

'Healthy' fat tissue could be key to reversing type 2 diabetes

January 28 2015



Dr. Axel Kallies (L), Dr. Ajith Vasanthakumar and colleagues have found a signalling molecule could prevent inflammation in fat tissue, reversing symptoms of type 2 diabetes. Credit: Walter and Eliza Hall Institute

Preventing inflammation in obese fat tissue may hold the key to preventing or even reversing type 2 diabetes, new research has found.

Researchers from Melbourne's Walter and Eliza Hall Institute, with colleagues from the RIKEN Institute, Japan, found they could 'reverse' type 2 [diabetes](#) in laboratory models by dampening the inflammatory response in [fat tissue](#).

Dr Ajith Vasanthakumar, Dr Axel Kallies and colleagues from the

institute discovered that specialised immune cells, called regulatory T cells (Tregs), played a key role in controlling [inflammation](#) in fat tissue and maintaining insulin sensitivity. The findings were published in the journal *Nature Immunology*.

More than 850,000 Australians are estimated to have type 2 diabetes, which is the most common type of diabetes, and its prevalence is rising. The disease is strongly linked with 'lifestyle' factors, such as being overweight or having [high blood pressure](#). Long-term complications of type 2 diabetes include kidney, eye and heart disease, and there is no cure.

People with type 2 diabetes have reduced sensitivity to insulin, a hormone that normally triggers uptake of glucose by cells, and their cells no longer respond to insulin appropriately. This decrease in [insulin sensitivity](#) is thought to be a result of long-term, low-level inflammation of fat tissue in people who are obese.

Dr Vasanthakumar said Tregs acted as the guardians of the immune system, preventing the immune response from getting out-of-hand and attacking the body's own tissues. "When Treg numbers are reduced, inflammatory diseases such as diabetes and rheumatoid arthritis can occur," he said.

Recent studies have shown that fat tissue has its own unique type of Tregs, which disappear from fat tissue during obesity. "The fat tissue of obese people has lower numbers of Tregs than the fat tissue of people in a healthy weight range," Dr Vasanthakumar said. "Without Tregs, inflammation-causing cell levels increase, and this rise in inflammation can lead to insulin resistance and high [blood glucose levels](#), a classic hallmark of type 2 diabetes."

The research team discovered a key hormone called IL-33

(interleukin-33) was able to selectively boost Treg populations in fat tissue, effectively halting the development of type 2 diabetes, or even reversing the disease in preclinical models.

"Treating fat tissues with IL-33 restored normal Treg cell levels, which reduced inflammation and decreased blood glucose levels," Dr Vasanthakumar said. "Treatments that mimic IL-33 could have the potential to reduce obesity-related inflammation and [type 2 diabetes](#)."

Dr Kallies said the research underscored the importance of 'healthy' fat tissue in maintaining a healthy body. "We can no longer think of fat tissue simply as energy storage," Dr Kallies said.

"Fat tissue is increasingly being recognised as a crucial organ that releases hormones and regulates development. Keeping our fat tissue healthy is important for our general wellbeing, and our research highlights the important role it plays in preventing disease."

More information: "The transcriptional regulators IRF4, BATF and IL-33 orchestrate development and maintenance of adipose tissue–resident regulatory T cells", *Nature Immunology*, www.nature.com/ni/journal/vaop...nt/full/ni.3085.html

Provided by Walter and Eliza Hall Institute

Citation: 'Healthy' fat tissue could be key to reversing type 2 diabetes (2015, January 28) retrieved 20 April 2024 from <https://medicalxpress.com/news/2015-01-healthy-fat-tissue-key-reversing.html>

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