DNA from common stomach bacteria minimizes effects of colitis

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DNA from *Helicobacter pylori*, a common stomach bacteria, minimizes the effects of colitis in mice, according to a new study by University of Michigan Medical School scientists.

The study published in *Gut* this month was performed by a team of investigators assembled by senior author John Y. Kao, M.D. of the University of Michigan's Division of Gastroenterology and assistant professor in U-M's Department of Internal Medicine. The findings indicate that DNA from *H. pylori* significantly ameliorates the severity of colitis, say lead authors Jay Luther, M.D. and Stephanie Owyang, an undergraduate student on the team.

Colitis involves inflammation and swelling of the large intestine that leads to diarrhea and abdominal pain. Approximately 3.3 million people in the U.S. suffer from colitis.

More than half of the people in the world are infected with *H. pylori*, although only about 20 percent of U.S. residents have it. In the U.S., *H. pylori* infection is treated in patients with stomach ulcers or cancers with antibiotics, but the majority of infected individuals don't notice they have it and may not develop ulcers or cancers. "This research shows further evidence that we should leave the bugs alone because there may be a benefit to hosting them in the stomach", says Kao.

"H pylori has co-existed with the human race for more than 50,000 years and although it is linked with peptic ulcer disease and stomach cancer,

only a minority of infected patients will develop those complications," says Luther, adding that less than 15 percent of *H. pylori*-infected patients develop peptic ulcer disease and less than 1 percent develop cancer.

The researchers aren't advocating infecting people with *H. pylori* to treat colitis, but say this may indicated that those already carrying the bacteria should not be treated unless they develop symptoms. These findings also raise significant concerns about global vaccination against *H. pylori*.

"This bug could be good for you, and we need to understand better what it does," says Owyang.

The *H. pylori* infection is more commonly found in developing countries or those with poor sanitation, where colitis, Salmonella and inflammatory bowel diseases are less common. Most people contract *H. pylori* in their first seven years of life, most commonly through an oral-fecal route.

In the study, researchers found that *H. pylori* DNA is uniquely immunosuppressive containing high numbers of sequences known to inhibit inflammation. They isolated the DNA from both *H. pylori* and another bacterium, E. coli, for further comparison. They found that mice receiving *H. pylori* DNA displayed less weight loss, less bleeding and greater stool consistency compared with mice infected with E coli DNA.

"With one dose, there was a significant difference in the bleeding and inflammation in the colon," says Luther. "However, further study is needed to define other potential protective measures that *H. pylori* may provide and its safety as a treatment in patients."

In previous research, U-M gastroenterologists also found that *H. pylori*

reduced the severity of inflammation of the colon caused by Salmonella in mice.

"It is amazing that the bacterial DNA not only directs the biological behavior of the bacteria, but also has a significant influence on gut immunity of the host. This information might have important implications down the line in our understanding of disease manifestation," says Owyang.

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