MedicalXpress

High-salt diet and ulcer bug combine to increase risk of cancer

April 18 2013

Numerous epidemiologic studies have shown that a diet high in salt is associated with an increased risk of gastric cancer. Now Timothy L. Cover and colleagues of Vanderbilt University show that high dietary salt combined with infection by the ulcer-causing bacterium *Helicobacter pylori* greatly increases the risk of cancer. The study was published ahead of print in the journal *Infection and Immunity*.

In the study, the researchers infected Mongolian gerbils with *H. pylori*. One set of gerbils received a regular diet; the other, a high salt diet. At the end of the experiment the researchers analyzed the animals' stomach tissues. Every animal on the high salt diet developed cancer, compared with just 58 percent of those on the regular diet.

It appears development of gastric cancer required the presence of a particular bacterial oncoprotein, known as CagA, which is produced by *H. pylori*. Gastric cancer did not develop in animals on the high salt diet that were infected with a mutant *H. pylori* which did not produce CagA. In earlier studies, Cover and others had shown that culturing *H. pylori* in a high salt environment boosts production of CagA. "This was one of the driving forces that led us to undertake the current studies," says Cover.

The investigators note that while no studies, to their knowledge, have examined relationships among a high salt diet, and infection with *H. pylori* expressing cagA, "in several parts of the world that have high rates of gastric cancer, there is a high prevalence of cagA+ strains and a large proportion of the population consumes a high-salt diet."

The investigators also detected significantly higher levels of gastric inflammation in *H. pylori*-infected gerbils on a high salt diet than in those on a regular diet, a finding which Cover says is relevant to many types of cancer. They also showed that transcription of various inflammatory cytokines, such as interleukin 1-beta, are elevated in the former as compared to the latter, suggesting that "these factors may contribute to the increased inflammation and increased gastric risk that accompany a high salt diet," says Cover.

At least 50 percent of humans are infected with *H. pylori*, at least 90 percent of them without symptoms.

More information: J.A. Gaddy, J.N. Radin, J.T. Loh, F. Zhang, M.K. Washington, R.M. Peek, Jr., H.M.S. Algood, and T.L. Cover, 2013. High dietary salt intake exacerbates Helicobacter pylori-induced gastric carcinogenesis. Infect. Immun. Publish ahead of print 8 April 2013 , doi:10.1128/IAI.01271-12

Provided by American Society for Microbiology