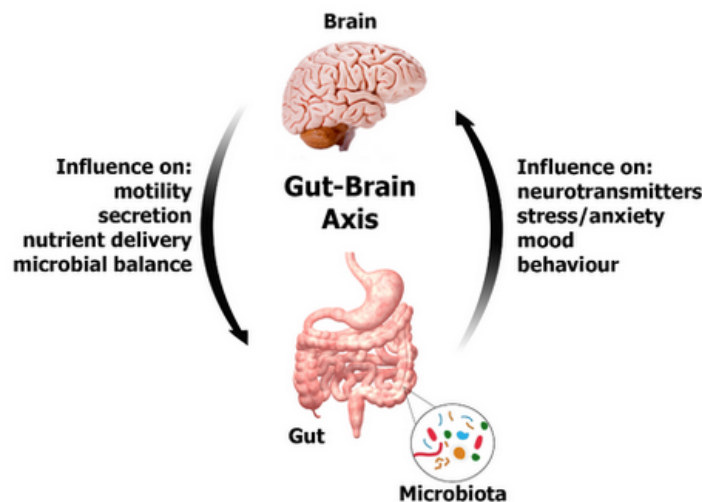


The Brain-Gut Connection and *Our Second Brain*:

“ *The gut-brain connection is neglected by both conventional and alternative medicine doctors.*

— Dr Datis Kharrazian, *The Digestion Sessions* (2015)

Did you know that what goes on in your gut *directly affects* your brain and vice versa? This is not a new theory. Back in the late 1800s, Charles Darwin discussed emotion and the theory of the heart-gut-mind axis, in addition to bidirectional communications between organs.¹ Today, new evidence allows us to step back and reevaluate what we once thought of as a body system composed of many isolated parts, which in reality, is a highly intelligent network of interconnected communication hubs that monitor and control various functions in the body. The brain-gut axis is one of the body's core functional pathways, playing an important role linking emotional and cognitive centers to the gut. There is also an ever-increasing amount of information about the *microbiome* and its unique relationship to gut health and chronic disease. It's amazing that human body is made up of roughly a 10:1 ratio of microbial cells to human cells. This news quite frankly, has many far-reaching implications for potentially preventing and reversing chronic disease. But from our perspective, the most empowering aspect to the brain-gut connection is the understanding that what we do in our daily lives and the choices we make plays a key role in our overall health and wellness.



What is the Microbiome?

If we think of the body as containing many interrelated ecosystems, probably one of the largest and most intricate of these is the microbiome, which contains literally trillions of bacteria and other microorganisms that live and thrive in our skin, mouth, body cavities and most



importantly, in our gut. Our microbiome continually evolves and responds in kind to our fluctuating environment i.e., stress, emotions, food, toxins, pollutants and exercise.² Most of the bacteria in the microbiome are found in our gut and are referred to as *gut microbiota*. It has recently become more evident that these gut microbiota play many important roles in our health and vitality and are now linked to autoimmune disease, gut disorders, cardiovascular disease and brain/neurological conditions.

The gut microbiota are part of the important bidirectional communications between our gut and brain via the nervous system. These microbiota send signals through the gut to the central nervous system, which then talks to the brain, that then determines what hormones should be released in order to respond to stress, memory and all the intricate biological mechanisms that keep our “lights on” every moment of our lives.

Your Second Brain

You may be surprised to find out that your gut is a lot smarter than you think – *it is constantly sending signals to the brain about the food you are digesting, how you are feeling, the thoughts you are having and your stress level.* It can do this because hidden in the thin walls of the gut, all the way from the esophagus to the rectum, are more than 100 million nerves. These nerves are collectively called the enteric nervous systems (ENS) and often referred to as the “little” or “second” brain.

Unlike the big brain, the gut brain (ENS) can’t create a shopping list, solve a complex math problem or drive a car. Its sole responsibility is to convert food into energy and basic nutrients in order to feed the entire body. Let’s not forget about the microbes, the trillions of gut microbiota, that also have an important role to play in the cross communications along the brain-gut axis. When it comes right down to it, all along this brain-gut axis, there is a constant intricate biological dance occurring between gut flora, electrical impulses and hormones that determine health and vitality throughout every system in the body.

Brain-Gut Connection and Inflammation

“ *When the gut brain axis starts to fail, either the gut or the brain can degenerate first, then leading into degeneration of the other.*

— Dr Datis Kharrazian, *The Digestion Sessions* (2015)

This intricate interplay between the brain and the gut is immensely important and should not be overlooked. The gut is our largest immune organ, so it would make perfect sense that any imbalances would ripple through via the brain to all other parts of the body. This is why inflammation originating in the gut can be so problematic and is seen now as a root cause for many chronic diseases and health conditions. A recent study noted, “*Inflammation may*



*represent a common mechanism of disease and has been extended to include neuropsychiatric disorders including major depression”.*³ If the brain-gut axis ceases to work well, you are preparing the way for something else to happen like leaky gut, leaky brain, systemic inflammation and autoimmune disease.

