Type 2 diabetes remission is possible even in people with lower body weight, supporting idea of 'personal fat threshold'

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Everyone has a "personal fat threshold," which if exceeded, will allow type 2 diabetes (T2D) to develop, even if they are of a lower body

weight, the annual meeting of the European Association for the Study of Diabetes (EASD) in Stockholm, Sweden (19-23 Sept), will hear.

The most common form of diabetes, T2D occurs when the pancreas can't make enough insulin (a hormone which helps move the sugar in food into cells for energy) or the insulin it makes doesn't work properly.

Having a BMI over 30 is a risk factor for T2D, and landmark research from Newcastle University has previously shown how and why an intensive weight loss program can put T2D into remission in people who are living with obesity or overweight.

But not everyone with T2D is overweight. Around 15% of T2D diagnoses are in people with normal weight and it is generally assumed the condition has a different cause in such cases.

The ReTUNE Study ("Reversal of Type 2 Diabetes upon Normalisation of Energy Intake in the Non-obese") looked at whether weight loss can also reverse the condition in people with a BMI at or only just above the "normal" range (BMI below 27kg/m^2). This would support the idea that we each have a "personal fat threshold"—a level of body fat we can cope with—and if we go above it, we will develop T2D, even if our weight seems unremarkable.

Twenty men and women with T2D (average BMI 24.8kg/m^2, average age 59.0 years) took part in the study. They followed a weight loss program in which they consumed 800 calories a day (from low-calorie soups and shakes and non-starchy vegetables) for two weeks, followed by four to six weeks in which they kept their new weight steady. They completed up to three rounds of this diet/weight maintenance cycle until they had lost 10–15% of their body weight.

Their results at the end of the study were compared to those of a group

of controls—20 people without diabetes who were matched for age, sex and BMI. Fourteen of the 20 participants (70%) with type 2 diabetes went into remission, a similar proportion to previous studies involving participants living with type 2 diabetes and overweight and obesity. Remission is an HbA1c (average blood sugar level) of less than 48mmol/mol for at least 6 months and off all medication. Participants had lost an average of 7.7kg at remission (10.7% of initial weight).

Weight remained stable between 6 and 12 months. Average BMI fell from 24.8 to 22.4 and total body fat fell from 32.1% to 27.7%, matched to the control group of people without diabetes who had an average BMI of 21.5 and 24.6% total body fat.

Special MRI scans showed that levels of fat inside the liver and pancreas fell substantially. Even though the average amount of fat in the liver of the study participants would be regarded as unremarkable at 4.1%, this was around three times higher than in healthy controls of the same weight and it fell to 1.4%, close to the healthy control level. Fat in the pancreas fell from an average of 5.8% to 4.3% and the activity of the insulin-producing cells returned towards normal.

The researchers say that their results clearly demonstrate that T2D is caused by the same factors in normal weight people as it is in those living with overweight or obesity. This is important because doctors tend to assume that T2D has a different cause in those with lower body weights and so they aren't usually advised to lose weight before starting on diabetes drugs, and eventually insulin.

"But if they lost around 10% of their weight, they would have a very good chance of putting their type 2 diabetes into remission," says Professor Roy Taylor, of Newcastle University, Newcastle, UK, the principal investigator on the trial.

The results should also help dispel the stigma that can be attached to a diagnosis of T2D, says Professor Taylor. He explains, "The results also support the personal fat threshold concept that anyone with type 2 diabetes has a little more fat on board than they individually can cope with. This is determined by your genes. Each of us has a threshold level under which they can store fat safely and that this has little to do with BMI. If you develop type 2 diabetes, you simply have more fat inside your body than you can cope with, even if apparently slim. This excess fat spills into your liver and pancreas stopping normal function and causing type 2 diabetes. You only need an extra half gram of fat in the pancreas to prevent normal insulin production.

"I'm often asked, 'Why have I got type 2 diabetes when all my friends are larger than me and do not have diabetes?' The present work answers this conundrum. This should help to remove some of the stigma that attaches to type 2 diabetes. It is clearly a condition which is not 'caused' by being over any level of BMI but by storing a little too much fat inside liver and pancreas, whatever your weight."

The researchers recommend that anyone who has someone with T2D in their family has their blood sugar checked each year, whatever their weight. Regular checks are also advised for anyone who has had diabetes in pregnancy or is not of white European ethnicity.

Provided by Diabetologia

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