

# Newly discovered bacteria-binding protein in the intestine

December 8 2016

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Deficiency in a certain protein in the gastrointestinal tract has been shown to lead to both inflammation and abdominal fat accumulation in mice. The discovery provides yet another piece of the puzzle of how humans are affected—or not—by the large quantities of intestinal bacteria we carry with us.

In the study from Sahlgrenska Academy, researchers have addressed the key role of the bacteria-binding [protein](#) ZG16 in protecting the body from [intestinal bacteria](#).

"The hope is that eventually, we'll be able to administer this protein to improve protection against bacteria in patients with a defective barrier," says Joakim Bergström, postdoctoral researcher at Sahlgrenska Academy.

Joakim Bergström is in Professor Gunnar C. Hansson's research group, which, eight years ago, was first to discover that there is a protective [mucus layer](#) in the intestine that separates intestinal bacteria from the intestinal surface.

## Clumping bacteria together

The thick mucus layer prevents the large quantities of bacteria people typically have in the gastrointestinal tract, one to two kilos, from reaching the body's tissues and causing inflammation or other harm.

Structurally, this protective barrier is made of proteins (mucins) that are formed and secreted by the goblet cells of the [gastrointestinal tract](#).

The discovery has led to a brand new area of research and has been followed by numerous findings about how the mucus layer is created, is maintained, moves, and is damaged.

The new research shows that the protein ZG16 binds and clumps bacteria together and thus works with the protective mucus layer in the intestine to keep bacteria at a safe distance from the [intestinal mucosa](#).

Mice that lack the protein develop a mucus layer that is more permeable to bacteria, allowing more bacteria to cross the intestinal mucosa into the body. The increased quantity of bacteria that reach the body's various tissues cause low-grade inflammation.

## Improved understanding

The bacteria that slip through from the intestine also led to increased abdominal fat accumulation in the mice that had a defective mucus barrier due to the lack of the protein.

The research group has previously shown that the mucus layer is permeable to bacteria in patients with the gastrointestinal disorder ulcerative colitis and in mouse models of inflammatory bowel disease. The finding of a specific protein that helps prevent bacteria from entering the body is important for the understanding of inflammatory bowel diseases and of the origins of more general diseases such as obesity and inflammation.

"It's becoming very clear now that a significant amount of [bacteria](#) leaks through the intestine into the body, which plays a role in inflammatory diseases, and even obesity, at least in mice. This indicates a principle that

is probably quite universally applicable," says Gunnar C. Hansson.

**More information:** Joakim H. Bergström et al. Gram-positive bacteria are held at a distance in the colon mucus by the lectin-like protein ZG16, *Proceedings of the National Academy of Sciences* (2016). [DOI: 10.1073/pnas.1611400113](https://doi.org/10.1073/pnas.1611400113)

Provided by University of Gothenburg

Citation: Newly discovered bacteria-binding protein in the intestine (2016, December 8)  
retrieved 17 April 2024 from  
<https://medicalxpress.com/news/2016-12-newly-bacteria-binding-protein-intestine.html>

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