

Dissertation release

07.03.2017

The human gut microbiota is implicated in the onset of type 1 diabetes

Title of the dissertation Metagenomic analyses of the human gut microbiome reveal connections to the immune system

Contents of the dissertation The gut microbiota, the community of microorganisms in the gastrointestinal tract, is an important factor in human health and is also implicated in many diseases. This thesis investigated connections between the gut microbiota and autoimmune diseases, specifically type 1 diabetes (T1D), in early childhood.

Stool samples collected from over 200 Finnish, Estonian and Russian infants were analyzed using modern DNA-sequencing techniques. This thesis contributes methodology for computational analysis of these data. We found a novel connection between a common bacterial surface molecule, lipopolysaccharide (LPS), and immune response. We showed that LPS-types found in Finnish and Estonian infants predisposed them to T1D. We also found out that recurrent antibiotic treatments lead to decreased microbial diversity and increase antibiotic resistance genes.

The thesis also includes an investigation of connections between the gut microbiota and health in 1135 healthy Dutch adults, and a fecal microbial transplantation study for 19 patients with active Crohn's disease.

According to the results of this thesis it is evident that the gut microbiota is involved in T1D pathogenesis. In the future, we will investigate, e.g., if probiotics provide protection against early onset T1D.

Field of the dissertation Bioinformatics

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Time of the defence 24.3.2017 at 12:00

Place of the defence Aalto University School of Science, lecture hall AS1, Maarintie 8, Espoo

Opponent Associate Professor David Berry, University of Vienna, Itävalta

Custos Professor Harri Lähdesmäki, Aalto University School of Science, Department of Computer Science

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