

## Gut bacteria offer new insights -- and hope -- for people with celiac disease

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Dietary changes that include probiotics and/or prebiotics (found in some foods) may help alleviate the severity of celiac disease for some patients. According to a new research study appearing in the May 2010 print issue of the *Journal of Leukocyte Biology*, differing intestinal bacteria in celiac patients could influence inflammation to varying degrees. This suggests that manipulating the intestinal microbiota with dietary strategies such as probiotics and prebiotics, could improve the quality of life for celiac patients, as well as patients with associated diseases such as type 1 diabetes and other autoimmune disorders.

"We hope the study will ultimately add to the understanding of the mechanisms of action of the intestinal microbiota in immune-mediated diseases," said Yolanda Sanz, one of the scientists involved in the research from the National Spanish Research Council in Valencia, Spain. "This study may also help to design novel strategies, which could improve the quality of life of celiac disease patients in the future."

To make this discovery, scientists used cultures of human peripheral mononuclear cells (PBMCs) as in vitro models, as intestinal mucosa monocytes are constantly replenished by blood monocytes and accurately represent an in vivo situation. To simulate the intestinal environment of celiac disease, cell cultures were exposed to Gram-negative bacteria isolated from celiac patients and bifidobacteria, both alone and in the presence of disease triggers. The effects on surface marker expression and cytokine production by PBMCs were determined. The Gram-negative bacteria induced higher pro-inflammatory cytokines than the bifidobacteria. These bacteria also up-regulated expression of cell surface markers involved in inflammatory characteristics of the disease, while bifidobacteria up-regulated the expression of anti-inflammatory cytokines. Although human clinical trials are necessary, this evidence could be the first step toward changing how celiac disease is treated and possibly prevented.

"Just as some foods can lead to poor health," said Louis Montaner, D.V.M., M.Sc., D.Phil. Editor-in-Chief of the *Journal of Leukocyte Biology*, "it's no surprise that others can have positive effects. For people with celiac disease, this opens a line of research into new therapies that may be as accessible as a grocer's shelf."

According to the National Institute of Diabetes and Digestive and Kidney Diseases, U.S. National Institutes of Health, celiac disease affects more than two million people in the United States. It causes damage to the small intestine and interferes with absorption of nutrients from food. People who have celiac disease cannot tolerate gluten, a protein in wheat, rye, and barley. When people with celiac disease eat foods or use products containing gluten, their immune system responds by damaging or destroying villi -- the tiny, fingerlike protrusions lining the small intestine. Without healthy villi, nutrients cannot be absorbed properly, leading to malnutrition, no matter how much food one eats.

### Story Source:

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### Journal Reference:

1. G. De Palma, J. Cinova, R. Stepankova, L. Tuckova, Y. Sanz. **Pivotal Advance: Bifidobacteria and gram-negative bacteria differentially influence immune responses in the proinflammatory milieu of celiac disease.** *Journal of Leukocyte Biology*, 2009; DOI: [10.1189/jlb.0709471](https://doi.org/10.1189/jlb.0709471)

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