

Press Release

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### **Cork Scientists identify new link between gut bacteria and type-1-diabetes**

Researchers at the Alimentary Pharmabiotic Centre in Cork have discovered that the composition and diversity of gut bacteria is dramatically altered in an animal model of diabetes. The research team, led by Professor Catherine Stanton, based in Teagasc Moorepark Research Centre and University College Cork and funded by Science Foundation Ireland, has published their research in the journal *Microbiology*.

This study took place in diabetic rats whose biology in terms of insulin is similar to humans.

The gut bacteria found in these animals was dramatically different from those of healthy animals of similar age. In particular, there were increases in 2 types of bacteria in the diabetic animals: Actinobacteria, which are normally found at very low levels in the healthy gut and Proteobacteria which are potentially disease-causing. The authors speculate that the increased Actinobacteria observed in the diabetic animals could be due to the overall decrease in microbial diversity, caused by diabetes onset at week one, and continually seen throughout the trial up to week five. Decreased microbial diversity has previously been associated with other disease states such as *Clostridium difficile* -associated diarrhoea and inflammatory bowel disease.

387 million people are currently living with diabetes and this number is expected to increase up to 592 million by 2035, according to the International Diabetes Foundation. Genetic and environmental factors both contribute to diabetes. It is known that risk of type1-diabetes onset in childhood is higher in children delivered by C-section, where there is also an altered microbiota composition. In addition a large body of evidence suggests that probiotic supplementation can reduce inflammatory responses, often associated with the autoimmune destruction of pancreatic beta cells causing type-1-diabetes. Also, others have shown that when mice, genetically pre-disposed to developing type-1-diabetes, were fed a probiotic, VSL#3, it was found to prevent them from developing the disease.

Stanton's group are currently looking at ways of manipulating the "diabetic gut microbiota" using probiotics to increase insulin production and/or reduce diabetic-associated intestinal damage (enhanced intestinal leakiness, "leaky gut" associated with diabetes). The hope is to one day treat early-stage or moderate insulin insufficiency with probiotic bacteria which beneficially manipulate the gut bacteria composition. This study was the first to employ advanced DNA sequencing to identify the species of gut bacteria affected following direct onset and progression of type-1-diabetes and is a crucial step in furthering our understanding.

This research is published in the journal *Microbiology* E. Patterson, T.M. Marques, O. O' Sullivan, P. Fitzgerald, G.F. Fitzgerald, P.D. Cotter, T.G. Dinan, J.F. Cryan, C. Stanton and R. P. Ross "Streptozotocin-induced type-1-diabetes disease onset in male Sprague-Dawley rats is associated with an altered intestinal microbiota composition and decreased diversity"

<http://mic.sgmjournals.org/content/early/2014/11/04/mic.0.082610-0.short>