

## Module 10 Transcript

### The Brain and the Gut

“The road to good health is paved with good intestines.”

Humans, as a species, have always regarded the mind and gut as strongly linked, at least intuitively. There’s good reason that we talk about “gut reactions” and “gut feelings.” When we’re deeply disappointed or saddened, we’re “gutted.” And, of course, when we are nervous, like before a big exam or speaking in a large group of people, we tend to feel it in our abdominals, maybe as butterflies or as strong feelings of nausea. More and more, though, researchers continue to make strides toward understanding the mechanisms behind this link, and the biology behind the brain-gut connection is more profound than we had ever imagined.

Though gut issues and mental health have a lot in common, we’re only just beginning to understand all the relationships between them. As it turns out, numerous studies have now demonstrated that the human gut plays a key role in helping to regulate your mental health. Just as there are certain gene variants that can increase an individual’s risk of developing depression or anxiety, the microbes in your gut also play a large role in how well, or how poorly, your brain functions. How is this possible? The answer turned the world of psychiatry on its head.

Over the past century, an extraordinary number of studies have shown us that there’s bidirectional communication between the gut and the brain. This powerful signaling highway is called the gut-brain axis, and it plays an important role in our basic survival. Your GI tract is home to hundreds of millions of neurons that can send messages to the nervous system in a matter of milliseconds.

Simply put, gut-to-brain communication is vital for homeostasis, or the ability to maintain a stable internal state so your body and brain can work at their best. Think of the signals

## Module 10 Transcript

your body gets when you eat one danish too many. Or, inversely, when you're running low on calories. The brain and the gut communicate, back and forth, to ensure that everything in the body works in time.

Take a look at the vagus nerve. Latin for "change," this nerve plays a central role in digestion, but, even more compelling--it carries messages from your gut to the brain, and vice versa.

Our guts also play an enormous role in our immune response. The gut helps mediate when, where and how our pro-inflammatory molecules are deployed in the body and also informs how our body and brain respond to inflammation.

This new understanding of how our gut and brain interact marks an exciting new area in both depression and anxiety research by providing more evidence that diet can help us to better manage our mental health. After all, few things affect the microbiome more than what you eat.

It's a bit of a paradigm shift to think of microorganisms, particularly bacteria, as promoting health. Traditionally, we've thought of bacteria as harmful, disease-causing agents, but not all bacteria are pathogenic. Many of those we consider disease-causing, like E. coli, naturally live in the gut. It's only when we pick up particular variants, or we feed bad bugs so their numbers grow too high inside our bodies, that we get sick. Most bacteria are silent, hidden passengers that travel along with us during our life's journey. It's a beautiful symbiotic relationship.

Every single interaction with your environment has the power to change your microbiome—some subtly, some to a greater extent. Good, healthy bugs help to break down foods and synthesize vital nutrients, like B vitamins. They also produce nourishment

## Module 10 Transcript

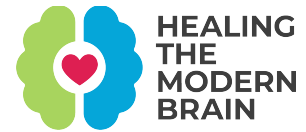
for the cells that line our gut by making short-chained fatty acids and modulate our immune system's inflammatory response.

Psychiatrists at Houston Methodist Hospital recently analyzed the microbiomes of 111 adult patients who had come to the hospital due to serious mental illness, such as severe depression or anxiety. They found that the less diverse the microbiome, the more serious a patient's psychiatric symptoms were.

This is profound! Given that fact, it's probably not a surprise to learn that when researchers look at depressed or anxious people, they tend to find reduced bacterial diversity in their GI tracts, too. It's not entirely clear whether a lack of certain types of bacteria may lead to depression, or if depression somehow reduces those bacteria in the gut; it may well be a bit of both.

And higher concentrations of unhealthy bugs can summon pro-inflammatory responses that dampen activity in well-established learning, memory, reward-processing, and emotional circuits in the brain. Earlier I mentioned those hundreds of millions of neurons in the gut. As it so happens, the majority of serotonin neurons—the neurons that release the neurotransmitter that helps regulate mood and learning—are located in the gut, not the brain.

The microbiome is very complex. While you can give people a probiotic, you can't necessarily stop them from eating foods that may negate its beneficial effects. Many of the highly processed, sugary, fatty, prepackaged foods so common to the Western diet give more sustenance to these "bad bugs," or the bacterial strains that get in the way of positive mood and tend to cause more inflammation. Those foods can also promote the release of pro-inflammatory molecules that negatively affect brain health. And each of our microbiomes—thanks to our unique backgrounds and experiences—are different.



## Module 10 Transcript

It's essential, as we look at our own mental fitness, to examine the foods we choose to ingest and to understand the nutrients that best foster a healthy microbiome. Following a diet focused on plants that are rich in prebiotic fiber, like the Mediterranean diet, and adding in fermented foods that are rich in probiotic bacteria, can serve as a solid foundation. And increasing the amount of fiber in your diet with the consumption of whole fruits and vegetables will not only help aid with digestion, but it can also give those good bugs the food they need to thrive. As a bonus, in making such changes to your diet, you can lower inflammation, increase the release of serotonin, and promote overall brain health.

Take a good look at your plate during your next meal. Are you eating in a way that benefits your microbiome? Are you including fermented foods to increase the amount of good bugs that live there? Are you eating lots of plants, including prebiotic rich foods that can feed those gut bacteria—and, consequently, your brain? Later, we'll examine the nutritional building blocks that make up a diverse, brain healthy diet.

For now, it's important to recognize that there's more going on inside your digestive tract than you're aware of. And by understanding the complex relationship between what we eat and what's happening in the brain, we can begin to develop a plan to reclaim agency and foster the mental health we desire.