



Organic Probiotic Technology for a Sustainable Future

They Outnumber Your Cells Ten to One but Researchers Show they Play Crucial Role in Your Health

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Probiotics, along with a host of other microorganisms, are so crucial to your health that researchers have compared them to "a newly recognized organ."

In fact, your microflora – a term used to describe the bacteria, fungi, viruses and other microbes that make up your microbial inner ecosystem – impact far more than your digestive tract.

Researchers have found they may play key roles in the development of cancer, asthma, allergies, obesity, diabetes, autoimmune diseases and even brain, behavioral and emotional problems like ADHD, autism and depression.

Rob Knight, a biologist at the University of Colorado, told the Washington Post:

"In terms of potential for human health, I would place it with stem cells as one of the two most promising areas of research at the moment...

We're seeing an unprecedented rate of discovery. Everywhere we look, microbes seem to be involved." To put this into perspective, your body contains about 100 trillion cells, but only one in 10 is "human." The others? They're made up of bacteria and other microorganisms.

Gut Bacteria Divides People Into Three Types

Just as you have one of four blood types, researchers have revealed that there are three distinct microbial ecosystems² in the gut of people they have studied. The three "enterotypes" could not be linked to ethnic background, sex, weight, health or age, so what causes you to develop a certain "gut type" is unknown (one theory is that infants' intestines are simply randomly colonized by different pioneering species of microbes, which alter the gut so that only certain species can follow them).

Lead researcher Peer Bork suggests that one of the "obvious" potential benefits of this finding is that doctors may some day be able to tailor diets or drug prescriptions based on your gastrointestinal enterotype. This includes providing a potential alternative for antibiotics – instead of killing off all your bacteria (good and bad) with antibiotics, doctors may give you a "prescription" for specific good bacteria that would restore you enterotype.

This is still an emerging field, but one that is growing by the day and revealing a host of exciting discoveries about the intricate workings of your inner ecosystem. One thing is for certain: the makeup of the "bugs" in your gut may have a direct role on your current and future health.

You are a Microbial Being

Your microflora plays an active role in a wide variety of diseases. If you want to dig into the research, check out the Human Microbiome Project (HMP),³ whose goal is to characterize microbial communities found at multiple human body sites and to look for correlations between changes in the microbiome and human health. There you can find 15 demonstration projects looking into the role of microflora and conditions like psoriasis, Crohn's disease, obesity, acne and more.

Other interesting research to date includes:

1. **Behavior:** A study published in *Neurogastroenterology & Motility*⁴ found mice that lack gut bacteria were found to behave differently from normal mice, engaging in what would be referred to as "high-risk behavior." This altered behavior was accompanied by neurochemical changes in the mouse brain. Researchers stated:

"Bacteria colonize the gut in the days following birth, during a sensitive period of brain development, and apparently influence behavior by inducing changes in the expression of certain genes."

2. **Gene Expression:** As noted above, researchers also discovered that the absence or presence of gut microorganisms during infancy permanently alters gene expression.

Through gene profiling, they were able to discern that absence of gut bacteria altered genes and signaling pathways involved in learning, memory, and motor control. This suggests that gut bacteria are closely tied to early brain development and subsequent behavior. These behavioral changes could be reversed as long as the mice were exposed to normal microorganisms early in life. But once the germ-free mice had reached adulthood, colonizing them with bacteria did not influence their behavior..

In a similar way, probiotics have also been found to influence the activity of hundreds of your genes, helping them to express in a positive, disease-fighting manner.

3. **Diabetes:** Bacterial populations in the gut of diabetics⁵ differ from non-diabetics, according to a study from Denmark. In particular, diabetics had fewer Firmicutes and more plentiful amounts of Bacteroidetes and Proteobacteria, compared to non-diabetics. The study also found a positive correlation for the ratios of Bacteroidetes to Firmicutes and reduced glucose tolerance.

Researchers concluded:

"The results of this study indicate that type 2 diabetes in humans is associated with compositional changes in intestinal microbiota."

4. **Autism:** Establishment of normal gut flora in the first 20 days or so of life plays a crucial role in appropriate maturation of your baby's immune system. Hence, babies who develop abnormal gut flora are left with compromised immune systems and are particularly at risk for developing such disorders as ADHD, learning disabilities and autism, particularly if they are vaccinated before restoring balance to their gut flora.
5. **Obesity:** The make-up of gut bacteria tends to differ in lean vs. obese people. This is one of the strongest areas of probiotic research to date, and you can read about a handful of such studies here. The bottom line is that restoring your gut flora should be an important consideration if you're struggling to lose weight, and doing this is relatively straightforward, as I'll describe below.

Your Gut Bacteria Are Under Constant Assault

Do you eat a lot of sugary foods? Take antibiotics? Drink chlorinated water? Eat CAFO (confined animal feeding operation) meats (which are typically pumped full of antibiotics)? All of these common practices will wreak havoc on the makeup of bacteria in your gut. And even though you may be born with a certain enterotype, your lifestyle can and does influence your gut flora on a daily basis. Your gut bacteria are extremely sensitive to:

- Antibiotics
- Chlorinated water
- Antibacterial soap
- Agricultural chemicals

•Pollution

This is why eating fermented foods is so beneficial! Doing so will help you to "reseed" your body with good bacteria. If you do not regularly consume the traditionally fermented foods below, a high-quality probiotic supplement will provide similar benefits:

- Lassi (an Indian yoghurt drink, traditionally enjoyed before dinner)
- Fermented milk, such as kefir (a quart of unpasteurized kefir has far more active bacteria than you can possibly purchase in any probiotics supplement)
- Various pickled fermentations of cabbage, turnips, eggplant, cucumbers, onions, squash and carrots
- Natto (fermented soy)

When choosing fermented foods, steer clear of pasteurized versions, as pasteurization will destroy many of the naturally occurring probiotics. This includes most of the "probiotic" yogurts you find in every grocery store these days; since they're pasteurized, they will be associated with all of the problems of pasteurized milk products and they typically contain added sugars, high fructose corn syrup, artificial coloring, or artificial sweeteners, all of which will only worsen your health.

Avoid This to Optimize Your Gut Flora ...

Along with eating the naturally fermented foods above and/or taking a high-quality supplement, it's essential that you avoid sugar, including fructose. Eating sugar actually nourishes the bad or pathogenic bacteria yeast and fungi in your gut, which may actually harm you more than its impact on insulin resistance. One of the major results of eating a healthy diet like the one described in my nutrition plan is that you cause your beneficial gut bacteria to flourish, and they secondarily perform the real "magic" of restoring your health.

Remember, an estimated 80 percent of your immune system is located in your gut, which is just one more reason why "tending to" your gut microflora is an essential element of good health. A robust immune system, supported by your flourishing inner ecosystem, is your number one defense against ALL disease, from the common cold to cancer.