

Designer probiotics could reduce obesity

December 23 2010

Specially designed probiotics can modulate the physiology of host fat cells say scientists writing in *Microbiology*. The findings could lead to specialised probiotics that have a role in the prevention or treatment of conditions such as obesity.

Scientists from the Alimentary Pharmabiotic Centre (APC), Cork, University College Cork and Teagasc, in Ireland engineered a strain of [Lactobacillus](#) to produce a version of a molecule called conjugated linoleic acid (CLA). When this engineered [bacterial strain](#) was fed to mice, the researchers found that the composition of the mice's fat tissue was significantly altered, demonstrating that ingesting live bacteria can influence metabolism at remote sites in the body.

CLA is a fatty acid that is produced in different versions by different bacteria. One type, called t10, c12 CLA, has been shown to be associated with decreased [body fat](#) in humans and other animals. t10, c12 CLA also has the ability to inhibit the growth of colon cancer cells and induce their death. However, this type of CLA is only produced by certain types of bacteria including *Propionibacterium acnes* – a skin bacterium that can cause acne.

In this study, an enzyme-encoding gene from *P. acnes* was transferred to the *Lactobacillus* strain allowing it to produce t10, c12 CLA.

Lactobacillus strains are common inhabitants of the normal gut flora and are often found in probiotic products. The researchers found that the level of t10, c12 CLA in the mice's fat tissue quadrupled when they were fed this recombinant probiotic. Thus, this study demonstrates that gut

microbes have an impact on host metabolism, and in particular fat composition.

Dr Catherine Stanton, from Teagasc who led the study explained the significance of the results. "CLA has already been shown to alleviate non-alcoholic fatty liver disease that often accompanies obesity. Therefore, increasing levels of CLA in the liver by ingestion of a probiotic strain is of therapeutic relevance," she said. "Furthermore, fat is not an inert layer around our bodies, it is active and proinflammatory and is a risk factor for many diseases, including cancers. The work shows that there is potential to influence this through diet-microbe-host interactions in the gut."

The same group of researchers previously found that microbially produced CLA was able to reduce the viability of colon cancer cells by 92%. "It is possible that a CLA-producing probiotic may also be able to keep [colon cancer](#) cells in check. All our findings to date demonstrate that the metabolism of gut bacteria can modulate host cell activity in ways that are beneficial to the host," explained Dr Stanton. "We need to further investigate the effects of CLA-producing bacteria on human [metabolism](#), but our work so far certainly opens up new possibilities for the use of probiotics for improvement of human health."

Provided by Society for General Microbiology

Citation: Designer probiotics could reduce obesity (2010, December 23) retrieved 24 April 2024 from <https://medicalxpress.com/news/2010-12-probiotics-obesity.html>

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