The Microbiome Secret Nutritionists Don't Share Transcript

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Introduction to the Microbiome

Hi everybody, I'm so excited to share this lecture with you. I just wanted to pop in and say hello and for this lectures, since it's so science focused, i wanted make a slideshow instead because this will help explain things hopefully in a lot more clarity.

So this module is all about the microbiome and I first want to give a shout out to my mentors and colleagues and people that I've trained with who have learned a lot about the microbiome from them.

So a big thank you to Dr. Andrea Macbeth, Dr Heather Zwicky, and Dr David Lashid for inspiration on this lecture. They've done so much great research in the field of the micro biome.

And after attending several of their lectures, this was really just a conglomeration and and Cliff Notes version of a of pearls of wisdom that they've imparted on.

So let's dive in. So what is the microbiome? The microbiomes is a combination of bacteria, protozoa, viruses, all of that and yeast that create this world in, on, and around us.

Now, certainly in the world of new research today, we're looking a lot at the micro biome in intestines.

What the Microbiome Is and Where It Lives

But I want to remind us that the microbiome is so much more than just in the intestines. It is on our skin, it is inside the nose, It Is in and on. Our genitals.

it Is even on the bottom of our feet. So on Our whole body, we have about three to five pounds of microbiomes, which is just amazing. And that's including in The intestines too.

So there's certainly a lot in the intestines, but we can't forget about the rest of the microbiome in and on us as a whole. And then around us, of course, there is so much life outside of just the the micro biome.

In and On our bodies. We've got microbiomes on the surface of our desk on, the lip of, The glass you're drinking out of. the plants around us, the whole ecosystem is full of life that we can't see with the naked human eye.

So this is a very exciting time to get to dive into the gut microbiome, because that's specifically what we'll be talking about today, being the the Gut-Brain connection.

But the microbiomes are so much bigger than just the pieces in our intestines, but it's fascinating that the research is showing so in these tiny little worlds.

So just a small history about bacteria and the Microbiome. In the 1860s, Louis Pasteur and Robert Koch first showed that bacteria can cause disease. This is where germ theory came from.

They're noticing that. Bacteria can. Cause people to feel feel ill. So bacteria got labeled as bad during that time.

History of Bacteria and Terrain Theory

In the 1870s, sanitation and sterilization techniques were developed because we saw that bacteria can cause disease. So we think, well, we should get rid of the bacteria.

Then in 1928, Alexander Fleming discovered the first antibiotic or first modern day antibiotic, penicillin. And from

here, this is where things started to get really exciting.

But before we dive into the world of the research and starting to discover more. There are two people that I want to pay homage to for terrain theory.

This was also in the 1800s, mid to late 1800's and then into the early 1900s where Claude Bernard first came up with the thought of terrain theory, which is thinking about the bacteria in and on our bodies as something where we can hone for balance and homeostasis.

And if everything is well balanced and our ecosystem is healthy, then the healthy terrain equals a healthy human. It's not just that the germs are bad, but a whole terrain piece can create more health in a human." And then that idea was expanded upon in the few later years with Antoine Beauchamp.

And that's who's pictured on the right here with the bow tie. That is thought about this theory of terrain versus terms. Truthfully, they're all right.

Bacteria can cause disease, and a healthy terrain leads to a healthier human. Then in 1995, the first two bacterial genomes were sequenced at the Institute for Genomic Research, which was very exciting.

The first one was Haemophilus influenza B, also known as Hib. And then the second one is very small genitalia microbiome. And in 2003, the Human Genome Project came about.

This was so exciting. Being able to see DNA sequenced to almost 90% accuracy at that time was really quite the win for science. And this was the tipping point to being able to see into the microbiome with all the detail that we can now and seeing these small structures coming into life.

And then 2006, the Human Microbiome Project came around. This was small at the time. There were 300 quote unquote healthy people that were getting to look into their microbiomes, people ages 18 to 40. and this is really the start of it all.

Now it's just budding and nearly certainly every year, but nearly every month is something new is coming out about the microbiome. Microbiome is influenced by a lot of things.

Now, we're scaling it back a little bit now to just thinking about, uh, the micro biome in and on the human body. Genetics plays a huge piece of it. Age, where you live, stress levels, exercise.

Diet is big. We're seeing a lotta pieces coming up here with, it's not even just the type of diet that you have. Or not even just the food that you eat specifically, but is it organic or versus not organic?

If you're having pesticides and herbicides, if those kill bugs and invasive herbs, what could it do to the inside of our bodies? So organic versus non-organic if you are eating a lot of plants versus if your eating animal products.

What Shapes the Microbiome

Even if you're doing more of a fasting pattern than eating regularly scheduled meals in small amounts, we're showing that all of those have influence on our microbiome.

Exercise, whether it's amount, duration, intensity, whether it's outside or inside, all of these play a piece in our microbiome as well. We saw some pieces with the stress levels about the gut-brain connection, but we'll discuss that even more in the next lecture here too.

And where you live, this is whether you in in country or the city, whether in a home with many people and pets versus if you lived by yourself. whether you live in a more developed country or more rustic.

These all have big effects on the microbiome. Smoking affects the microbiome, the pets piece is interesting too,

because it's the type of pets, how often do you cuddle with them?

How are they indoor, outdoor pets? And are you rubbing your face right on their faces while getting contact into their microbiomes? Medications, we think about antibiotics as being big things for decreasing the bacteria in the microbiome.

Antifungals would certainly get rid of the fungus there too, and things that get out of parasites would decrease the parasites prevalence. But it's not just those medications that kind of deforest the microbiome.

