

Beneficial Bacteria Protect the Gut from Stress

TORONTO, April 24 — Probiotics can help protect the gut against harmful bacteria and symptoms brought on by long-term stress, according to researchers here.

In a study of rats subjected to stress, those who were pretreated with either of two *Lactobacillus* strains had less adhesion to intestinal walls of harmful bacteria, said Philip M. Sherman, M.D., and colleagues at the Hospital for Sick Children here.

What's more, pretreatment with the probiotics prevented translocation of the harmful bacteria to the mesenteric lymph nodes, indicating a protective effect, they reported in the early online issue of *Gut*.

Although the study focused on stressed-out rodents, the findings have implications for the treatment of inflammatory bowel disease and irritable bowel syndrome in humans, the authors wrote.

"Enhanced bacterial uptake following exposure to chronic stress may lead to an increased antigen load in the intestinal mucosa," Dr. Sherman and colleagues wrote. "Thus local inflammation could be initiated, which eventually leads to more diffuse intestinal inflammation... In addition, these findings indicate that probiotics may provide a novel approach for the management of stress induced intestinal dysfunction."

Dr. Sherman and colleagues looked at the ability of probiotics to prevent intestinal pathophysiology precipitated by stress. In this case, the stress was induced by a water avoidance stress test, in which the animals were placed for one hour per day for 10 days on a small platform surrounded by warm water in a plastic container. Controls were subjected to "sham stress," in which they were placed on an identical platform in an empty plastic container.

The animals had been fed either a standard diet or the same diet with probiotics (*Lactobacillus helveticus* and *L. rhamnosus* strains) added to the water for seven days before the start of the induced stress and continuing for the duration of the study.

"We have previously shown that probiotics survive and transiently colonize the gut when administered

to mice via addition to sterile drinking water," the authors noted.

Four hours after the last real or sham stress session, the rats were killed and their tissues, including mesenteric lymph nodes and intestinal segments, were examined for studies of bacterial translocation, and morphological and functional analysis.

The authors found that the chronic stress caused by water-avoidance induced excess ion secretion and intestinal mucosal barrier dysfunction in both the ileum and the colon, and that these effects were associated with increased bacterial adhesion and penetration into surface epithelial cells.

They also saw that about 70% of the rats subjected to the water avoidance stress had bacterial penetration of the gut endothelium and translocation of the bacteria to mesenteric lymph nodes.

However, pretreatment with probiotics reduced the number of adherent bacteria, prevented bacterial translocation to mesenteric lymph nodes, and inhibited chronic stress-induced elevated intestinal ion secretion, but not increased permeability, the authors found.

"These findings indicate that probiotics can prevent chronic stress induced intestinal abnormalities and, thereby, exert beneficial effects in the intestinal tract," they wrote.

Action Points

Explain to interested patients that this study suggests that probiotics may help to protect the gut against stress-induced intestinal disease.

Caution patients that this study was conducted only in animal models.

By Neil Osterweil, Senior Associate Editor, MedPage Today
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Zareie M et al. "Probiotics prevent bacterial translocation and improve intestinal barrier function in rats following chronic psychological stress." *Gut* 2006;000:1-8. doi: 10.1136/gut.2005.080739