

The Human Microbiome and Mental Health

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The colloquial “gut” refers to the gastrointestinal (GI) tract, a pathway in the body which goes from the mouth to the anus and lives inside the intestines with its own miniature biome (Stone, n.d.). While they are different from one another and perform different tasks in the stomach, small intestine, and large intestine, all elements of the GI tract are habitats for microbiomes. A microbiome is an ecosystem unique to each human gut, meaning the gut has trillions of specialized, microscopic organisms, including various species of bacteria, viruses, fungi, and parasites, floating around or stuck to soft tissue lining the body’s organs (Stone, n.d.). While this may sound terrifying, the microbiome as a whole is important to human health. The microorganisms living in the gut keep humans healthy by fighting any harmful microorganisms that may enter the GI tract. Gut microorganisms can only maintain their function, however, when kept healthy with good diets and probiotics. (Stone, n.d.). They also do more than just protect humans from developing an unhealthy microbiome. Microorganisms work within our digestive, immune, endocrine, and, most importantly, nervous systems. Research has revealed that the brain and gut are in constant communication with one another. Changes in microbiome health are thus connected to changes in mental health. Research done by neuroscientist Arpana Church at UCLA’s Goodman Luskin Microbiome Center resulted in the discovery of the effect of microbiomes in stressful situations (“The Gut Microbiome,” n.d.). Church’s research enlisted 116 adults without previous mental health diagnoses to be split up into two groups based on their score on a psychological resilience scale. Church and her team then had them take psychological questionnaires, provide stool samples, and undergo brain imaging (“The Gut Microbiome,” n.d., p. 1). They sorted this information into a machine-learning model to look for patterns. An

analysis of the gene activity showed that the high resilience group had increased emotion regulation and cognition ("The Gut Microbiome," n.d.). Additionally, participants who were more resistant to stress showed reduced inflammation in their microbiomes and improved gut barrier integrity. These patterns complement previous research that showed that patients with psychiatric conditions tend to have microbiomes with more pro-inflammatory bacteria. Church's study, however, is only a part of the ongoing research concerning the brain-gut relationship. Other scientists conducting such research include Jane Foster, a neuroscientist at UT Southwestern Medical Center, who discovered that people with depression had a reduction of a certain bacteria that produced short-chain fatty acids that promote gut health. (Yang, n.d.). This path of study is rapidly growing with frequent new results, but the treatment plan for certain psychiatric conditions, according to current research, does not call for probiotics. The microbiome field is still relatively new, which means it is going to take time to develop treatments. Scientists have already speculated, however, that finding treatments for psychiatric conditions could come from a single molecule or drug.

References

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