Study identifies specific bacteria which precede autoimmune diabetes

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A study led by Matej Oresic from VTT Technical Research Centre of Finland suggests that autoimmune diabetes is preceded by diminished gut microbial diversity of the Clostridium leptum subgroup, elevated plasma leptin and enhanced glucose-stimulated insulin secretion.

In collaboration with the DIPP - Finnish Type 1 Diabetes and Prediction study, VTT researches have previously found that specific metabolic disturbances precede early β-cell autoimmunity markers in children who subsequently progress to type 1 diabetes. However, the question remained what are the environmental causes and tissue-specific mechanisms leading to these disturbances?

Matej Orešič from VTT Technical Research Centre of Finland and collaborators Eriika Savontaus from the University of Turku, Samuel Kaski from Aalto University and Mikael Knip from the University of Helsinki set out to address this question, and the results were published on October 27, 2011 in *PLoS Computational Biology* journal.

The team carried out a study using non-obese diabetic (NOD) mice that recapitulated the protocol used in the DIPP clinical study, followed up by independent studies in which NOD mice were studied in relation to the risk of diabetes progression. Researchers found that young female NOD mice that later progress to autoimmune diabetes exhibit the same metabolic pattern as prediabetic children. These metabolic changes are accompanied by enhanced glucose-stimulated insulin secretion, upregulation of insulinotropic amino acids in islets, elevated plasma

leptin and adiponectin, and diminished gut [microbial diversity](#) of the [Clostridium](#) leptum subgroup.

The elucidation of early metabolic pathways associated with progression to Type 1 diabetes points to novel avenues for early disease prevention. The ongoing efforts of VTT researchers are focused on the potential of specific bacteria from the C. leptum subgroup to help prevent Type 1 diabetes.

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The environmental factors and molecular mechanisms leading to Type 1 diabetes are poorly understood and of great public health interest. The incidence of inflammatory and autoimmune diseases is rising faster than for any other major disease, and these diseases are affecting a wide spectrum of the population. The number of new cases of Type 1 diabetes in European children less than 5 years of age is expected to double between 2005 and 2020.

Provided by VTT Technical Research Centre of Finland

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