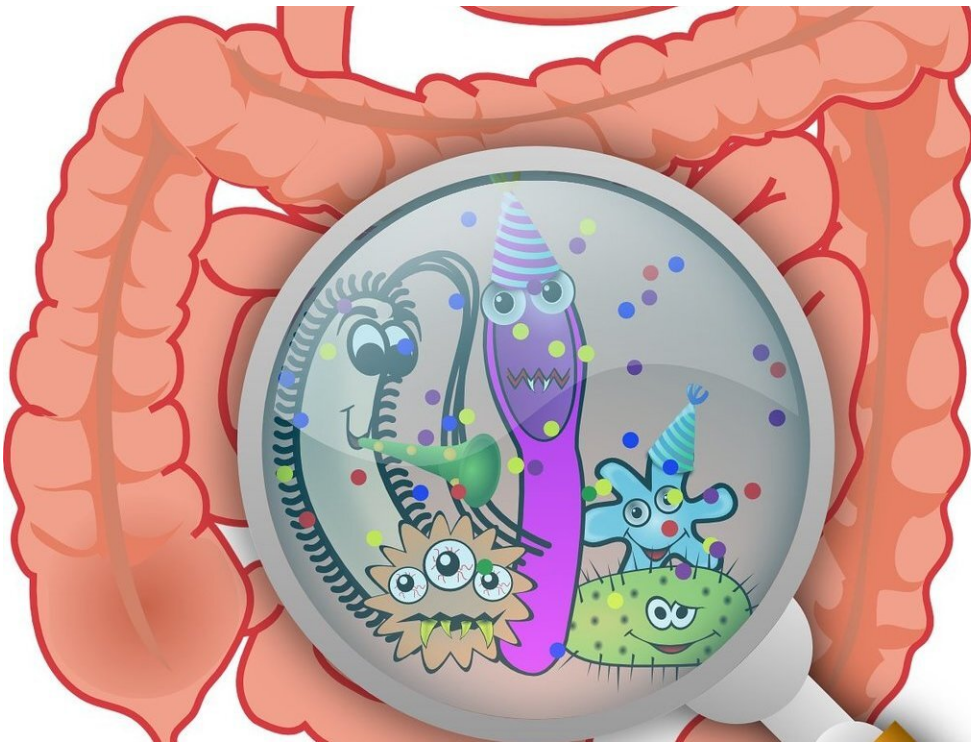


# How bacteria in your gut interact with the mind and body

May 29 2020

---



Credit: CC0 Public Domain

Many people are familiar with the idea that gut bacteria are important for health. Given their location, you might assume that role is only about digestion.

But evidence is mounting that the microbes in our intestines interact with

our minds—and hearts—in significant ways. Gut [bacteria](#) have been linked to depression, anxiety and the regions of the [brain](#) that process emotions. These regions share brain circuitry that affects cardiovascular issues such as [blood pressure](#).

"People have co-evolved with [environmental bacteria](#) (that have) adapted over eons to being at home in [human bodies](#). The present-day result is that our metabolism, our neurons and indeed our entire physiology is an interactive cross-talk with the bacteria in our bodies," said Bruce R. Stevens, professor of physiology and functional genomics in the College of Medicine at the University of Florida in Gainesville.

He perceives humans and [gut bacteria](#) as one interactive "meta-organism"—a single ecology of human cells plus [bacterial cells](#).

The idea that guts and minds are linked goes back centuries, and the influence of gut bacteria on our health has been discussed in the press for years. But recently, after thousands of published articles, understanding of the links has grown immensely.

For example, [studies](#) show transferring gut bacteria from depressed people into lab rats can cause the rats to exhibit depression-like behaviors. Similar [mouse studies](#) show gut bacteria affect anxiety.

Dr. Kirsten Tillisch, professor of medicine at the David Geffen School of Medicine at the University of California, Los Angeles, led a [study in 2013](#) that was the first to show eating a bacteria-friendly, or probiotic, food—in this case, yogurt—affected regions in the brain associated with processing of emotion and sensation in healthy women with no psychiatric symptoms. Four years later, [her team linked](#) specific gut bacterial profiles to brain differences in those regions.

How might tiny microbes exert such great influence? Stevens explained

some basics.

First, the number of bacteria in your gut is vast—50 trillion or so, which equals about one for every human cell in our bodies. The makeup of this bacterial collection, or microbiome, is affected by many things, including diet, exercise and cultural influences.

Those bacteria interact with the brain and other organs in three ways. First, the gut and brain communicate by molecules carried in the blood, and microbes influence those chemical messages.

Microbes also interact with the gut's special nervous system, called the enteric nervous system. It has a direct, two-way connection with the brain via the central nervous system.

Finally, the immune system of the gut wall and the body's other immune components respond to gut microbes, affecting the brain and organs.

Here's one example of how it all ties together. You might have heard of serotonin and dopamine, neurotransmitter molecules that steer mood and behavior in brain circuits. These molecules also are found in the gut. In fact, Stevens said, most of the body's serotonin comes from the gut wall.

Gut bacteria also use them to signal the gut's nervous system and its direct link to the brain. The bacterial messages also can prompt responses from the body's immune system.

Summed up: "Your gut, your brain and your immune system interact," Stevens said. "The triangulation of those things controls much of your other physiology, whether it's blood pressure, metabolism or mood."

Plus, it's two-way communication, he said. "We use their molecules; they use our molecules and physiology in a mutualistic way." Our

understanding of these interactions, he said, could someday open the door to better treatment, diagnosis and prevention for disorders of the heart and mind.

To Tillisch, the body-brain link to the gut biome is significant not just for what it might do in the future, but for what anyone can do with it now.

"I really feel like all the research to date has pointed us to really basic concepts" that add up to "what we eat and how we live our lives is going to affect our health, whether it's our mental health, whether it's our cardiovascular health, whether it's our gut health, whether it's our neurologic health."

She's intrigued by the prospect that an understanding of gut bacteria might someday explain why some people can, say, eat a seemingly unhealthy food but stay thin. But for now, she said, we can use our knowledge to do what we already know is good for us—such as avoid processed foods and eat more fruits and vegetables.

Research supports the [Mediterranean diet](#), Tillisch said. The diet features fish and poultry, and includes plenty of fruits, vegetables, bread and other grains, potatoes, beans, nuts and seeds. It uses olive oil as a primary fat source.

Stevens agreed. "There is currently no 'silver bullet' probiotic or antibiotic, although certain combinations of probiotics are providing promising research results. If you want to foster 'good guy' bacteria over 'bad guy' bacteria, research evidence demonstrates the best way is to exercise and eat a diet that has the appropriate dietary fiber, unsaturated fat and low sugar, which will encourage the growth of those particular species of bacteria."

People get excited about the microbiome, Tillisch said. "Like, 'Oh, it's so cool, all these things are making all these decisions and changing our health!' They're really resulting from our behaviors—whether we exercise, whether we take (medications), whether we drink alcohol, whether we eat well.

"And it's really—eat well."

Provided by American Heart Association

Citation: How bacteria in your gut interact with the mind and body (2020, May 29) retrieved 17 April 2024 from <https://medicalxpress.com/news/2020-05-bacteria-gut-interact-mind-body.html>

This document is subject to copyright. Apart from any fair dealing for the purpose of private study or research, no part may be reproduced without the written permission. The content is provided for information purposes only.