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Gut Bacteria Affect Intestines and Brain in IBS Patients

Irritable bowel syndrome is one of the most common gastrointestinal problems, yet little is known about its causes. Treatment options focus on relieving the symptoms - which often include anxious behavior - rather than curing the illness. New research may have found a connection between gut bacteria and behavior in IBS patients, which could inform new treatments. Irritable bowel syndrome (IBS) is a gastrointestinal disorder that affects approximately 11 percent of the worldwide population. More women tend to be afflicted with IBS than men. Symptoms of the disease include intense abdominal pain, bloating, constipation, or diarrhea. Often, patients also experience anxiety and depression (Mayo Clinic).

Irritable bowel syndrome (IBS) is a group of symptoms—including abdominal pain and changes in the pattern of bowel movements without any evidence of underlying damage. Disorders such as anxiety, major depression, and chronic fatigue syndrome are common among people with IBS (NIDDK). The risk of developing IBS increases six-fold after acute gastrointestinal infection. For post-infection, further risk factors are young age, prolonged fever, anxiety, and depression. Research has found that genetic defects in innate immunity and epithelial homeostasis increase the risk of developing both post-infectious as well as other forms of IBS (NIDDK).

A new study - carried out by researchers from the Farncombe Family Digestive Health Research Institute at McMaster University in collaboration with researchers from the University of Waterloo, both in Ontario, Canada - may have found a link between gut bacteria in people with IBS and their behavioral symptoms. The findings, published in the journal *Science Translational Medicine*, may soon lead to new treatment options for those living with IBS. The new research, led by Dr. Premysl Bercik and Dr. Stephen Collins, set out to investigate whether fecal microbiota from humans with IBS can alter the gut and brain function in mice (Sandoiu).

For their study, the researchers used healthy, IBS-free individuals, as well as two groups of patients with IBS: one group that also had anxiety and another that did not. Using fecal transplants, they transferred the microbiota from these humans into germ-free mice. After the transplant, the mice developed gastrointestinal and behavioral symptoms similar to those of their donors. The mice experienced gastrointestinal transit dysfunction (changes in the time it takes for food to travel from the stomach through the intestine), intestinal barrier dysfunction (in which the gastrointestinal tract does not provide a tight barrier against external, harmful bacteria as it normally would), inflammation, and behavior indicative of anxiety (Sandoiu).

A research associate with the Farncombe Family Digestive Health Research Institute and the study's first author, Giada De Palma, explains the significance of the findings, "This is a landmark study because it moves the field beyond a simple association, and towards evidence that changes in the microbiota impact both intestinal and behavioral responses in IBS" (Sandoiu). Dr. Premysl Bercik, the study's lead author and associate professor of medicine at McMaster University, also weighs in, "Our findings provide the basis for developing therapies aimed at the intestinal microbiota, and for finding biomarkers for the diagnosis of IBS," Bercik says. The authors note that their findings may provide new opportunities for treatment development. "Microbiota-directed therapies, including pre- or probiotic treatment, may be beneficial in treating not only intestinal symptoms but also components of the behavioral manifestations of IBS," they conclude (Sandoiu).

According to the authors, the results of their study also add to the mounting evidence that the gut's microbiota can affect the brain and a range of mental disorders. "The intestinal microbiota may play some role in the spectrum of brain disorders ranging from mood or anxiety to other problems that may include autism, Parkinson's disease, and multiple sclerosis," write Bercik and colleagues. However, the authors conclude that more studies are needed to fully clarify the connection between these conditions (Sandoiu).

Works Cited

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