

Study links stress to Crohn's disease flare-ups

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Former McMaster post-doctoral researcher Ryan Shaler, left, and professor Brian Coombes work together in the lab. Credit: McMaster University

A possible link between psychological stress and Crohn's disease flare-ups has been identified by a McMaster University-led study.

Researchers using mouse models found that stress hormones suppressed the [innate immune system](#) that normally protects the gut from invasive *Enterobacteriaceae*, a group of bacteria including *E. coli* which has been linked to Crohn's disease.

Key to innate immunity is the protective barrier of epithelial cells in the gut, which rely on molecular signals from [immune cells](#) to keep out harmful microbes, repair the [cell wall](#) and secrete mucus. Without properly functioning immune cells, the epithelial cellular wall can break down, allowing microbes associated with Crohn's disease to invade the gut and trigger symptom flare-ups.

"The main takeaway is that [psychological stress](#) impedes the body's ability to fight off gut bacteria that may be implicated in Crohn's disease. Innate immunity is designed to protect us from microbes

that do not belong in the gut, like harmful bacteria," said senior author Brian Coombes, professor and chair of biochemistry and biomedical sciences at McMaster.

"When our innate immune system functions properly, it prevents harmful bacteria from colonizing us, but when it breaks down, it leaves an opening for pathogens to colonize locations they normally cannot and cause illness."

The study was published in *Nature Communications* on Nov. 18.

Coombes said that removing stress hormones in the mouse models restored proper function to immune cells and epithelial [cells](#), blocking the invasion of harmful microbes.

While this discovery could lead to new treatments for Crohn's disease, Coombes emphasizes these findings are still at the pre-clinical stage and more work needs to be done.

"The more we know about what triggers Crohn's disease, the closer we come to new treatments and potentially even disease prevention," said Coombes.

Crohn's disease is an inflammatory condition that causes inflammation, ulcers and scarring in the digestive system. While its root cause is still not fully understood, Coombes said patients with the disease often have an altered gut microbiome dominated by *Enterobacteriaceae* like *E. coli*.

The Coombes lab is part of the Michael G. DeGroote Institute for Infectious Disease Research and the Farncombe Family Digestive Health Research Institute based at McMaster University. External funding for the study was provided by the Canadian Institutes of Health Research and Crohn's and Colitis Canada.

More information: Psychological stress impairs IL22-driven protective mucosal immunity against colonizing pathobionts, *Nature Communications* (2021).

Provided by McMaster University

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