Can This Probiotic Fix Your Gut and Hair?

Analysis by Dr. Joseph Mercola | January 22, 2024

STORY AT-A-GLANCE

- The probiotic bacteria Lactobacillus reuteri help upregulate the hormone oxytocin, a chemical messenger that plays important roles in the male and female reproductive systems and influences aspects of human behavior, including sexual arousal, recognition, trust and interpersonal bonding
- L. reuteri also upregulate systemic immune responses, thereby promoting wound healing, mental health, metabolism and myoskeletal maintenance
- Aged mice fed L. reuteri-containing probiotic yogurt experienced skin and hair changes that mimic the peak health and reproductive fitness seen in younger animals, including thicker dermis, and thicker, shinier, more lustrous fur. In contrast, age-matched controls that ate chow alone had dull fur and suffered from occasional alopecia and dermatitis
- L. reuteri have antimicrobial, immune-boosting and immune-regulating effects, and strengthen the intestinal barrier. Lactobacilli also benefit your health by breaking down dietary fiber into beneficial short-chain fatty acids, breaking down phytonutrients, promoting the growth of other beneficial gut microbes, maintaining an appropriate pH level in your gut, and inhibiting endotoxin production
- Mental health problems have in recent years been linked to gut health and immune function, and studies have confirmed that different species of Lactobacillus can help prevent and/or treat these conditions

Probiotic supplements have long been promoted for their ability to improve your gastrointestinal health. However, as noted in a 2016 paper,[1] gut bacteria also "exert effects beyond the local boundaries of the gastrointestinal tract to include distant tissues and overall health."

For example, the probiotic bacteria Lactobacillus reuteri help upregulate the hormone oxytocin, a chemical messenger that plays important roles in the male and female reproductive systems and influences aspects of human behavior, including sexual arousal, recognition, trust and interpersonal bonding.[2]

L. reuteri also upregulate systemic immune responses, thereby promoting wound healing, mental health, metabolism and myoskeletal maintenance.[3] Some of these effects are achieved through competitive inhibition, which is when beneficial bacteria crowd out harmful ones.

Beneficial bacteria like L. reuteri also serve important signaling functions, and as a whole, your gut microbiome interacts with various systems of your body via immune-endocrine-brain signaling networks.

As such, probiotics "provide novel therapeutic strategies to stimulate powerful homeostatic pathways and genetic programs, stemming from the coevolution of mammals and their microbiome," the 2016 paper[4] concludes.

Lactobacillus Reuteri Induce Healthy Glow

An earlier study, published in 2013,[5] found that aged mice fed a commercially-available vanilla-flavored L. reuteri-containing probiotic yogurt experienced skin and fur changes that mimic the "peak health and reproductive fitness characteristic of much younger animals," including a thicker dermis, and thicker, shinier, more lustrous coats.

These changes were largely attributed to a bacteria-induced interleukin-10-dependent mechanism in the males and a more acidic pH in the skin of the females. In contrast, age-matched controls that ate chow alone had dull fur and suffered from occasional alopecia and dermatitis.

Results were also reproduced using purified L. reuteri in water. The researchers point out that healthy-looking fur (and hair in humans) also tend to be a sign of good fertility, and is a recognized sign of health in general, both among animals and humans:

> *"In a previous GI immune-related study, we documented changes in fur appearance in mice treated with probiotics. Similar 'probiotic' organisms dominate under natural conditions during infancy and fertility in many animal species.*
>
> *Taken together these facts lead us to hypothesize that probiotics may play a role in effecting the 'glow of health' associated with youth and reproductive fitness. Further, we postulated that feeding of probiotic organisms recapitulates these beneficial integumentary effects characteristic of youth within aged adult animals ...*
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> *Using published data of Ravel et al (2011) for vaginal microbiome and pH levels of human females, we found that an acidic vaginal pH correlated with Lactobacillus sp abundance and peak fertility, estimated to be 25 years of age in women.*
>
> *Taken together with our earlier data, this led us to postulate that probiotic bacteria induce host physiological changes including a more acidic pH resulting in radiant skin and shiny hair signaling peak health and fertility and thus a good reproductive investment."*

