

Type 2 diabetes reversed by losing fat from pancreas

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A team from Newcastle University, UK, has shown that Type 2 diabetes is caused by fat accumulating in the pancreas—and that losing less than one gram of that fat through weight loss reverses the diabetes.

Affecting two and a half million people in the UK—and on the increase—Type 2 diabetes is a long-term condition caused by too much glucose, a type of sugar, in the blood.

The research led by Professor Roy Taylor is being published online today in *Diabetes Care* and simultaneously he is presenting the findings at the World Diabetes Conference in Vancouver.

Bariatric surgery

In a trial, 18 people with Type 2 diabetes and 9 people who did not have diabetes were measured for weight, [fat levels](#) in the pancreas and insulin response before and after [bariatric surgery](#). The patients with Type 2 diabetes had been diagnosed for an average of 6.9 years, and all for less than 15 years.

The people with Type 2 diabetes were found to have increased levels of fat in the pancreas.

The participants in the study had all been selected to have [gastric bypass surgery](#) for obesity and were measured before the operation then again

eight weeks later. After the operation, those with Type 2 diabetes were immediately taken off their medication.

Both groups lost the same amount of weight, around 13% of their initial body weight. Critically, the pool of fat in the pancreas did not change in the non-diabetics but decreased to a normal level in those with Type 2 diabetes.

This shows that the excess fat in the diabetic pancreas is specific to Type 2 diabetes and important in preventing insulin being made as normal. When that excess fat is removed, insulin secretion increases to normal levels. In other words, they were diabetes free.

Drain excess fat out of the pancreas

Professor Taylor of Newcastle University who also works within the Newcastle Hospitals as part of the Newcastle Academic Health Partners said: "For people with Type 2 diabetes, losing weight allows them to drain [excess fat](#) out of the pancreas and allows function to return to normal.

"So if you ask how much weight you need to lose to make your diabetes go away, the answer is one gram! But that gram needs to be fat from the pancreas. At present the only way we have to achieve this is by calorie restriction by any means—whether by diet or an operation."

In patients who had started with Type 2 diabetes, fat levels in the pancreas (pancreatic triglyceride) decreased by 1.2% over the 8 weeks. Very exact methods were needed to be able to measure this and a new method using a special MRI scan was developed. With an average pancreas for a person with Type 2 diabetes having a volume of 50 ml, this is the equivalent of around 0.6 grams of fat.

However, the patients who had never had diabetes saw no change in the level of fat in their pancreas demonstrating that the increase in fat in the pancreas is specific to people who develop Type 2 diabetes. Importantly, individuals vary in how much fat they can tolerate in the pancreas before Type 2 diabetes occurs.

Transforming the thinking on Type 2 diabetes

Traditionally, Type 2 diabetes has been thought of as a progressive condition, controlled by diet initially then tablets, but which may eventually require insulin injections.

It affects 9% of the global population and was once known as adult-onset diabetes but is now found in young adults and children. It causes too much glucose in the blood due to the pancreas not producing enough insulin—a hormone which breaks down glucose into energy in the cells—together with insulin resistance, a condition in which the body responds poorly to insulin.

Previous work by Professor Taylor and his team highlighted the importance of [weight loss](#) through diet in reversing Type 2 diabetes. This work in 2011 transformed the thinking in diabetes as it was the first time that it had been demonstrated that diet could remove fat clogging up the pancreas allowing normal insulin secretion to be restored.

Professor Taylor adds: "This new research demonstrates that the change in level of fat in the pancreas is related to the presence of Type 2 diabetes in a patient. The decrease in pancreas fat is not simply related to the weight loss itself. It is not something that might happen to anyone whether or not they had diabetes. It is specific to Type 2 diabetes.

"What is interesting is that regardless of your present body weight and how you lose weight, the critical factor in reversing your Type 2 [diabetes](#)

is losing that 1 gram of [fat](#) from the [pancreas](#)."

Newcastle Academic Health Partners is a collaboration involving Newcastle University, Newcastle Upon Tyne Hospitals NHS Foundation Trust and Northumberland, Tyne and Wear NHS Foundation Trust. This partnership harnesses world-class expertise to ensure patients benefit sooner from new treatments, diagnostics and prevention strategies.

Provided by Newcastle University

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