

Obesity and diabetes: immune cells in fat tissue explain the link

John Wentworth has found that immune cells in fat tissue explain the link between obesity and diabetes.

Inflammation-causing cells in fat tissue may explain the link between obesity and diabetes, a team of Walter and Eliza Hall Institute researchers has shown.

The discovery, by Professor Len Harrison and Dr John Wentworth from the institute's Autoimmunity and Transplantation division, opens the way for new anti-inflammatory treatments that prevent insulin resistance (where the body is unable to respond to and use the insulin it produces) and other complications associated with obesity.

"We have shown that insulin resistance in human obesity is closely related to the presence of inflammatory cells in fat tissue, in particular a population of macrophage cells," Professor Harrison said.

Macrophages, white blood cells derived from the bone marrow, are immune cells that normally respond to infections. In obese people, macrophages move into the fat tissue where they cause inflammation and release cytokines, which are chemical messenger molecules used by immune cells to communicate. Certain cytokines cause cells to become resistant to the effects of the hormone insulin, leading to diabetes and heart disease.

Professor Harrison and Dr Wentworth worked with Mr Gaetano Naselli, Ms Belinda Phipson and Dr Gordon Smyth at the institute as well as Professor Paul O'Brien at Monash University's Centre for Obesity Research and Education to analyse the fat tissue of more than 100 Victorians who had undergone lapband surgery.

Their findings, published in the journal *Diabetes*, provide the first evidence in humans that macrophages in the fat tissue are producing cytokines that prevent cells from appropriately responding to the presence of insulin.

"The complications of obesity such as insulin resistance and diabetes, cardiovascular disease associated with hardening of the arteries, and liver problems are the result of inflammation that occurs in the fat tissue," Professor Harrison said. "These complications could be prevented by developing drugs that target certain cytokines released by the macrophages.

"Encouragingly, our study also showed that when obese people lost weight the macrophages in the fat tissue disappeared, as did the risk of developing insulin resistance and diabetes."

Diabetes affects more than a million Australians and is a disease in which the body does not produce or properly use insulin, a hormone necessary to convert sugar, starches and other food into the energy needed for daily life.

This research was supported by the Australian National Health and Medical Research Council, the Victorian Government, Diabetes Australia Research Trust and the Royal Australasian College of Physicians Research and Education Foundation.

The DRFWA commends Professor Harrison and his team on these research findings and the hope this brings to many who live with diabetes.

Please join us in our quest to find a cure for diabetes – ph: 08 9224 1006
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