

The microbiome and disease: Gut bacteria influence the severity of heart attacks in rats

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New research published online in the FASEB Journal (www.fasebj.org) suggests that the types and levels of bacteria in the intestines may be used to predict a person's likelihood of having a heart attack, and that manipulating these organisms may help reduce heart attack risk. This discovery may lead to new diagnostic tests and therapies that physicians use to prevent and treat heart attacks. In addition, this research suggests that probiotics may be able to protect the heart in patients undergoing heart surgery and angioplasty.

"Our discovery is a revolutionary milestone in the prevention and treatment of heart attacks," said John E. Baker, Ph.D., study author from the Division of Cardiothoracic Surgery at the Medical College of Wisconsin in Milwaukee. "The biochemical link between [intestinal bacteria](#), their metabolites, and injury to the heart will reduce the risk of death from a [heart attack](#) and, coupled with the use of probiotics, will ultimately be able to improve the overall cardiovascular health of the [human population](#)."

To make this discovery, Baker and colleagues conducted experiments involving three groups of rats. The first group was fed a standard diet. The second group was treated orally with the antibiotic vancomycin in the drinking water. The third group was fed a probiotic supplement that contains *Lactobacillus plantarum*, a bacterium that suppresses the production of leptin.

The group treated with the antibiotic had decreased levels of leptin (a

[protein hormone](#) that plays a key role in appetite and metabolism), which resulted in smaller heart attacks, and improved recovery of mechanical function as compared to the group fed a standard diet. The antibiotic reduced total bacterial numbers in the intestines and altered the abundance of specific types of bacteria and fungi that live in the gut. Treating these rats with leptin was shown to offset the protection produced by the antibiotic treatment. The third group was fed a probiotic that also altered the numbers and types of bacteria and fungi living in the gut. Like those fed the antibiotic, these rats also had decreased leptin levels, resulting in smaller heart attacks and greater recovery of mechanical function as compared to the first group. Treating these rats with leptin also was shown to offset the protection produced by the probiotic.

"We may not be ready to prescribe yogurt to prevent heart attacks, but this research does give us a much better understanding of how the microbiome affects our response to injury," said Gerald Weissmann, M.D., Editor-in-Chief of the [FASEB Journal](#). "Just as physicians use cholesterol levels, blood pressure, and overall body composition as measures of heart disease risk, we may soon evaluate our body's susceptibility to disease by looking at the microbes that inhabit the gut."

More information: *FASEB J.* [doi: 10.1096/fj.11-197921](https://doi.org/10.1096/fj.11-197921)

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