

Linking diet, gut immunity and microbiota in the pathogenesis of Type 1 Diabetes

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Abstract

Recent data indicate that gut immunity and the mechanisms that regulate effector and regulatory T cell differentiation in the intestine are instrumental to maintain immune tolerance towards self-tissues and to prevent extra-intestinal autoimmune diseases. This observation led to the hypothesis that environmental factors as diet and microbiota modifications, affect the pathogenesis of autoimmune Type 1 Diabetes (T1D). To this aim, we analysed gut mucosal immunity in tissue samples isolated from the small intestine of T1D patients and healthy controls (HC). A phenotypical analysis of gut mucosal immune cell subsets have been performed. We observed a statistically significant increase of Th22 cells and CD1c+CX3CR1+ dendritic cells (DCs) in the gut of T1D patients compared to HC. In order to find if there is a correlative link between diet component and immune cells subsets, we are collecting a 3-days-food record questionnaire from T1D patients. At this stage we still have not found correlations between the percentage of different Th subsets and content of fibre and polyunsaturated/saturated fat from the diet. Gut microbiota of brushing material from duodenum was analyzed by 16S rRNA sequencing. We also investigated if different type of diet can influence autoimmunity in preclinical models of T1D. In particular if a high fat diet can activate the diabetogenic T cells in BDC2.5 mice, and whether if an anti-inflammatory diet enriched in fibres and omega3 can reduce gut inflammation and protect NOD mice from T1D. We further aim at elucidating the link of gut immunity alterations and environmental factors that might have a strong impact on T1D.

Biography

Ilaria Cosorich has completed master's degree in Garvan institute of Medical Research and from then she started working as a Research assistant at Diabetes Research Institute and further she graduated her doctorate from University Vita-Salute San Raffaele University. Her project is focused on intestinal immunology and nutrition in type 1 diabetes and multiple sclerosis. Currently she is pursuing Post-doctorate at San Raffaele Hospital.

Publications

CCR9 expressing T helper and T follicular helper cells exhibit site-specific identities during inflammatory disease.

Increased iNKT17 Cell Frequency in the Intestine of Non-Obese Diabetic Mice Correlates With High Bacteroidales and Low Clostridiales Abundance.

Experimental colitis in IL-10-deficient mice ameliorates in the absence of PTPN 22.

Loss of gut barrier integrity triggers activation of islet-reactive T cells and autoimmune diabetes.

New therapeutic perspectives in Type 1 Diabetes: dietary interventions prevent β cell-autoimmunity by modifying the gut metabolic environment.



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