Decoding pain pathways along the gut-brain axis

Researchers have identified the nerve pathways responsible for pain signals from the bowel to the brain, paving the way for new IBS and IBD treatments.

New research has identified the pain pathways between the gut and brain

ADELAIDE, SOUTH AUSTRALIA, AUSTRALIA, September 10, 2025 /EINPresswire.com/ -- An Adelaide-based research collaboration has identified the specific nerve pathways responsible for relaying pain signals from the bowel to the brain, paving the way for new irritable bowel syndrome (IBS) and inflammatory bowel disease (IBD) treatments.

Around 12% of Australians currently live with chronic pain related to IBS or IBD, conditions that cause nerves in the gut to become overactive or hypersensitive. Despite the prevalence of these conditions, therapy options remain scarce.

> By pinpointing these pathways, we now have a clear guide of what neural pathways to target to help understand and manage abnormal pain."
>
> *Dr Andrea Harrington*

The research, published in the Journal of Neurochemistry, was SAHMRI-led in collaboration with researchers from the University of Adelaide, the University of Melbourne and Flinders University.

Lead author Dr Andrea Harrington says the findings reveal two distinct neural pathways in the spinal cord that act as "gatekeepers" in transmitting pain from the colon and rectum into the brainstem.

"We've discovered that the sensory information from the colorectum is transmitted into the brainstem through two distinct regions of the spinal cord," Dr Harrington said.

"One region in the thoracolumbar spinal cord was shown to relay noxious information into

brainstem pain-related circuits, while the other spinal region in the lumbosacral spinal cord carried a broader range of signals into brainstem circuits involved in normal gut motor function and pain modulation.

“By pinpointing these pathways, we now know how signals from the gut are being transferred and processed in the nervous system appropriately, giving us a clear guide of what neural pathways to target to help understand and manage abnormal pain.”

The study was made possible by world-class imaging support from Adelaide Microscopy at the University of Adelaide, and histology services that enabled the team to visualise these pathways in unprecedented detail.

Building on this discovery, researchers will now investigate how these pathways are altered in IBS and IBD, with the aim of then discovering new therapies to target the faulty pathways directly.

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