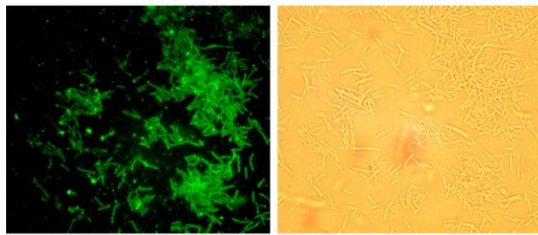


# Probiotic *Lactobacillus acidophilus* shows promise for treating inflammatory bowel disease and other conditions

20 April 2021



FITC-labeled *Lactobacillus acidophilus* (LA1)      Bright field *Lactobacillus acidophilus* (LA1)

Left-hand: FITC-labeled *Lactobacillus acidophilus* (LA1).  
Right-hand: Bright field *Lactobacillus acidophilus* (LA1).  
Credit: Rana Al-Sadi, PhD

Intestinal epithelial tight junctions (TJs) act as a functional and structural barrier against harmful antigens that promote intestinal inflammation in inflammatory bowel disease (IBD) and other inflammatory conditions of the gut. A defective intestinal TJ barrier, sometimes known as "leaky gut," plays an important role in exacerbating and prolonging intestinal inflammation.

New research reported in *The American Journal of Pathology*, shows that the probiotic *Lactobacillus acidophilus* (*L. acidophilus*) strain known as LA1 can generate a rapid and sustained enhancement of this defective intestinal barrier and effectively treat [intestinal inflammation](#) by preserving and restoring the intestinal barrier.

The use of probiotics has emerged as a therapy for a number of intestinal disorders, including IBD and necrotizing enterocolitis; however, specific probiotic bacteria with true beneficial effects on intestinal [disease](#) need to be identified. In this

study researchers used [high-throughput screening](#) to assess over 20 probiotic bacteria to determine their ability to increase intestinal barrier function, using both a cell culture model of the intestinal epithelial lining and live mice.

The probiotic bacterial species *L. acidophilus*, specifically the LA1 strain, produced a rapid and marked increase in intestinal TJ barrier; other [strains](#) within *L. acidophilus* had no effect. The researchers found that this particular strain interacted with intestinal cells in a unique way to activate pathways that tightened the intestinal barrier, treating intestinal [inflammation](#). It attaches to the intestinal epithelial membrane surface by directly interacting with the toll-like receptor-2 complex, which alerts the intestine to trigger an immune response.

The researchers also performed in vivo proof-of-concept studies in live mice to investigate the effect of LA1 and another strain, LA3, in the enhancement of mouse intestinal barrier and the therapeutic efficacy of LA1 in maintaining intestinal barrier and protecting against induced colitis. They found that LA1, but not LA3, caused rapid and marked enhancement of small intestine and colonic epithelial barrier in mice. Treatment studies after the onset of colitis found that LA1 was also effective in the healing of intestinal [barrier](#) and colitis.

"Our data indicate that LA1 is able to prevent colonic inflammation formation and promote colitis healing," said lead investigator Thomas Ma, MD, Ph.D., Penn State College of Medicine, Hershey Medical Center, Hershey, PA, USA. "The implications of the present findings are that this bacterial strain can be used in a wide variety of intestinal permeability disorders, including IBD, coeliac disease, alcoholic liver disease, non-

alcoholic fatty liver disease, and necrotizing enterocolitis, to treat inflammation associated with the leaky gut."

*L. acidophilus* is found in various brands of yogurt including Chobani, Dannon, Siggi's, Stonyfield, and Yoplait.

**More information:** Rana Al-Sadi et al, Lactobacillus acidophilus Induces a Strain-specific and Toll-Like Receptor 2–Dependent Enhancement of Intestinal Epithelial Tight Junction Barrier and Protection Against Intestinal Inflammation, *The American Journal of Pathology* (2021). DOI: [10.1016/j.ajpath.2021.02.003](https://doi.org/10.1016/j.ajpath.2021.02.003)

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