

# Defects in a specific cell type may cause ulcerative colitis

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There are many variants of "goblet cells" in the intestines and they seem to have different functions, according to a new study from the University of Gothenburg. The study indicates that defects in goblet cells of a particular type may be a factor contributing to ulcerative colitis, an inflammatory bowel disease.

The entire inside of our intestines is covered by a thin [layer](#) of mucus that protects the fragile mucous membrane (mucosa) from bacteria and other microorganisms. If the microorganisms repeatedly come into contact with the [intestinal mucosa](#), inflammation and even cell changes may result. These increase the risk of intestinal cancer. In a healthy colon, the mucus layer is up to a millimeter thick. This layer, which undergoes complete renewal hourly, is formed from [cells](#) of a special type, known as [goblet cells](#).

## Many different goblet cells

In the present study, now published in the journal *Science*, the scientists separated goblet cells from other cells and investigated which proteins each individual goblet cell expresses. There proved to be many different subtypes of these cells, and goblet cells' functions turned out to vary more than researchers have previously realized.

"We believe this is important knowledge that may enable us to influence the protective function of the gut in the future. The system that maintains the protective intestinal mucus layer seems to be able to change its functions, and we could utilize this capacity by reprogramming the layer with various signals, for example by using new drugs," says Malin Johansson, Associate Professor at Sahlgrenska Academy, University of Gothenburg, who led the research behind the present study.

## Connected with ulcerative colitis

The most impermeable part of the [mucus layer](#) is formed by glands in the gut. In particular, the research team studied one of the specific types of goblet cells, found on the outermost surface of the mucosa. These goblet cells provide another type of mucus, which contributes to the

protection of the gut but allows certain nutrients to pass through.

"If the function of these specific cells is impaired, we see that unprotected cell surfaces arise. These lead to inflammation, both in studies on mice and in samples from patients with ulcerative colitis," Johansson says.

## Appear to cause damage to mucosal protection

In the study, these specific goblet cells seemed to be repelled by the mucosa earlier than normal in patients with ulcerative colitis. Accordingly, the cells became fewer.

"To our surprise, we were able to observe this both in patients with active ulcerative colitis and in those who were temporarily asymptomatic. This indicates that premature rejection of the particular goblet cells we've been studying damages the [mucus](#) protection and that this is a contributing cause of inflammatory bowel disease. It could also be a partial explanation for these patients' elevated cancer risk," Johansson says.

There are some 30,000 people in Sweden with [ulcerative colitis](#), which is a chronic but intermittent inflammatory bowel disease.

**More information:** Elisabeth E. L. Nyström et al. An intercrypt subpopulation of goblet cells is essential for colonic mucus barrier function, *Science* (2021). [DOI: 10.1126/science.abb1590](https://doi.org/10.1126/science.abb1590)

Provided by University of Gothenburg

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