

THE HIDDEN CONNECTION: HOW GUT HEALTH AFFECTS OUR MIND AND BODY



In this article, where we'll explore an intriguing connection that's often overlooked - the link between gut health and our mental well-being. We often think of the brain and the gut as two separate entities, but there's a remarkable interplay between the two that influences our physical and emotional health. Join me as we unravel the complexities of the gut-brain axis and how it impacts our overall well-being.

The Primal Brain and the Higher Brain:

Our journey begins with a deeper understanding of our brain's structure. We have the primal brain, residing near the brain stem, responsible for survival instincts, and the higher brain, situated at the front, which handles logical thinking and executive functions. The tug of war between these two brains can trigger emotional responses due to the amygdala's activation - our primal fear center. While our higher brain may know there's no immediate danger, the primal brain's fight-or-flight response takes over, leading to a constant state of panic. These unconscious battles beneath the surface can leave us feeling on edge without realizing what's happening.

Introducing the Enteric Brain:

Now, let's introduce a third brain that may surprise you - the enteric brain, or gut microbiome. This community of over 100 trillion microbes residing in our colon plays a crucial role in our physical and mental health. Comprising around 800 different species of microbiota, including various bacteria, viruses, fungi, and archaea, the gut ecosystem forms a complex system that interacts with our body and brain.

Understanding the Mind-Microbiome Connection:

Before we delve deeper into the enteric brain, let's address why I'm discussing gut health in "The Mind Manual" community. Our mind and body have an intricate relationship, with the physical dimension (brain and body) influencing our non-physical dimension (mind and spirit). It's essential to recognize this interdependence to understand the role gut health plays in shaping our mental state.

Unveiling the Gut-Brain Axis:

Emerging evidence indicates that gut microbiota plays an important role in the regulation of brain activity and cognitive functions. Microbes mediate communication among the metabolic, peripheral immune, and central nervous systems via the microbiota-gut-brain axis.

This gut-brain axis, which includes the central nervous, endocrine, and immune systems. It is a fascinating information exchange network connecting the gut and the brain bidirectionally. This two-way signalling system allows the gut to transmit signals to the brain and vice versa through the vagus nerve, which runs from the lower part of the brain to the stomach. The gut microbiota produce neurotransmitters, enzymes, and other essential chemicals needed for regulating our body and brain.

Neurotransmitters and Their Impact on Mental Health:

Neurotransmitters are chemicals that can be transported between neurons via synapses to carry messages between nerve cells to control behaviors such as motility, emotion, memory, etc.

Besides short chain fatty acids and bile acids, recent studies have identified a subpopulation of enteroendocrine cells in the intestine and specific bacteria in the gut that are responsible for producing;

- over 90% of the total serotonin in the body
- over 50% of the dopamine in the body
- and many other important neurotransmitters such as acetylcholine, GABA, Glutamate, norepinephrine as well as trace amines that act as neuromodulators or neurotransmitters. The gut microbiome's role in producing neurotransmitters like serotonin, dopamine, GABA, and more has significant implications for our mental well-being.

Various studies have linked imbalances in gut microbiota to neurodegenerative diseases like Alzheimer's and Parkinson's, as well as autism, schizophrenia, anxiety, depression, and even mood disorders. It's clear that gut health has a profound impact on our brain functions and emotions.

Numerous studies have shown how when changes in intestinal microbial abundance are altered, with one study using antibiotic administration that lead to the acquired deprivation of gut bacteria, it also alters the levels of neurotransmitters and their precursors in the gut and blood as well as the altering the expression of neurotransmitter receptors within the brain. Interestingly, changes in dietary habits and environment, such as a high carbohydrate rich diet and temperature changes significantly influenced intestinal microbial composition and contributed to changes in neurotransmitter levels in the faeces, blood and central nervous system.

These findings collectively demonstrate an association between a healthy gut microbiome structure and balanced neurotransmitter levels.

Anxiety & Gut Health:

Anxiety and gut problems are often intertwined due to the gut-brain axis. When we experience anxiety, stress-related chemicals are released in the gut, leading to abdominal pain, altered gut bacteria, and abnormal bowel movements. On the other hand, a poorly functioning gut can contribute to mental health changes. Patients with IBS often experience symptoms like chronic fatigue, anxiety, depression, joint pain, and more. Restoring gut health through personalized approaches can have positive effects on mental health.

The dysregulation of serotonin, GABA, dopamine and glutamate levels in the central nervous system are also associated with disorders like anxiety. Recent studies provide evidence that gut microbiota affects anxiety symptoms. Administration with probiotics such as *Lactobacillus rhamnosus* were shown to regulate the mRNA levels of GABA in distinct regions of the brain including the cortex, hippocampus and the amygdala which showed to improve anxiety and depression like behaviours in mice. It was noted that these effects were not experienced in mice that had a vagotomy which is a surgical operation where one or more branches of the vagus nerve are cut. This study implied there is a crucial connection between the bacteria and the brain through the vagal nerve pathway.

Meanwhile, patients with depression exhibit dysregulation of GABA, serotonin and dopamine levels. Patients with depression also exhibited increased intestinal leakage and bacterial translocation, implying the low level inflammatory reaction caused by the intestinal leakage, can lead to altered brain function and behaviour. It was also shown that a transplantation of fecal microbiota from a mouse model of depression, will induce depressive like behaviours in germ free recipient mice. The administration of probiotic *Lactobacillus plantarum* was able to restore normal behaviour.

