Medical Xpress

Changes in the gut bacteria protect against stroke

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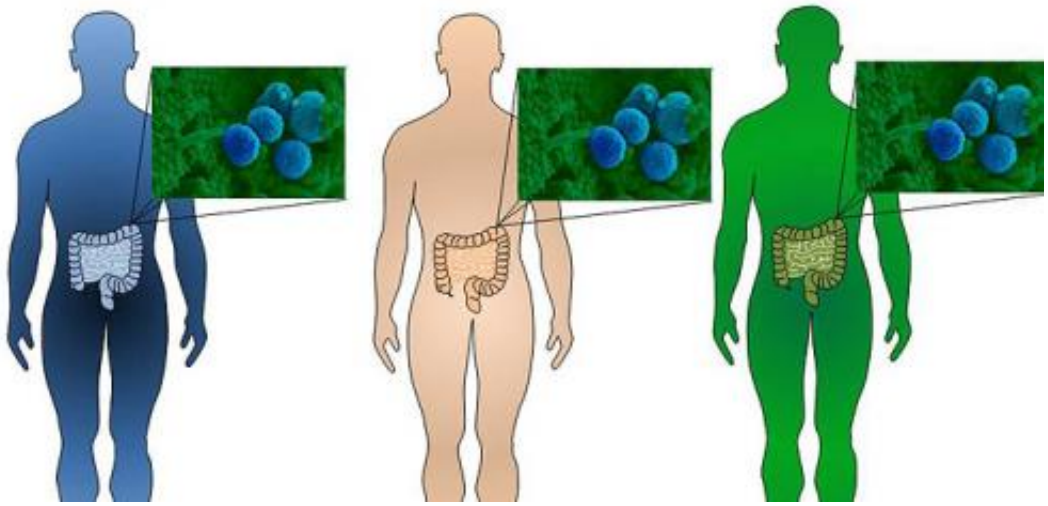
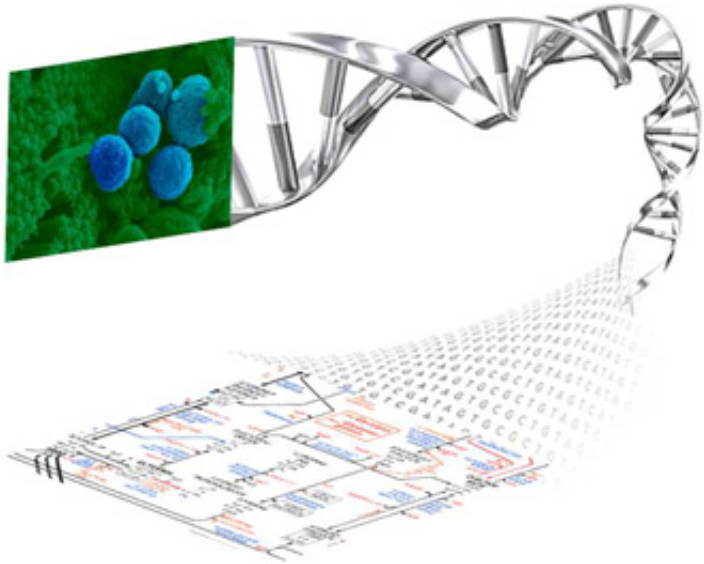


(Medical Xpress)—Researchers at Chalmers University of Technology and University of Gothenburg demonstrate that an altered gut microbiota in humans is associated with symptomatic atherosclerosis and stroke. These findings are presented in a study published in *Nature Communications*.

The human body contains ten times more bacterial cells than human cells , most of which are found in the gut. These bacteria contain an enormous number of genes in addition to our host genome, and are collectively known as the gut metagenome.

How does the metagenome affect our health? This question is currently being addressed by researchers in the rapidly expanding field of metagenomic research. Several diseases have been linked to variations in the metagenome. Researchers at Chalmers University of Technology and Gothenburg University now also show that changes in the gut metagenome can be linked to atherosclerosis and stroke.

The researchers compared a group of stroke patients with a group of healthy subjects and found major differences in their gut microbiota. In particular, they showed that genes required for the production of carotenoids were more frequently found in gut microbiota from healthy subjects. The healthy subjects also had significantly higher levels of a certain carotenoid in the blood than the stroke survivors.



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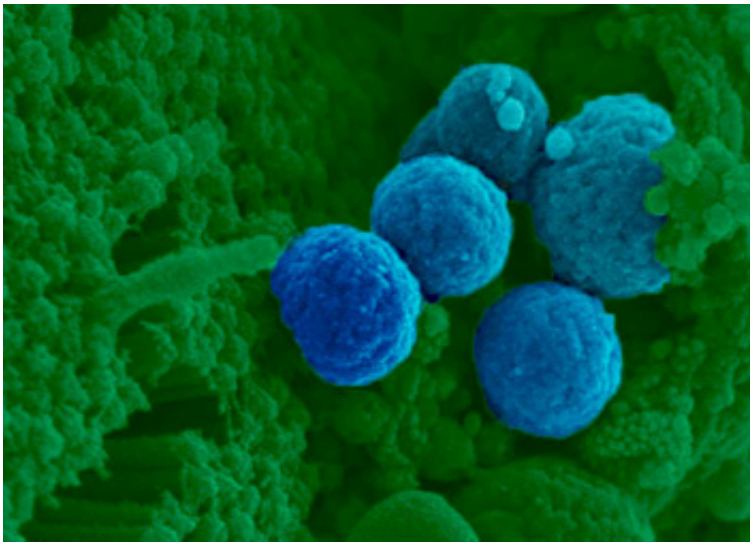
Carotenoids are a type of antioxidant, and it has been claimed for many

years that they protect against angina and stroke. Thus, the increased incidence of carotenoid-producing bacteria in the gut of healthy subjects may offer clues to explain how the gut metagenome affects disease states.

Carotenoids are marketed today as a dietary supplement. The market for them is huge, but clinical studies of their efficacy in protecting against angina and stroke have produced varying results. Jens Nielsen, Professor of Systems Biology at Chalmers, says that it may be preferable to take probiotics instead – for example dietary supplements containing types of bacteria that produce carotenoids.



Bacteria (blue) sitting on a mucosal cell (green) in the gut. Credit: Frida Fåk

"Our results indicate that long-term exposure to carotenoids, through production by the bacteria in the digestive system, has important health benefits. These results should make it possible to develop new probiotics. We think that the bacterial species in the probiotics would establish themselves as a permanent culture in the gut and have a long-

term effect".

"By examining the patient's bacterial microbiota, we should also be able to develop risk prognoses for cardiovascular disease", says Fredrik Bäckhed, Professor of Molecular Medicine at Gothenburg University. "It should be possible to provide completely new disease-prevention options".

The researchers have now started a company, Metabogen, to further develop their discoveries relating to the metagenome. Their success is based on close cooperation between engineers, microbiologists and doctors.

Jens Nielsen and Fredrik Bäckhed both agree that one of the challenges in the rapidly developing area of metagenomics is its multidisciplinary facets, requiring novel collaborations and merging of research fields.

More information: Read the paper "Symptomatic atherosclerosis is associated with an altered gut metagenome."

Provided by Chalmers University of Technology