Mind you, it's all in your Gut: The Gut Psychobiome for modulating brain and mood Transcript

(Transcripts are generated by AI and may contain errors)

Introduction to the Gut-Brain Connection

And I have the guts to do it because your gut bugs are bugging your brain. And we're going to talk all about those links in today's talk called Mind You.

It's all in your guts. Hello everyone and welcome to the Microbes and Mental Health Summit. I'm your host, Dr. Miles Nichols, and I am sorry, but I have to bug you.

And I've got the guts to do it because your gut bugs are bugging your brain. We're going to talk all about those links in today's talk called Mind You.

It's all in your gut. The gut psychobiome for modulating brain and mood. the gut brain axis and mental health can I bug you for some brain food.

Anxiety and Depression in IBS

Because not only can gut bacteria potentially actually cause, for example, neuroinflammation by there being a leaky gut and the cell wall of bacteria have something called lipopolysaccharide, which can, or LPS for short, is considered an endotoxin that can inflame the body and brain.

But actually gut bugs can make food for the brain in a sense that they can synthesize directly neurotransmitters like GABA, and they synthesized compounds like peptidoglycans, which have been shown to be involved in brain development.

So it's a complex relationship that we'll be covering today, but before I go into the links in research, we need to go over the general stats on anxiety and depression.

Because you're going to be surprised to find out, I was at least surprised at how much more significant anxiety in depression is. in individuals struggling with gut dysfunction than it is in the general population.

Because in general, population, the stats on anxiety, you know, 12 month prevalence, it's 19.1%. It's a little under one in five. And for depression, its only 8.4%. Well, I shouldn't say only, 8.4%, that's at 12-month prevalence a major depressive episode.

That's significant and needs to change. We're going to see it as much greater for those with got dysfunction. So Irritable Bowel Syndrome is a diagnosis that looks at a collection of symptoms.

So it looks things like abdominal pain and distension and bloating and diarrhea and constipation. And it creates this label that you put on those things, calling them Irritable Bowels Syndrome if there's not actual structural changes that are obvious in the digestive tract and anxiety and depression prevalence.

is much more significant in those with IBS as compared to the general population.

Microbes, GABA, and Mood Effects

What we see in this study is actually that of the 769 Ibs patients they analyzed, and this is one of many studies that have confirmed a similar number, they found 44.9% reported anxiety.

Now we just covered that only 19.1% of general populations. Had anxiety, I say only, but that's already huge

number and sad, But 44.9% is a huge ERR number.

And the general population, that was in a 12 month prevalence. Like in 12 months, how many US adults had experienced any anxiety disorder. This is real time in one questionnaire, they were asking about anxiety and found 44.9%. That's more than double, that's a lot.

And then for depression, they found 25.7%. Wait, general population 12 month prevalence was 8.4%. This is like three times. as much depression in people with IBS, that's significant.

It also found that psychological distress, those who had it had worse digestive symptoms and non-digestive symptoms like fatigue, anxiety, lower quality of life.

So anxiety and depression clearly are linked with irritable bowel syndrome in a way different way than just the general population. And it's complex, it may be bi-directional and the DI symptoms may worse with anxiety and depression and anxiety, and oppression may the worsened and or caused by whatever's causing the irritable bowel syndrome.

Which by the way, in many cases, In most cases is a small intestinal bacterial overgrowth, which can be tested for and treated. So there's a strong connection between anxiety and IBS 44.9% between depression on Ibs 25.7% percent between.

Psychologic distress with greater GI symptoms than normal, greater fatigue, reduction in the quality of life. Another class of digestive disorders are called inflammatory bowel disease, IBD.

This is where actually there are observed structural changes in the intestines where they might find fissures, they may find abscesses, and these are considered a class autoimmune diseases, Crohn's, ulcerative colitis, microscopic colitises.

And there's been links also with depression as well as behavioral disorders like ADHD. So here's one study that This study showed in the research community a strong recognition that the microbiome, the gut population's ability to affect behavior is strong.

In fact, a psychobion have been linked to a plethora of neurological and psychological diagnoses, including autism and Parkinson's.

Vagus Nerve and Stress Response Research

disease and this study looked at a particular strain of bacteria and bacteria synthesized GABA directly and the bacteria also was able to induce depressive like behavior in mice.

Now this is noteworthy because usually a single strain to have an effect is unusual because so many bacteria in different species and strains and they all work together and there are usually these ecologies, these patterns, these constellations bacteria that, that more have effects.

So to have a single strain, even in mice, which don't always translate to human studies have effect in depressive like behavior is noteworthy. And now one of my favorite studies of all time, this study looked at a certain strain of bacteria in.

Having the ability to change the brain secretion of GABA. And show that that brain secretion of GABA was impacted directly by signals via the nervous system from the gut to the brain.

Fascinating. And this study is a little older, it's from 2011, but it so. definitive in the way that it shows it. I love this study. It starts by saying there's increasingly more and more evidence that's pointing to how gut bacteria can impact the central nervous system.

And there's lots of research to try to figure out what are all the mechanisms by which that happens. Mice don't like to swim and there is this thing called the forced swim test.

It's a stress test for mice, basically big bowl of water. And the mice are trying to get out, trying get up, but they can't because the bowl is too steep.

