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News Release

Freising-Weihenstephan, April 23rd, 2009

A shimmer of hope in the treatment of inflammatory bowel diseases

New mechanism of action discovered in probiotic bacteria

Increasing numbers of people in the industrialized world are suffering from inflammatory bowel diseases. Although the condition cannot yet be treated effectively, it has been known for a number of years that the consumption of probiotics can inhibit the inflammatory process. Nutrition researchers at the Technische Universität München have now discovered the reason: They have cracked the molecular method of action of a probiotic mixture used in therapy – and this could help improve the treatment of these gastro-intestinal diseases in the future.

Over 3.5 million Europeans and Americans in USA suffer from inflammatory bowel disease (IBD), i.e. from Crohn's disease or ulcerative colitis. IBD results from an overreaction of the immune system to bacteria in normal intestinal flora. Like allergies and autoimmune diseases, they rank among the typical ailments of affluence in the industrialized world. To date, IBD patients can be treated only symptomatically. Over the past few years clinical studies have shown that the consumption of probiotic microorganisms such as *E. coli Nissle* or the probiotic mixture VSL#3 leads to a significant improvement of chronic inflammatory processes in the bowel. Yet, in spite of research across the globe, the question of how this works has remained largely unanswered.

An interdisciplinary team of researchers at the Technische Universität München (TUM), in collaboration with the German Institute of Human Nutrition (DIfE), the Helmholz Zentrum and Aberdeen University in Scotland, have shed new light on the molecular mechanism of action of the bacterial strain *Lactobacillus casei* (shorthand: *L. casei*) in VSL#3. A variant of this strain is added to most probiotic yogurts and drinks as an active ingredient.

Prof. Dirk Haller, Chair of Biofunctionality of Foods at the TUM, had to look very closely to discover the secret behind *L. casei*. Together with his team at the Center for Life and Food Sciences Weihenstephan, he simulated the IBD infection situation in cell culture experiments with intestinal epithelial cells and analyzed the molecular effects of *L. casei* under these circumstances. Further, the positive effects of VSL#3 on the severity of the infection as well as on the molecular infection markers in epithelial cells were investigated in experimental studies with animal models for inflammatory bowel disease.

It turns out that the bacterial strain *L. casei* inhibits the production of so-called “IP-10” in the epithelial cells of intestinal mucosa. In IBD patients this inflammation-triggering signal protein

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causes the excessive enlistment of immune cells that prop up and maintain intestinal inflammation. *L. casei* checks the course of Crohn's disease and ulcerative colitis right at the source: it has an anti-inflammatory effect due to its IP-10 inhibition.

"On the basis of these specific mechanisms of action in a probiotic bacterium, we can now identify the protective components of *L. casei*," says Prof. Haller. This gives the TUM researchers a concrete starting point in their efforts to advance the search for unknown and potentially effective probiotics in the context of inflammatory bowel disease. Haller is optimistic: "With this discovery we have come one step closer to achieving our goal of developing a safe and effective treatment for IBD."

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Literature:
Hörmannsperger, G., Clavel, T., Hoffmann, M., Reiff, C., Kelly, D., Loh, G., Blaut, M., Hölzlwimmer, G., Laschinger, M., Haller, D. (2009). "Post-translational Inhibition of IP-10 Secretion in IEC by Probiotic Bacteria: Impact on Chronic Inflammation." PLoS One. Available online at http://www.pubmedcentral.nih.gov/articlerender.fcgi?artid=2634842

Background:
This study was funded by the German Federal Ministry for Education and Research, as well as by the European Nutrigenomics Organization NuGO (www.nugo.org).