

Scarring key to link between obesity and diabetes

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The team, in collaboration with University Hospital Aintree, the University of Warwick and researchers in Sweden, found that people classified as obese and those with pre-diabetes have raised levels of a protein called SPARC, that can cause tissue scarring. The research revealed that an increase in insulin, a hormone that controls blood sugar levels, and leptin, a hormone that regulates appetite, can trigger an increase in SPARC, which can prevent the proper storage of fat in fat tissue cells.

It is thought that leptin, in an attempt to balance energy levels in the body, could trigger SPARC to limit the storage of fat. SPARC can do this by increasing the formation of scars in [fat tissue](#), which can prevent fat being stored safely in the body. Researchers found that this process could predispose obese patients to type 2 diabetes.

Professor John Wilding, from the University's School of Clinical Science, explains: "We tested fat tissue of patients at University Hospital Aintree and found that an increase in leptin also increases SPARC levels, which reduces the safe storage of fat through the development of abnormal tissue scarring. Scarring of fat tissue is known to increase as we gain weight and we found that this is exacerbated by leptin, as well as an increase in [insulin](#), produced by the [pancreas](#)."

Dr Katarina Kos, lead author of the research, added: "Leptin is produced in [fat cells](#) to regulate appetite, but the body becomes resistant to the effects of [appetite](#) reduction in obese patients. Leptin continues to

increase in response to overall fat mass and promotes scarring through increased SPARC levels. Once scarring occurs, the excess nutritional energy from fat cannot be taken up by fat cells and so remains in the blood and begins to gather around organs. As a result, fat cells of people classified as obese, may not fulfil their natural purpose to store fat."

Diabetes is caused by the cells' inability to respond to insulin, which would normally enable uptake of sugar from the blood. To compensate, the pancreas creates more insulin to clear blood sugar from the circulation. The pancreas becomes exhausted and is unable to produce sufficient insulin to keep up with the demands of the body. This results in the development of [type 2 diabetes](#), which can cause problems such as lack of energy to the cells and, over time, damage to the eyes, kidneys and heart.

The research team, working with the Swedish fast food study group at Linköping University, also found that weight gain, induced by more than doubling calorie intake through eating 'junk food', causes SPARC levels to increase by 33%. In a further study with the University of Gothenburg, scientists found that a reduced calorie diet can decrease SPARC levels and the stimulus for tissue scarring.

Researchers are now investigating why some people are more prone to fat tissue scarring than others and how further understanding of SPARC could contribute to future treatments for diabetes.

More information: The research is published in the journal, *Diabetes*.

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