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Gut Health and Depression: The Incredible Link Between Gut Health, Serotonin, and Mood

We've all had "gut feelings" before about one thing or another, but rarely think about gut health, depression, and serotonin being related to one another. But, the science shows that the feelings we often write off as just being "butterflies" are actually a window into an intriguing connection that exists between the brain, gut health, and serotonin.

Let's take a deeper dive into this incredible link between gut health and depression, beginning with an overview of the trillions of bacteria that live in our gastrointestinal tracts and why we need them for things like serotonin. From there, we'll explore some easy ways that you can boost your own gut health at home!

GUT HEALTH AND SEROTONIN: HOW BACTERIA PLAY A ROLE

The first step to understanding the link between gut health and depression is understanding what's really going on in the gut, which is really just another term for the gastrointestinal (GI) tract. You've probably heard the term "good bacteria" used in relation to gut health. That's because there are an estimated *100 trillion* bacteria that live in the GI tract, and they're believed to be equal in number to the actual cells that make up your body!

In addition to aiding with digestion and immunity, the microbes in the gut are responsible for producing an incredible 95% of the body's serotonin, and 50% of dopamine. Both serotonin and dopamine are key neurotransmitters - chemical messengers used by the brain - that regulate mood. Having a shortage of serotonin is often a primary factor for depression, which gives us our first major insight into how gut health, depression, and serotonin tie-in to one another.

In fact, there's even an observable example that illustrates the connection between gut health and depression. Researchers examined the correlation between gastrointestinal disorders such as irritable bowel syndrome (IBS) and ulcerative colitis (UC) and depression. They found that people with these GI disorders, which cause imbalances to gut bacteria, were 39% (for patients with IBS) and 33% (for patients with UC) more likely to suffer from depression than healthy controls.¹ That impact on serotonin becomes very evident!

But, the close connection between the gut and the brain doesn't end with gut bacteria's depression link - there's more to this story.

THE GUT BRAIN CONNECTION: SEROTONIN ISN'T THE ONLY FACTOR

While the connection between gut health and serotonin plays a major role in gut health and depression's overall relationship, your GI tract and your brain have even more in common. You probably know that neurons are cells in the brain that transmit information to other nerve cells, but did you know that there are roughly 100 million neurons in the gut itself? It's no wonder that our GIs have earned the nickname "second brain".

A major nerve called the *vagus* nerve serves as a sort of information highway between the gut and the brain, which may help to explain why gut bacteria and depression are so closely related. A very interesting animal study helps highlight this: mice given probiotics (good bacteria) had lower levels of stress hormone in their blood, but, when the vagus nerve was severed, the probiotics no longer had any effect.² This has led scientists to infer that our gut bacteria and brains actually "talk" through the vagus nerve, with serotonin again playing a role in this communication, and some new depression resources even target it.

Alright, now that we've taken a crash course in the biological roots of gut health and depression, let's look at some of the ways that diet and supplementation affect your gut health, and what you can do to optimize your own!

HOW TO USE THE LINK BETWEEN GUT HEALTH AND MOOD TO YOUR ADVANTAGE

Now we know that gut health, depression, and serotonin are all intertwined, and that the biggest factor at play is the microbiome of bacteria in the GI tract communicating with the brain. With that context, it's easy to understand what kind of lifestyle changes can help boost your gut health. Even if you don't suffer from depression, there's growing evidence to suggest that improving the make-up of your gut bacteria can result in better moods thanks to that serotonin connection!

There are two main ways to improve your GI's microbiome. The first is *probiotics*, which help introduce new good bacteria to the gut. The second is *prebiotics*, which support and nourish the bacteria that are already there. Here's a breakdown of how you can get more of each:

Probiotics

If you've ever been to the grocery store and seen fancy yogurt with impressive words like "Lactobacillus paracasei Shirota" on the package, you're already acquainted with probiotics. Yogurt is just one example of a food rich with probiotic cultures. Other foods you should include in your diet that are in-line with this discussion of gut health and depression are:



- Kefir - A fermented, probiotic milk drink.
- Sauerkraut - Fermented, finely shredded cabbage.
- Kimchi - A cabbage-based, Korean side dish.
- Kombucha - Black or green tea that's been fermented.
- Pickles - The cucumbers used for pickles undergo some fermentation while brining.
- Cheeses - Not all cheeses contain probiotics, so look for ones that mention "live active cultures" on the label. Cottage cheese is one great choice!

Notice the common theme? Fermented foods often contain the most live cultures that can help improve your gut health. You can also find probiotic supplements that contain these good bacteria to help boost that gut health and serotonin relationship to stave off depression.

Prebiotics

Since the bacteria in your gut are living organisms just like the rest of us, they need to eat! A poor diet can damage the health of your GI's microbiome, and lead to or exacerbate some of the gut health and mood problems we've discussed. Foods that are rich in prebiotics to help stimulate good gut bacteria include:



- Asparagus
- Artichokes
- Onions
- Beans
- Celery
- Broccoli Stalks
- Carrots

Essentially, you're looking for foods rich in *cellulose* and *oligosaccharides*, which are both types of fiber. Similar to probiotics, you can also find multiple types of prebiotics available in supplement form.

It's incredible to think just how closely related the brain and the GI are, and how gut health and depression can directly influence one another. Equipped with simple facts like the correlation between gut health and serotonin, how good bacteria play a central role, and what types of foods nourish these bacteria, you can make huge strides in your own wellness journey.

Remember to follow us on social media to stay connected with even more interesting, relevant health and science exploration of how gut health and depression, gut health and serotonin, and gut health and mood are all connected!

1. Shah, Eric et al. "Psychological disorders in gastrointestinal disease: epiphenomenon, cause or consequence?." *Annals of gastroenterology* vol. 27,3 (2014): 224-230.
2. Bravo, Javier A et al. "Ingestion of Lactobacillus strain regulates emotional behavior and central GABA receptor expression in a mouse via the vagus nerve." *Proceedings of the National Academy of Sciences of the United States of America* vol. 108,38 (2011): 16050-5. doi:10.1073/pnas.1102999108