

News Release

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Hope for effective drugs for patients

Researchers at TUM are on the trail of causes of irritable bowel syndrome

Irritable bowel syndrome makes life miserable for those affected - at least ten percent of the population. And what really rankles with many of them is that they are often labeled as hypochondriacs, since physical causes for irritable bowel have never been identified. Now, human biologists at Technische Universität München (TUM) have shed light on the issue: They have discovered mini-inflammations in the mucosa of the gut, which upset the sensitive balance of the bowel and are accompanied by sensitization of the enteric nervous system.

Flatulence, constipation and diarrhea, nausea and stomach cramps: irritable bowel syndrome (IBS) turns digestion into a nightmare. Constant visits to the bathroom are often joined by sleep disturbances, headaches and backaches. In Germany alone, some 7 million people are affected by the disorder - and by the fact that their irritable bowel syndrome is often deemed psychosomatic. This is because the organic trigger of the disease has never been discovered, and consequently the various therapeutic interventions are as disappointing for the patients as they are for doctors. However, that may soon change, because now, for the first time, biologists in Munich have nailed down hidden physical causes of the cruel bowel disorder.

Prof. Michael Schemann's research team at the TUM Department for Human Biology has managed to demonstrate that micro-inflammations of the mucosa cause sensitization of the enteric nervous system, thereby causing irritable bowel syndrome. Using ultrafast optical measuring methods, the researchers were able to demonstrate that mediators from mast cells and enterochromaffin cells directly activate the nerve cells in the bowel. This hypersensitivity of the enteric nervous system upsets communication between the gut's mucosa and its nervous system, as project leader Prof. Schemann explains: "The irritated mucosa releases increased amounts of neuroactive substances such as serotonin, histamine and protease. This cocktail produced by the body could be the real cause of the unpleasant IBS complaints."

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The human biologists at TUM are blazing a trail as they follow this lead. Their current focus is to what extent nerve sensitization correlates with the severity of symptoms. Working with colleagues from Amsterdam, they have already substantiated the clinical relevance of their results: irritable bowel symptoms improved after treatment with an antihistamine known for its immune-stabilizing effect in the treatment of allergic reactions such as hay fever. Thanks to funding from the German Research Foundation (DFG), the scientists are now investigating whether the improved symptoms are accompanied by a normalization of nerve activity.

In the medium term, the successful identification of the active components will enable the development of effective drugs to treat irritable bowel syndrome. Even now, though, the TUM team have made life easier for many irritable bowel patients, in that they have shown that the chronic disorder does have physical causes and is not merely "imagined".

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Background:

As lead author of the article in "Gastroenterology", research assistant Dr. Sabine Bühner received the €5,000 Norgine Gastro Award for outstanding research and discovery in the field of gastroenterology. The project "The pathophysiology of irritable bowel syndrome: Effect of mucosal biopsy supernatants from patients with irritable bowel syndrome on the enteric nervous system" is funded by the German Research Foundation (DFG).

Free visual material:

The Press Office will provide a high resolution image on request, provided copyright is cited (Title: Section of the human gut wall).

Original publications:

Buhner S, Li Q, Vignali S, Barbara G, De Giorgio R, Stanghellini V, Cremon C, Zeller F, Langer R, Daniel H, Michel K, Schemann M.: Activation of human enteric neurons by supernatants of colonic biopsy specimens from patients with irritable bowel syndrome. *Gastroenterology*. 2009 Oct;137(4):1425-34. (doi:10.1053/j.gastro.2009.07.005)

Klooker TK, Braak B, Koopman KE, Welting O, Wouters MM, van der Heide S, Schemann M, Bischoff SC, van den Wijngaard RM, Boeckxstaens GE.: The mast cell stabiliser ketotifen decreases visceral hypersensitivity and improves intestinal symptoms in patients with irritable bowel syndrome. *Gut*. Published on-line in advance at <http://gut.bmj.com> (doi:10.1136/gut.2010.213108)

Technische Universität München (TUM) is one of Europe's leading universities. It has roughly 420 professors, 7,500 academic and non-academic staff (including those at the university hospital "Rechts der Isar"), and 24,000 students. It focuses on the engineering sciences, natural sciences, life sciences, medicine, and economic sciences. After winning numerous awards, it was selected as an "Elite University" in 2006 by the Science Council (Wissenschaftsrat) and the German Research Foundation (DFG). The university's global network includes an outpost in Singapore. TUM is dedicated to the ideal of a top-level research based entrepreneurial university.

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