The primary bacterium responsible for the healthy glow in this study was again from the genus of lactobacillus — gram-positive, anaerobic bacteria that metabolize carbohydrates to produce lactic acid. Lactobacillus is the largest genus within the lactic acid bacteria (LAB) group.[6]

This genus is best known for its ability to promote gastrointestinal health and modulate the immune system, making it valuable in the treatment of GI issues such as inflammatory bowel diseases,[7,8] but as these two (and other) studies show, their influence is quite extensive and includes most if not all of your body.

Antimicrobial, Anti-Inflammatory and Immune Regulatory Effects

As detailed in the 2018 paper, "Role of Lactobacillus Reuteri in Human Health and Diseases," L. reuteri's mechanisms of action include:[9]

- **Antimicrobial effects**, as it produces several antimicrobial molecules, including organic acids, ethanol and reuterin. As a result, L. reuteri can effectively inhibit the colonization of pathogenic microbes and remodel the composition of your commensal microbiota (opportunistic pathogens).

  Importantly, studies[10,11] have shown L. reuteri and L. rhamnosus GG can lower the risk of staph infections and sepsis during wound healing when applied topically. L. rhamnosus GG was found to promote cell migration, resulting in more rapid wound closure, while L. reuteri increased cell division rates, thereby aiding in the wound healing.

  The idea of placing live bacteria on an open wound is questionable, but since the extract of killed bacteria proved to have a similar effect, the researchers suggest bacterial extracts may eventually be used in wound care.

  Another double-blind, placebo-controlled study[12,13] found that use of L. reuteri prodentis-containing lozenges improved the efficacy of standard treatment for chronic periodontitis (scaling and root planing) by 53%.

- **Immune-boosting and immune-regulating effects —** Some L. reuteri strains are known to inhibit the production of proinflammatory cytokines while simultaneously promoting regulatory T cell development and function.

- **Strengthening the intestinal barrier**, thereby decreasing microbial translocation from the gut lumen to other tissues. As a result, a wide variety of diseases rooted in systemic inflammation may be ameliorated.

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.[14]
- 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.

Strain-Specific Benefits

Specific Lactobacillus strains have also been shown to be particularly beneficial for certain health conditions. For example:[15]

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.[16]

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.[17]

L. rhamnosus has been shown to help women lose weight.[18]

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.[19]

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.

L. helveticus may help improve memory.[20]

Lactobacillus Regulates Your Mood Too

In addition to the above mentioned effects, mental health problems have in recent years also been linked to gut health and immune function, and several studies[21] have found that different strains of the Lactobacillaceae[22] 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."[23] For instance, one 2011 study[24] found L. 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.

Most recently, researchers at the University of Virginia School of Medicine discovered that two strains of Lactobacillus bacteria — L. intestinalis and L. murinus — help dampen stress responses by modulating levels of an immune mediator called interferon gamma (IFNγ). As explained by the authors:[25]

> *"... we found that the Lactobacillus species themselves, and not the disrupted microbial communities, are protective from environmental stressors. Further, we determine that Lactobacillaceae 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 Inhibits Endotoxin Production

Lactobacillus also inhibits the growth of gram-negative endotoxin-producing bacteria through a process known as competitive inhibition,[26] 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 previous articles, **endotoxin** is one of several factors that destroy 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.

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

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.[27]

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,[28] 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.

How to Feed the Lactobacillus in Your Gut

The greater the diversity of your gut microbiome, the more likely you are to be able to maintain overall good health as the beneficial bacteria will maintain homeostasis and make sure opportunistic pathogens (commensal bacteria) won’t get the upper hand.

There are three primary ways to increase the number of Lactobacilli and other beneficial bacteria in your gut:[29]

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.