensitive c-reactive protein levels (a marker of inflammation) by 18% after 12 weeks in elderly patients diagnosed with Alzheimer's.[16]

Meanwhile, those who got a placebo saw a 45% increase in hs-CRP. The placebo group also continued to decline cognitively, while those who got the probiotics saw significant improvement in their mini-mental state examination (MMSE) scores.

When it comes to mental health, three Lactobacillus species — L. casei, L. helveticus and L. rhamnosus — have been shown to reduce anxiety and depressive behavior. L. helveticus may also improve memory.[17]

How to Feed the Lactobacillus in Your Gut

The take-home here is that diversity matters, even within a single family of bacteria. The greater the diversity of your gut microbiome, the more likely you are to be able to maintain overall good health. There are three primary ways to increase the number of Lactobacilli and other beneficial bacteria in your gut:[18]

1. Take a high-quality probiotic supplement that contains one or more strains.
2. Consume fermented foods such as unpasteurized yogurt or kefir made from raw milk, sour cream, and fermented vegetables such as sauerkraut.
3. Eat foods that promote proliferation of Lactobacilli, such as dietary fiber, Konjac flour, wheat bran, buckwheat, barley, apples, walnuts, artichoke and chokeberry.

Sources and References

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