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Researcher's work on how gut inflammation drives changes in brain structure earns national recognition

Seeking to understand how chronic gut inflammation drives changes in brain structure, function, and behaviour, University of Lethbridge postdoctoral researcher Dr. Chelsea Matisz (BSc '05, MSc '09) has received national recognition in support of her quest. Now, as she focuses on how cannabinoids and psilocybin may help remediate chronic inflammation-induced changes in brain and behaviour, she's excited about the therapeutic potential of her work.



Matisz recently received a [L'Oréal Canada For Women in Science Research Excellence Fellowship](#) and one of three [Royal Society of Canada Alice Wilson Awards](#). The support

validates how important her research is and how widespread and debilitating gut inflammation can be for people.

“Research agencies are recognizing the importance of the gut-brain axis on all aspects of human health, whether it's neurodegenerative diseases and gut diseases, as well as arthritis, aging, pregnancy — all of these kinds of things,” says Matisz. “Recognizing that understanding the gut-brain axis and its relationship to the microbiome can open a whole new world of therapeutic options for different kinds of diseases.”

It has been a winding road for Matisz to reach this point in her career. Her undergraduate work at ULeithbridge focused on hummingbirds and evolutionary biology with Dr. Andrew Hurley before she turned her attention to parasitology and Dr. Cam Goater's lab for her master's studies.

“After my master’s, I was still really interested in parasites, but I wanted to do something related to human health,” says Matisz.

She looked into pursuing a career in public health but felt she could make a greater impact as a researcher and gravitated to the University of Calgary (2016) where her doctoral work focused on human health and parasites and eventually the connection between gut inflammation and the brain. Inevitably, that focus led her back to ULeithbridge and the Canadian Centre for Behavioural Neuroscience.

“We’re a smaller institution and there’s dialogue happening all the time between departments. It was Cam (Goater) who had a discussion with Aaron Gruber that put him on my radar as a potential supervisor,” says Matisz.

It also opened a whole new area of study. With Matisz’s expertise in gastrointestinal sciences and Gruber’s research as a behavioural neuroscientist, the pairing is an ideal fit to pursue how non-psychoactive cannabinoids and psilocybin can be used therapeutically.

“We’ve already done some work with cannabinoids and exploring the anti-inflammatory effects of that, and it yielded some interesting results,” she says. “Now, we’re really interested in psilocybin because of its ability to potentially ameliorate mood disorders that are so comorbid with gut disease. The evidence is very striking that a single dose of psilocybin can have huge therapeutic effects in people with refractive depression.”

Matisz says the mice study they just completed examined the effectiveness of psilocybin in reducing anxiety in cases of recurring gut inflammation.

“A single bout of gut inflammation does not have a lasting effect on someone, but multiple bouts of chronic gut inflammation, which is what people with IBD experience, really drives the anxiety phenotype in the mice,” she says. “Now we’re looking at whether psilocybin can remediate that, along with what the right doses might be and the right mode of delivery.”

Breaking the cycle for those who suffer from chronic inflammation is the key. She explains their research has found that those dealing with chronic inflammation experience functional and structural changes in their brains such that the sickness morphs into more depression and anxiety, which in turn changes the way your body responds to stress, triggering more inflammation.

“That’s why we’re so excited about this work because of the prospect that psilocybin might be able to help remediate the structural and functional inflammation induced changes. I also think a lot of people are excited at the prospect of something that is quicker acting than traditional antidepressants. The evidence suggests that in conjunction with behavioral therapy, it can be really effective.”

For more, see the L'Oréal Canada for Women in Science Research Excellence Fellowship awards presentation and video [here](#) (1:32.07).

To view online: <https://www.ulethbridge.ca/unews/article/researcher%E2%80%99s-work-how-gut-inflammation-drives-changes-brain-structure-earns-national>

Attached photos:

Chelsea-Matisz — Dr. Chelsea Matisz

Chelsea-Matisz-Lab — Dr. Chelsea Matisz in the lab with graduate student Kaylen Beekman (BSc '22)

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