New mouse model confirms how type 2 diabetes develops

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Researchers at Lund University in Sweden have developed a new mouse model that answers the question of what actually happens in the body when type 2 diabetes develops and how the body responds to drug treatment. Long-term studies of the middle-aged mouse model will be better than previous studies at confirming how drugs for type 2 diabetes function in humans.

"The animal models for type 2 diabetes studies that have previously existed have not been optimal because they use young mice. Our idea was to create a model that resembles the situation in the development of type 2 diabetes in humans. We generally get the disease in middle age when we start to put on weight and live a more sedentary, and more stressful, life. Our new middle-aged mouse model has enabled us to study long-term physiological effects of the development and treatment of type 2 diabetes in a completely new way", said Bilal Omar, one of the researchers behind the study.

What the Lund researchers have done is to feed normal mice fatty food over a long period from the age of eight months, i.e. middle age, until the end of their natural lives at the age of two. The mice become overweight, and develop high blood sugar levels and reduced insulin release, as expected before the onset of type 2 diabetes.

"Throughout the period we were able to study the process that leads to the development of type 2 diabetes with a lifestyle like that of people predisposed to the condition", said Bilal Omar.

In the study, the researchers could confirm that fatty foods lead to inflammation in the islets of Langerhans in the pancreas, which produce insulin. Researchers have seen inflammation in the islets in people with type 2 diabetes, but in Bilal Omar's view, it is only with the new mouse model that it can really be confirmed. Inflammation in these islets is an important risk factor for type 2 diabetes.

"What was so interesting and exciting was that the mice that were treated with DPP-4 inhibitors, a class of drugs used for type 2 diabetes, did not develop inflammation and they maintained good insulin production. They were still obese, but had normal blood sugar, were otherwise healthy and lived longer", said Bilal Omar.

Researchers have worked for decades and on many fronts to understand the causes and course of diabetes. Models of different diseases are therefore an important tool for the development of new and better drugs, and a requirement to develop the best possible drugs is to understand what is happening on a physiological level.

"The goal is to design drugs and treatments which, if they can't cure the disease, can at least give the patient a better quality of life for several years", said Bilal Omar.

"Another aspect of our findings is that the inflammation in the islets was caused by a high-fat diet. Even if it is too early to draw parallels with the diet of humans, it makes it doubtful whether a high-fat diet over a long period should be recommended, as in the LCHF diet", said Professor Bo Ahrén, another of the researchers behind the study.

More information: Omar, B. et al. Enhanced β-cell function and anti-inflammatory effect after chronic treatment with the dipeptidyl peptidase 4 inhibitor vildagliptin in an advanced age diet induced obesity mouse model, *Diabetologia*, May 2013. link.springer.com/article/10.1 …

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