

# Deficient regulators in the immune system responsible for type 1 diabetes

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The main regulators of the immune system, called CD4+Treg cells, are thought to be highly involved in a large range of immune diseases. The gradual reduction in their regulating capacity seems to play a critical role in the onset of type 1 diabetes, as demonstrated in the latest study by Dr. Ciriaco Piccirillo, a researcher in the Department of Microbiology and Immunology at the Research Institute of the McGill University Health Centre and the principal investigator for this project. This study was published this month in the journal *Diabetes*.

The immune system needs to be regulated so that it attacks only the site of an inflammation and focuses its attack on pathogens rather than on the body tissues, causing an autoimmune disease.

In a healthy patient, CD4+Treg cells deactivate any T lymphocytes, a type of immune cell, that are misprogrammed and could attack the body. Dr Piccirillo's research indicates that in type 1 diabetic patients this control mechanism may be deficient, thereby allowing the misprogrammed T lymphocytes to proliferate and gain the ability to destroy the insulin-producing cells of the pancreas. This leads to type 1 diabetes.

“We have been able to demonstrate this in mice with type 1 diabetes, and other genetic studies have shown that this same mechanism is applicable to humans,” explained Dr. Piccirillo. Dr Piccirillo is an assistant professor at the McGill University, and the Canada Research Chair in Regulatory Lymphocytes of the Immune System. “Furthermore, the

predominant role of nTreg cells leads us to believe that they are also involved in other autoimmune pathologies. Finding this common denominator among diseases that were previously thought to be unrelated is a very promising avenue for future study”, he adds.

Although the mechanism of action of CD4+Treg cells has not yet been completely unravelled, the scientific community generally accepts that this mechanism is of crucial importance to the entire immune system. Major fundamental and applied research efforts are currently being directed down this path and aim to clarify the role of CD4+Treg cells in order to develop innovative cellular therapies that could restore immune stability in patients.

“The eventual hope is to treat the cause of type 1 diabetes and other autoimmune diseases and not just their symptoms, as we do today”, says Dr Piccirillo.

Source: McGill University Health Centre

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