

# Epigenetic changes could explain type 2 diabetes

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People with type 2 diabetes have epigenetic changes on their DNA that healthy individuals do not have. This has been shown in a major study by researchers at Lund University. The researchers also found epigenetic changes in a large number of genes that contribute to reduced insulin production.

"This shows that the risk of developing type 2 [diabetes](#) is not only genetic, but also epigenetic", said Charlotte Ling, who led the study.

Epigenetic changes occur as a result of factors including environment and lifestyle, and can affect the function of genes. Charlotte Ling and her colleagues have analysed insulin-producing cells of both healthy individuals and patients with type 2 diabetes. The analysis revealed [epigenetic changes](#) in approximately 800 genes in those with type 2 diabetes. Over 100 of the genes also had altered expression and many of these could contribute to reduced insulin production. Reduced insulin production is one of the underlying causes of type 2 diabetes.

In order to work out which is the chicken and which is the egg, i.e. whether the epigenetic changes are a consequence of the disease or if the disease is a result of the changes, the researchers also investigated whether healthy individuals had epigenetic changes caused by age, BMI and raised [blood sugar levels](#).

"We were able to observe that a number of epigenetic changes had already taken place in healthy subjects as a result of age or high BMI,

and were therefore able to conclude that these changes could contribute to the development of the disease", said Charlotte Ling. "Unlike genes that can't be changed, epigenetic changes are reversible", added Tasnim Dayeh, first author of the publication in *PLOS Genetics*.

Drugs that cause epigenetic changes have long been used in the treatment of cancer and epilepsy. The new survey changes the view of epigenetics in relation to diabetes, according to Charlotte Ling.

"It shows that epigenetics is of major significance for [type 2 diabetes](#), and can help us to understand why people develop the condition. This also opens the way for the development of future drugs."

**More information:** *PLoS Genet* 10(3): e1004160. [DOI: 10.1371/journal.pgen.1004160](#)

Provided by Lund University

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