All of these findings support the microbiota-gut-brain axis hypothesis which has led to the discovery of microbe derived drugs for the treatment of brain diseases.

Depression and other Emotions:

So if we have an imbalance in our Microbiome then it will naturally follow that we're going to have an imbalance in our serotonin. Serotonin also regulates our mood. If you look at the action of antidepressant drugs... that a huge percentage of the population are on, they come from a class of drugs called SSRI which stands for Selective Serotonin Reuptake Inhibitor. So basically they suppress the body's ability of reuptaking the serotonin out of circulation so that there's higher levels of it left in the body... to help regulate our mood.

If we were to go the level of addressing the underlying cause (as opposed to treating the symptom) and restore the balance of our Microbiome, we would not only restore the balance of serotonin, but all the other essential neurotransmitters that are required for a well functioning mind and body. With such a complex environment as the Microbiome there is no way we're going to do it as well as our natural system can when it's all in balance. Serotonin is just one neurotransmitter, they all play different roles in regulating different emotions.

We have serotonin that regulates disgust and sadness, dopamine that regulates joy, norepinephrine which regulates fear and anger....and then there's everything in between....So taking a pill that allows the serotonin to stay in the body longer is just not going to cut it....as most people who are on antidepressants will tell you.

Exercise and Gut Health:

Beyond the gut-brain axis, exercise also plays a vital role in neurotransmitter regulation and mental health. Studies show that physical activity can be 1.5 times more effective in reducing depression, stress, and anxiety symptoms than medication or therapy alone. Exercise induces the release of neurotransmitters and endorphins, promoting better mental well-being.

IBS, GERD & Gut Health:

They estimate 15-20% of the world's population, which includes both diagnosed and undiagnosed, have IBS and/or GERD).

Serotonin is responsible for regulating nearly the whole digestive tract.

It plays a major role in gut motility and is one of the primary neurotransmitters for maintaining gut distension, and motility which is that peristalsis action that is necessary to push the food through the colon, as well as visceral sensitivity.

Patients with irritable bowel syndrome - of the diarrhea subtype have increased serotonin production and availability in the gut, which increases motility and causes diarrhea and pain.

In a study with mice that had decreased serotonin levels in the intestine, they found their fecal pellets were larger than normal pellets because of the lack of serotonin induced peristalsis.

Researchers found that about 55% of patients treated with selective serotonin reuptake inhibitors (SSRIs) showed improvement in their IBS symptoms vs. 33% for the placebo group.

Studies have found a distinct imbalance in the microbiota of people with IBS, with:

- Decreased counts of bifidobacteria.
- Increased levels of Clostridia spp.
- A decrease of coliforms, lactobacilli and bifidobacteria.

* Reduced Bacteroides and

- A 2-fold increase in the ratio of Firmicutes to Bacteroidetes.

Factors that can disrupt your gut microbiota:

- Antibiotics. The use of antibiotics is by far the most common and significant cause of gut dysbiosis. The alteration and disruption of the normal level of flora caused by antibiotics has been known for a long time. Antibiotics do this by inviting a secondary infection by harmful yeasts and pathogenic bacteria to take hold. Antibiotics kill all kinds of bacteria, both good and bad.
Studies have shown that, by taking a single course of antibiotics, you can lose the biodiversity and balance of your gut flora within as little as 3 - 4 days.
Another study was carried out showing that the use of broad-spectrum antibiotics was linked with the development of IBS.
- Poor diet is another cause. Not enough prebiotic fruit and vegetable fiber to provide food for the probiotics and so microbial activity dies off. Sugar is also a great source of food for the pathogenic bacteria, so when they have a good environment to grow and thrive, it throws off the balance in the Microbiome.
- Chronic stress, leading to the release of stress hormones and other chemicals, will also disrupt the balance.
- Gastrointestinal infections (food poisoning, travellers diarrhea, gastroenteritis)
- Medications such as NSAIDs, proton pump inhibitors . They inhibit Certain antibacterial secretions in the gut, like gastric acid, pancreatic juices and bile, which keep bacterial growth in check. So if these acids are artificially inhibited, the acidity level isn't high enough to kill the pathogenic bacteria which can lead to an overgrowth of bad bacteria in the small intestines, known as SIBO which stands for Small Intestine Bacterial Overgrowth.

Challenges in Conventional Medicine:

Unfortunately, conventional medicine often fails to address gut health as a root cause of mental health issues. Instead, medications may be prescribed to manage symptoms without targeting the underlying imbalance in the microbiome. This approach may provide temporary relief, but it doesn't

address the core problem.

Most of our doctors and specialists have no idea that over 90% of the serotonin in the body is produced by the Microbiome in the gut and yet there are serotonin receptors in nearly every organ in our body, that this neurotransmitter is helping to function properly.

The mind and body are intricately connected and understanding the gut-brain axis sheds light on the influence of gut health on our mental state. By recognizing the importance of a balanced microbiome and its role in neurotransmitter production, we can develop more effective and holistic approaches to mental health. Embracing personalized treatments, exercise, and a proactive focus on gut health can lead to improved well-being and a better quality of life. Let's keep exploring this fascinating connection between our gut and our mind to unlock a healthier and happier future.

[Listen to Podcast episode 25 - The importance of our enteric brain](#)