

# Breakthrough in battle against type 2 diabetes

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Dr. Iain J Gallagher. Credit: University of Stirling

Experts from the University of Stirling have made a breakthrough in understanding how people respond to lifestyle treatment for preventing Type 2 diabetes.

The team, including academics from the Faculty of Health Sciences and Sport, discovered a new genomic signature in people whose Type 2 [diabetes](#) status improves following a treatment intervention.

Significantly, it is the first reliable signature for [insulin](#) sensitivity in human muscle.

Scientists believe that the findings—published in leading journal *Nucleic Acids Research* - will inform future research by helping understand why not all people are able to eliminate the risk of the condition by changing their lifestyle.

Dr. Iain J Gallagher, of the University of Stirling, one of the research team, said: "Our hypothesis was that, with sufficient numbers of well characterised subjects and our new analysis methods, we could reveal a robust signature for what is known as 'insulin resistance' - an important precursor for developing Type 2 diabetes.

"Importantly, because we could also examine how the activation status of each 'insulin resistance' gene responded to treatment, we have also discovered a potential explanation for why not all people eliminate their Type 2 diabetes risk by following a lifestyle and exercise training programme."

The team—which included a number of international partners—analysed more than 1,000 [human muscle](#) samples and five distinct treatment regimes. In doing so, they demonstrated that 16 genes are consistently "switched" on or off in muscle tissue—but only in those people whose Type 2 diabetes risk factors improved. In such cases, the gene changes increased the individuals' insulin sensitivity—a measure of how effectively the [hormone insulin](#) is working.

Activation of the signature is impaired in people with poor [insulin sensitivity](#), and is dysregulated to a greater extent following various types

of standard lifestyle treatment.

The signature includes more than 300 measures of gene activity, representing both protein coding and long non-coding [genes](#). It was extensively modelled to take into account body weight and age, as well as exercise capacity.

**More information:** James A Timmons et al, A coding and non-coding transcriptomic perspective on the genomics of human metabolic disease, *Nucleic Acids Research* (2018). [DOI: 10.1093/nar/gky570](https://doi.org/10.1093/nar/gky570)

Provided by University of Stirling

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