Communications between the brain and gut travels along neural pathways and the vagus nerve in particular facilitates the messages about the levels of inflammation. This long cranial nerve extends from the brainstem to the abdomen passing through multiple organs including the heart, esophagus, lungs, and finally taking root in the gut. When there is poor communications along the vagus nerve, you can have bidirectional problems in the brain and/or gut. When there is failure in the brain, this can lead to slower motility in the intestines resulting in sluggishness or reduced function, low secretion of digestive enzymes, overgrowth of bad bacteria and yeast, and inflammation. We already know from recent research that issues in the gut, especially inflammation, can have consequences in the brain i.e., *“when you have brain inflammation, nerve conduction speed slows down, leading to symptoms like brain fog and slowed cognitive function”.*⁴

Poor Gut Health and Neurological and Psychiatric Disorders

“ *Dietary factors play major roles in determining whether the brain ages successfully or experiences a Neurodegenerative Disease.*

— Nat. Institute on Aging, Vol 139, no.5, 2003, 441-444

Researchers are discovering that poor gut health is related to neurological and psychiatric conditions such as Alzheimer’s, Parkinson’s, autistic spectrum disorders, multiple sclerosis and mood disorders. One of the common perpetrators in all these diseases is a pro-inflammatory state in the body stemming from gut dysbiosis and imbalances in the microbiome. There is now research designating depression as an inflammatory disorder i.e., *“leaky gut may play a role in the pathophysiology of (chronic) depression”* and that when we manipulate the gut microbiota, we can induce emotional changes like anxiety or depression.⁵ The gut also has an important role in the development of neurotransmitters (chemical messengers). Specifically, two important gut functions come to mind: 1) during digestion, proteins are broken down into amino acids, which are the building blocks for neurotransmitters and 2) about 90% of the brain chemical serotonin (a neurotransmitter that contributes to feelings of well-being and happiness) is found in the gut.

Prevention and Reversing Chronic Disorders

Now more than ever before, there is the possibility of both preventing and reversing some of the most challenging neurological and psychiatric health conditions *simply by eating a healthier diet and having a lifestyle that promotes balanced gut health and functionality.* From our perspective, this entails a diet that reduces excess sugar and refined carbohydrates, reduces



and/or eliminates potential toxins such as gluten and various “mimickers”, increases fiber, includes more good fats (Omega3) and introduces pre and probiotics. We ignore the important role gut health plays in overall wellness throughout the body and that research is now pointing to obvious links between gut health and the onset of chronic diseases from cardiovascular and diabetes to autoimmune.

We can't say enough about the impact that constant high levels of stress have on the body, especially the brain and gut. When the body is under stress (physical, mental, emotional), the sympathetic nervous response (fight or flight) kicks into gear and triggers our gut to respond in various ways i.e., slow down the digestion process, which promotes overgrowth of bacteria and yeast and overtime leads to systemic issues such as IBS, allergies, bloating, etc. The stress response also triggers hormones e.g., adrenaline, norepinephrine, and cortisol. While adrenaline and norepinephrine rush to scene of a stressful event and then leave the body soon thereafter, cortisol (at unhealthy high levels) can linger in the body for much longer causing damage to the brain (among other tissues). For most of us, the brain-related stress symptoms are fairly obvious i.e., brain fog, anxiety, fear, and depression, but many of the most damaging effects of stress on the brain are “silent” and go unnoticed until it is too late and irreversible damage has been done.

Here are some of the ways chronic stress and cortisol affect the brain:

- Creates free radicals that can cause premature aging even killing brain cells and may even shrink the brain
- Makes you forgetful and emotional
- Overloads the brain's fear center creating a vicious cycle of worry and anxiety
- Halts the production of new brain cells
- Depletes critical neurotransmitters (serotonin, dopamine)
- Negatively impacts cognitive function like decision making, memory and control of impulsive behavior
- Prevents us from *shutting off* the stress response after a stressful event is over, therefore preventing rest and recovery
- Damage the protective blood-brain barrier letting toxins into your brain
- Turn on inflammation in the brain, which is very difficult to turn off.

If You Want to Find Out More About the Brain-Gut Axis

We understand your concerns around chronic diseases and health conditions that impact and potentially reduce quality of life. It is necessary to be as proactive as possible and halt and reverse symptoms and disease *before* irreversible damage is done. If you'd like to discover



more about the brain-gut axis and how systemic gut issues and inflammation can lead to severe chronic disease including cognitive and autoimmune disorders, by signing up for our [Wellness Foundations 1 & 3](#) programs where we will discuss your health goals and current challenges you are experiencing.

References

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