

## New method protects anacidic stomachs from carcinogenic acetaldehyde

Researchers at the University of Helsinki and the Helsinki University Central Hospital have in cooperation with Biohit Oyj developed a new method that helps reduce the cancer risk posed by acetaldehyde in an anacidic stomach. Favourable results from the first clinical trials were presented at the eleventh Finnish Gastroenterology Seminar (XI Gastropäivät) held in Helsinki on 12 February 2009.

The method uses a capsule that slowly releases small amounts of cysteine locally in the stomach. Cysteine is a completely safe amino acid, and 1–2 grams will normally be ingested per day as part of a standard diet. The granular, free cysteine contained in the capsule (100–200 mg) spreads slowly and evenly throughout the stomach, efficiently binding the acetaldehyde molecules and rendering them inactive.

Biohit Oyj seeks to bring its BioCyst capsules to market both in Finland and abroad during 2009.

### An anacidic stomach is the major risk factor for gastric cancer

*Helicobacter pylori* infection or an autoimmune disease may lead to atrophic gastritis (damage to gastric mucosa) and subsequently to an anacidic stomach, which is the major risk factor for gastric cancer and also increases the risk of esophageal cancer. While a healthy, acidic stomach is free of microbes, mouth bacteria can live and multiply in an anacidic stomach. Acetaldehyde is the first metabolic product of alcohol that is produced by microbes or sometimes by cells in the mucosa.

Acetaldehyde is also present in tobacco smoke in amounts almost one thousand times greater than the other carcinogens found in tobacco. Some of the acetaldehyde contained in tobacco smoke dissolves into the saliva, thereby making its way down into the esophagus and stomach. This is probably why smoking is an independent risk factor in cancers of the mouth, esophagus and stomach. The combined cancer risks of alcohol and tobacco are synergistic.

An anacidic stomach is also a risk factor for gastric cancer in those who don't drink alcohol or smoke. This is because many 'alcohol-free' drinks and foodstuffs contain small traces of alcohol that are changed directly into acetaldehyde by microbes in both the mouth and an anacidic stomach. In a low acid or acid-free stomach, microbes also produce acetaldehyde and alcohol from sugar.

There is powerful scientific evidence from recent studies to show that acetaldehyde is a carcinogen. The substance causes cancer in laboratory animals. There are also three human gene mutations known to increase the upper digestive tract's exposure to acetaldehyde when alcohol is consumed. People carrying these gene mutations have a much higher risk of developing cancers of the upper digestive tract if they drink alcohol, and there are hundreds of millions of people in the world who have inherited these gene mutations. A person who smokes, is a large-scale consumer of alcohol and carries two of these gene mutations has a 380 times higher risk of developing esophageal cancer.

Over 5 per cent of over 50-year-olds in developed countries suffer from an anacidic stomach, and the condition is even more common in Eastern Europe and Asia. There are over 50,000 sufferers in Finland and about 500 million worldwide. Although most people do not show any symptoms, the condition can be diagnosed with gastroscopy or even more easily with a simple blood test (GastroPanel, Biohit Oyj). Using PPI medication that prevents stomach acid secretion also leads to microbic acetaldehyde production in a low-acid or anacidic stomach.



If cancer is to be prevented, it's crucial that specific cancer-causing factors and potential risk groups are identified. There is such compelling scientific evidence of a causal relationship between cancer and acetaldehyde in risk groups (those with an anacidic stomach and/or gene mutations conferring increased exposure to acetaldehyde) that many research teams all over the world have announced measures for the early identification of risk groups followed by repeated monitoring with gastroscopy. Now that this Finnish innovation enables us to reduce acetaldehyde exposure, it's even more important to identify and inform these risk groups.

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