

Villain stomach bug may have a sweet side: Researchers reveal how 'bad' gut bacteria may help control diabetes

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A stomach bacterium believed to cause health problems such as gastritis, ulcers, and gastric cancer may play a dual role by balancing the stomach's ecosystem and controlling body weight and glucose tolerance, according to immunologists at the Virginia Bioinformatics Institute of Virginia Tech.

Usually the villain in studies of [gastric cancer](#) and [peptic ulcers](#), *Helicobacter pylori* infect about half of the world's population although most infected individuals don't get sick. The bacterium's dwindling numbers coincide with the epidemic of obesity and diabetes in developed countries.

"*H. pylori* is the dominant member of the gastric microbiota and infects about half of the world population. While *H. pylori* infection can be associated with severe disease, it helps control chronic inflammatory, allergic, or [autoimmune diseases](#)," said Josep Bassaganya-Riera, director of the Nutritional Immunology and Molecular Medicine Laboratory and the Center for Modeling Immunity to Enteric Pathogens (MIEP) at Virginia Tech. "We demonstrated for the first time that gastric colonization with *H. pylori* exerts beneficial effects in mouse models of obesity and diabetes."

During the past 20 years, obesity in the United States has increased dramatically, according to the [Centers for Disease Control and Prevention](#). About 36 percent of U.S. adults and approximately 17 percent of young people aged 2 to 19 years are obese. Obesity is the leading risk factor for type 2 diabetes and the rates of diabetes have increased in parallel with the rates of obesity.

Mice infected with *H. pylori* showed less [insulin resistance](#) than uninfected mice or other mice infected with a more [virulent strain](#) of *H. pylori*, according to the study, which was recently

published in [PLOS One](#). Researchers believe that whether the infection is harmful or beneficial depends on the interaction between the [genetic makeup](#) of *H. pylori* and the host's immune response.

H. pylori carrying the cytotoxin-associated gene pathogenicity island were harmful. But the bacteria with or without an atypical island may be integral to human stomach microbiota. Indeed, studies show that humans have been colonized by *H. pylori* for about 116,000 years.

The role of *H. pylori* as a pathogen does not provide an explanation as to why it has colonized the stomach of humans thousands of years. Our new findings suggest that *H. pylori* may provide important metabolic traits required to ameliorate diabetes that humans have not evolved on their own," Bassaganya-Riera said.

This suggests that the overuse of antibiotics for everything from misdiagnosed infections in humans to supplementary livestock feed may destroy beneficial bacteria and contribute directly to diseases such as obesity, allergies, inflammatory bowel disease, and asthma. It may be time for humans to reconsider how we can better co-exist with *H. pylori* and other microbes as a means of promoting health.

"This novel finding underscores the complex relationship between *H. pylori* and humans, with effects not limited to the stomach, but more broadly affecting systemic inflammation and metabolism," said Martin Blaser, the Frederick H. King Professor of Internal Medicine and chairman of the Department of Medicine, and professor of microbiology at New York University School of Medicine.

To better understand the complex relationship between *H. pylori* and the human host and to better predict health outcomes, the Center for Modeling Immunity to Enteric Pathogens has developed computer models of the mechanisms by which *H. pylori* interacts with the host and new tools for investigating such interactions," Bassaganya-Riera said.

Provided by Virginia Tech

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