

## *Module 4, Lesson 2 Handout:* **Microbiome Research**

The microbiome is one of the most fascinating topics in the health world these days. Research now shows that our guts and the trillions of microbes that live there are connected to pretty much everything else in the body and it feels like we're learning more about the gut every day. This is an area where the research is continually evolving - and fast - so it's important to stay up to date. Here's a glimpse at what we know about the microbiome and how it impacts our health.

### **Microbiome & Weight Management**

There's lots of solid research out there showing the connection between the microbiome and weight. Gut dysbiosis - a fancy way of saying microbe imbalance - is linked to overweight and obesity intimately. One of the earliest studies to investigate this looked at the microbiomes in both obese humans and mice, finding ratios of bacteria were altered with weight loss. Other lab research has found that fecal transplant from mice eating an unhealthy "Westernized" diet into germ-free mice was enough to induce obesity. Basically, scientists put the gut bacteria from the mice eating a junk diet into mice who weren't, and just an unbalanced mix of bacteria, not food, led to weight gain. Even studies in twins show a lean twin will have a more diverse and active microbiome than an obese sibling. All this research shows that when we eat Western diets loaded with packaged processed foods, our microbiomes become unbalanced and lose diversity and a more diverse and active gut biome is better weight management.

### **Microbiome & Digestive Disorders**

Research suggests microbiome dysbiosis may also be linked to digestive disorders like IBS and leaky gut. Introduction of a higher fiber diet and more diversity in foods as well as probiotic rich foods can help to manage symptoms and prevent flare ups. Interestingly there are certain microbes that have been identified as being particularly beneficial. One study found significant differences in the microbiomes between children with and without IBS and that different strains were correlated with different symptoms. For example, participants who experienced pain more often also had an abundance of several bacteria from the genus *Alistipes*. Studies focusing on Crohn's disease have had similar results - people who suffer from Crohn's have similar ratios of bacteria in the gut.

### **Microbiome & Immunity**

It's well established that our microbiome and immune system are tightly linked. There's an important part of the immune system called the intestinal mucosal immune system - it's actually the biggest part of our immune systems and it works closely with the intestinal microbiome. Lab studies have found the microbiome plays a key role in building mucosal immunity, which is important for

overall immunity against foreign invaders. Research shows an unbalanced microbiome can throw this all off and that an unbalanced gut may not only weaken our immunity but could result in inflammatory autoimmune diseases.

## **Microbiome & Brain**

The relationship between our guts and brain is super tight and communication between the two can impact everything from emotions and moods to decision making and behavior. Research shows gut microbiota can influence the neurotransmitters (such as dopamine, norepinephrine and serotonin) that play a huge role in regulating our emotions, mood, alertness and stress. These neurotransmitters are also linked to mood disorders such as anxiety and depression, so gut health plays a role there too. For example, in an animal study, changing the makeup of gut microbiota actually changed how mice behaved, affecting anxiety and cognition. Mice raised without beneficial microbes also have been shown to be less capable of managing stress. There's even evidence that gut bacteria can play a role in the development of schizophrenia, bipolar disease and other mental health and neurological diseases.

## **Microbiome & Heart Health**

Data now shows a link between microbiota and cardiovascular disease. These studies have focused on the compound trimethylamine N-oxide (TMAO), which is a molecule generated via gut microbial metabolism and an indicator of heart disease risk - the more TMAO in your blood, the greater the risk for heart disease. One study found that people who took antibiotics - meaning they wiped out their gut bacteria - ended up with more TMAO in their blood, increasing risk of heart disease. This is a fairly new area of research and it will be exciting to see other connections between our guts and our hearts.

## **Other Microbiomes**

As if the gut microbiome weren't fascinating enough, let's not forget about other microbiomes in our bodies too. Our largest organ, the skin, has an entire ecosystem made up of different layers, habitats and microorganisms that affect our health. Different skin disorders such as dermatitis and acne have been linked to the organisms on our skin. There's also the vaginal microbiome, which has been linked to fertility and medical conditions like bacterial vaginosis - basically, you need a healthy vaginal biome for a healthy vagina. And then there's the oral microbiome. We know bacteria in the mouth are a cause of oral inflammation, tooth decay and the gum diseases. Though the research in all these fields is fairly new, it's safe to say bacteria have a serious impact on our overall health.

## Supporting a Balanced Microbiome

By now you're sold on the idea that a diverse microbiome is essential for health, but what do you tell your clients? This isn't as clear cut as "take a probiotic" to support your gut. We still have so much to learn about how food impacts our guts, but there are a few things we know for sure.

- Ditch packaged processed foods. We know for sure that overly processed junk is linked to microbiota imbalances, which is negative for overall health
- Limit refined sugars and get rid of all artificial sweeteners. We know these have a negative impact on the gut
- Eat more fruits and vegetables. Research finds diets high in fresh produce can promote diversity in a healthy gut. Not only do fruits and vegetables contain fiber, necessary for a health gut, but they pack phytochemicals that have been linked to gut health as well
- Choose foods with polyphenols. These plant compounds have multiple functions in the gut and can influence inflammatory and immune statuses. In addition to fruits and vegetables, other sources include tea, spices, dark chocolate and red wine
- Go for fermented foods. These are natural sources of probiotics and these live microbes can benefit your gut
- Bulk up on fiber. Choose whole and ancient grains, beans and legumes
- Eat more plant based meals. Plant based foods in general promote a more diverse gut
- Consider a probiotic supplement. We talk more about specific strains in another handout
- Hydrate with water
- Minimize use of hand sanitizers and antibacterial soaps. Use these products only when necessary
- Exercise regularly. Good for your gut, and the sweat is good for your skin