

# Probiotics mitigate stress in medical students at exam time

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A probiotic given to medical students during the run-up to nationwide medical school examinations reduced stress among the students. "The probiotic strain, *Lactobacillus casei* strain Shirota can relieve many aspects of the stress response, especially gastrointestinal dysfunction," said corresponding author Kouji Miyazaki, PhD, director of the Food Research Department of Yakult Central Institute, Tokyo, Japan. The research is published ahead of print May 6th, in *Applied and Environmental Microbiology*, a journal of the American Society for Microbiology.

In the study, beginning eight weeks prior to the examination, 23 [medical students](#) drank milk that had been fermented by *L. casei* strain Shirota, while 24 control [students](#) consumed non-fermented (placebo) milk that was otherwise identical, in such parameters as taste, color, and nutrition. Neither group of students knew which milk they had received.

Weekly, the subjects answered a questionnaire concerning levels of five common abdominal symptoms, such as "abdominal discomfort and pain." They also responded to a questionnaire on anxiety levels. Additionally, the investigators measured certain physiological parameters, such as salivary cortisol—a stress hormone.

The study demonstrated that daily consumption of the probiotic milk reduced gastrointestinal pain and dysfunction, as well as the feeling of being stressed out. It also dampened the rise in salivary cortisol, said Miyazaki.

Additionally, the *L. casei* strain Shirota changed levels of expression of stress-related genes. In placebo group students, as the examination date approached, expression soared in 179 stress-related genes, while rising much less in the students who consumed the probiotics.

The percentage of bacteria from the stress-related

*Bacteroidetes* species increased prior to exams only in the placebo group. Meanwhile, the students on the probiotics maintained healthier and more diverse populations of gut bacteria throughout the time leading up to the examination. The investigators suspect this contributed to reducing stress symptoms.

The researchers used a technique called 16S rRNA gene amplicon sequence analysis to census the bacteria.

"These findings indicate that the stress responses are controlled by probiotics at a higher level of the stress system, through the brain-gut axis," said Miyazaki. "Thus, the probiotic strengthens the resilience of our [stress response](#) system."

Miyazaki said that the idea for the study had originated from indications that probiotics mitigated [stress](#)-related gut diseases such as irritable bowel syndrome.

**More information:** Akito Kato-Kataoka et al. Fermented milk containing strain Shirota preserves the diversity of the gut microbiota and relieves abdominal dysfunction in healthy medical students exposed to academic stress, *Applied and Environmental Microbiology* (2016). [DOI: 10.1128/AEM.04134-15](#)

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