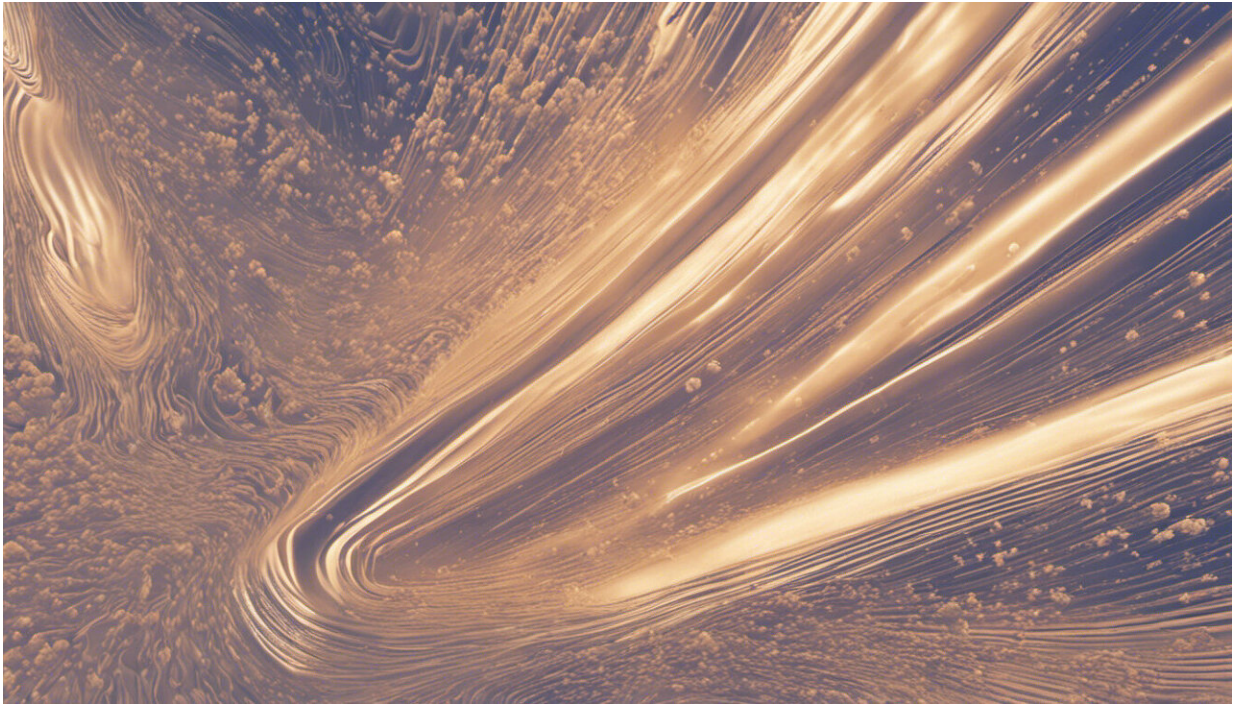


Insensitive irritable bowel syndrome

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Credit: AI-generated image ([disclaimer](#))

For the first time, biopsies of patients with irritable bowel syndrome have shown that the nerves in their gut wall respond poorly to a cocktail of inflammatory substances. This refutes the previous theory that patients with irritable bowel syndrome have an overly sensitive gut. The new study by scientists of the Technical University of Munich (TUM) was carried out in collaboration with several German hospitals.

Irritable bowel syndrome affects around ten to 15 percent of people in industrialized countries. The disease is associated with typical symptoms such as abdominal pain, bloating and irregular bowel movements. It had long been speculated that irritable bowel syndrome is a psychosomatic disorder triggered by stress. To date, there is no specific treatment for the disease itself, only for the accompanying symptoms. In the meantime it is recognized that irritable bowel syndrome is in fact an organic disorder; however, the manifold causes, cannot be detected with today's measurement methods in routine practice. A new study, published in *Frontiers in Neuroscience*, has now shown, for the first time, that measurable changes occur in the nerves in the gut wall of patients with irritable bowel syndrome.

Nerve sensitization can be ruled out

"One possible cause of symptoms in some irritable bowel syndrome patients is the increased release of neurotransmitters," says Professor Michael Schemann of the TUM Department of Human Biology. "These substances play a role in inflammatory processes, among other things." Based on their own earlier studies, the TUM researchers postulated that the nerves in the gut wall of irritable bowel syndrome patients are highly sensitive. They therefore examined the reaction of biopsy samples from irritable bowel syndrome patients and [healthy volunteers](#) to [electrical stimulation](#) and nicotine. Both are well-established methods for testing the responsiveness of enteric nerves: Electrical stimulation results in synaptic transmission, while nicotine directly activates enteric nerves. Surprisingly, the nerves of both groups reacted similarly, so that general [nerve](#) sensitization can be ruled out.

Perplexing results: irritable bowels have reduced sensitivity

The researchers then administered a cocktail of inflammatory substances containing histamine, proteases, serotonin and TNF-alpha in order to simulate the environment in the gut wall of patients with irritable bowel syndrome and measured the response. The results were perplexing: "What we found was exactly the opposite of what we initially surmised. The nerves of irritable bowel syndrome patients reacted much less strongly to the cocktails we administered than the [biopsy samples](#) of healthy volunteers," says Professor Schemann. "The gut wall of these patients is evidently desensitized as a result of earlier excessive activation. This could be a protective measure to prevent overstimulation."

To verify this conclusion, enteric nerves were exposed to irritation for several hours. The result: "When the nerves are irritated continuously, they down-regulate the reaction," says Schemann, who has been studying [irritable bowel syndrome](#) for years. He emphasizes that these sophisticated experimental investigations are a long way from being used for routine diagnosis. "It remains unclear how the observed desensitization of the nerves to specific neurotransmitters causes the actual symptoms and whether this phenomenon will lead to new therapeutic options."

Although experiments show a decreased response to an inflammatory cocktail, they do not rule out the possibility of sensitization to other substances.

More information: Daniela Ostertag et al. Reduced Responses of Submucous Neurons from Irritable Bowel Syndrome Patients to a Cocktail Containing Histamine, Serotonin, TNF α , and Trypsin (IBS-Cocktail), *Frontiers in Neuroscience* (2015). [DOI: 10.3389/fnins.2015.00465](#)

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