There is influence on the micro biome with any medication, including supplements. So if you're having herbal supplements, that would certainly influence the microbial.

If you are eating or having supplements that are anything plant based, That would affect the Microbiome or even seeing any type of pharmaceutical medication can affect The Microbium to the work environment you live in.

or excuse me, the work environment that you work in. This can be partially the stress levels, but then also how many people are you coming into contact with?

Are you inside an office? So you're working at home, are outside working construction? are a massage therapist that your literally coming in to contact skin on skin with somebody else's microbiome on the daily.

All of these pieces have an effect on a microbiom. Time outside and then home environment. Stress levels, pets, siblings, how many people you live with.

Do you have roommates? And all of these pieces come into contact with the microbiome and have a big influence as well. So why do we care? Why is this important?

Dr. Macbeth shared this analogy in one of her lectures a couple years ago and just thought it was so good, so relatable. So back in the 1920s in Yellowstone National Park, this actually happened within the park.

And I think it's a great analogy of a macrocosm of how this could happen with microcosms of what's happening in our bodies. In the 1920s, they were thinking the gray wolf is causing too much havoc at the park.

It's our apex predator. We should get rid of the Gray Wolf. So they did. And it triggered a whole ecosystem change that actually changed the course of flow of water in the parks.

Just from the change of one species. So without the gray wolf as the apex predator, coyotes became the new apex predators. And with coyote, they've each antelope and red fox and rodents and some birds.

They noticed that the population of those animals came down. Then the grey wolf normally fed on elk.

Why Microbiome Diversity Matters

Without the great wolf, elk population exploded. and they were overgrazing on willows and aspen and caused a lot of over grazing in the park but then the willow and Aspen that the elk were eating that's the primary food for for beavers and their primary shelter and what they used to build dams and so the beaver population virtually disappeared it went down to just one one pod of families, one colony, and then the beavers weren't there anymore so the dams started disintegrating and what used to be marshy ponds turned into streams because there was more water flow there and that also affected a lot of plants and animal species.

This was just from one change at the top of this food chain. Then in 1995, the Endangered Species Act said, we need to reintroduce the gray wolf. So they did.

And coyote population got cut in half. And that allowed more antelope, and more rodent, more fox to flourish. And then the elk population also went down because the gray wolf was their main predator.

That helped with the aspen and the willows. Then the beavers were able to come back. What went from one colony bloomed to 12. The change of the flow of river went back to how it was pre-1920s.

I think this is fascinating. And this IS a macrocosm. If we change one thing in the microbiome, it has an effect on our whole system. It's something that we're seeing, which is a little bit of doomsday.

prepare yourself is that as we're becoming more industrialized as humans, we are seeing a change in the diversity of our microbiome, where the diverse and robustness of microbiomes is decreasing.

As you can see on the graph here, if you live in a jungle or the savannah, the microbiom has a lot more diversity, then it goes stepwise down as you get into more rural areas and then even more so in urban areas.

And we're also seeing not only correlation, but we're seeing some causation too with more modern diseases. We're saying more obesity than we've ever seen.

we are seeing more prevalence of asthma and food allergies, diabetes, even cognitive disorders. And we were seeing perhaps it's just a correlation and it might be, but were also seeing that the microbiome has a huge play in this change of modern disease and decreased microbial diversity.

Now, the one piece that I like to really remind people of is we can't grow this back. Once we lose the microbiome as a human species, or once we decrease its diversity, it's very hard to get it back.

We can increase the amount of the existing microbial species that we have, but without other interventions, we can't get back what we've lost. So it was very important to keep a healthy mouth.

The microbiome doesn't just affect our gut health, it affects almost all systems in our body.

Microbiome-Related Diseases and the Gut-Brain Connection

It affects the immune system, It effects our brain and behavior and our stress response, our HPA axis, which is hypothalamic pituitary axis. it's in brain, into our adrenals and how well we respond with cortisol and stressful responses.

affects our heart, affects your blood flow. And it of course affects are metabolism and nervous system in your gut. specifically, so that enteric nervous system that we've been chatting about.

This is a short list of the microbiome and disease patterns that were seeing. And this is this a big list, but it's not complete. There are a lot more patterns I just didn't put on here because they're not as common.

So in the world of gastroenterology or digestion, we're seeing a correlation of a microbiomes with IBS and Crohn's disease, ulcerative colitis. even non-alcoholic fatty liver disease.

We're seeing patterns there. With metabolism, we're saying patterns with obesity, type 1 and type 2 diabetes. In autoimmune, or seeing a pattern with chronic fatigue syndrome, rheumatoid arthritis, psoriatic arthritis.

I don't think about the joints having an effect with our microbiome, but there certainly is. And then in the neurology sphere, even Parkinson's and Alzheimer's, these are really coming to the forefront in last five years.

The anxiety and depression we've talked about a little bit already, but we'll dive into a lot of the neurology pieces in that next lecture. And then we're seeing a patterns with immune system too.

So not just autoimmune, but UTIs and antibiotic resistance, these more like infectious type things, COVID too, especially along COVID. And this is just a small smattering of why the microbiome is so important and why we wanna keep a robust, healthy diversity.

So the gut-brain connection is what we're going to dive into in a lot more detail next. This is a small schematic of what this looks like. We've got the central nervous system, which is in our brain and spinal cord, and that connects to our enteric nervous systems, specifically in the intestines.

And then the connection between the two is the autonomic nervous system. So all those pieces talk to each other through the vagus nerve, through that HPA axis, though the immune system, and we'll get to talk all the details on how this affects secretion, motility, mood, stress and cognition in the next lecture.