So basically what they do is they have them in there for almost four minutes here and they're swimming and trying out and then they see how long is it taking to give up.

The longer they've given up the more time they are immobile. So you see here the broth fed mice are immobile for about three minutes. And so they really gave up and weren't trying for as long as the ones that were fed, the Lactobacillus rhamnosus, they only had less than two minutes immobiles.

So that really shows that there was a significant difference. They. didn't give up in the same way they kept swimming. And why is that part of it? They looked at the corticosterone secretion.

This is like cortisol for humans. It's the stress hormone. Something that will, if it gets too high for too long, people can get burned out and maybe give.

But if it's just high enough to be able to have a stress response, but not burn out that can lead to a better prolonged ability to try to deal with a stressful situation.

And what this found is that the controls without the stress test, both had fairly low corticosterone levels, and then it went straight up when they were doing the forced swim test, which is expected, but it went way, way higher, like almost double in the group that did not have the probiotic versus the groups that didn't.

Meaning the stress response was cut in half. The stress hormones were cut. Wow. And they didn't give up and they were swimming for longer.

How Gut Dysfunction Affects the Brain

That's incredible. And part of that was that there were changes on the GABA receptor expressions in different areas of the brain. Now it's pretty complex.

I'm not going to go over that, but there are changes in the. a significant lowering in the stress hormone release. The vagus nerve is connecting the brain to the organs, the heart, lungs, gut, and a lot of connections to gut.

So we see actually that it innervates the gut in many, many places. This vagous nerve, is a way in which the brains talk to a gut but also the guts can talk the to brain.

A lot people don't think about that. They think, oh, brain is sending all these signals via the nervous system. Well, The brain's receiving a lot from the body, from, the gut, especially, and it may be where that gut feeling comes from.

You get a gut-feeling about things. So that, there's lots of signals going on through the nervous system from that. so what they did is they actually did a vagotomy on these mice.

They cut that vagal nerve. The one on the right has the vagatomy and the probiotic, uh, The second one. has the no vagotomy and the probiotic. And that second one's the only one that significantly had less immobile time and was better off in terms of the stress response.

So what this shows is that essentially that if you cut the vagus nerve, you lose all the effect. of the improvements in stress response to the reduction in, stress hormone of, the improvement in GABA signaling in the brain, meaning that it must be signals through the vagus nerve from the gut.

This bacteria in gut is actually signaling somehow through, through vagous nerve to brain to tell the, brain. To regulate GABAA better and to regulate stress better.

Incredible. findings here. So the findings for Lactobacillus are on this reduced stress induced corticosterone and anxiety and depression related behavior in mice.

Now we're getting clear on some of these mechanisms for how gut bacteria can impact the brain. Signals from the vagus nerve can go from gut to the brain.

The gut microbes can synthesize directly neurotransmitters and different chemicals and constituents that can impact brain function, including those peptidoglycans, and then microbes that enter the blood in the brains.

Causes of Leaky Gut and Microbiome Disruption

If it's leaky, if there's intestinal permeability, then Those microbes themselves can get into the bloodstream can, get it into brain and those microbes often if they're green negative have lipopolysaccharide on that cell wall, which is that LPS endotoxin that can cause systemic inflammation and neuroinflammation in the brain.

Neuroinflammations been linked with depression, with anxiety, cognitive impairment, Alzheimer's, dementia. So definitely an issue. We have to ask what causes the mechanisms that we're talking about.

What leads to that improper signaling from the gut to the brain? How and why do compounds that are made by gut microbes either help or harm brain function or mood?

And what are the causes of intestinal barrier permeability and leaky gut? What can be done about these things? Well, some of the cause is that were going to be exploring in the talks today, we have expert speakers covering these.

We're going to be talking about overgrown bacteria in the small intestine or SIBO. Now there can also be over grown fungus in a small intestines or large intestine.

There can be commensal bacteria, there could also parasites, and there are lots of things that can happen in gut. We know SIBOS is the main cause for IBS.

The anxiety and depression rates in IBS are so significant. So that's just one of those main causes that we're definitely going to want to consider and understand how can we test for and treat that.

And then overuse of antibiotics, the non-steroidal anti-inflammatory drugs, proton pump inhibitors, or acid reflux medications, alcohol can be big ones to impact gut function and then brain.

Food, of course, and nutrient imbalance and lifestyle variables, sleep, blood sugar regulation, metabolic function, many aspects can disrupt the gut microbiome.

And then that disrupted gut micro biome can impact the brain and mood. So I hope you really enjoy the talks for today. They're going to touch deeper on the practicality and the nitty gritty of these different dimensions of how gut function can impact the brain and your mood and what to do about it.

Thank you so much for watching. This is Dr. Myles Nichols with the Medicine with Heart Functional Medicine Clinic. Take care and have a healthy and happy day.

Thank you for tuning in to Doctor Talks. We hope today's episode has enlightened and inspired you on your path to optimal health. Each day is a new opportunity to make choices that empower your well-being.

For more insights and strategies, subscribe to our podcast and visit our website, www.doctortalks dot com. Stay connected, stay healthy, and join us next time on DoctorTalks, real talks from real doctors on the issues that matter

to you most.