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Breakthrough in understanding type-2 diabetes as key genes identified

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The most important genes associated with a risk of developing type-2 diabetes have been identified, scientists report today in a new study.

The research, published online in *Nature*, is the first time the genetic makeup of any disease has been mapped in such detail. It should enable scientists to develop a genetic test to show an individual their likelihood of developing diabetes mellitus type 2, commonly known as type-2 diabetes.

The researchers identified four loci, or points on individuals' genetic maps, which corresponded to a risk of developing the disorder. The scientists, from Imperial College London, McGill University, Canada, and other international institutions, believe their findings explain up to 70% of the genetic background of type-2 diabetes.

In addition, one of the genetic mutations which they detected might further explain the causes behind type-2 diabetes, potentially leading to new treatments. The research revealed that people with type-2 diabetes have a mutation in a particular zinc transporter known as SLC30A8, which is involved in regulating insulin secretion. Type-2 diabetes is associated with a deficiency in insulin and the researchers believe it may be possible to treat it by fixing this transporter.

Professor Philippe Froguel, one of the authors of the study from the Division of Medicine at Imperial College London, said: "The two major reasons why people develop type-2 diabetes are obesity and a family

link. Our new findings mean that we can create a good genetic test to predict people's risk of developing this type of diabetes.

"If we can tell someone that their genetics mean they are pre-disposed towards type-2 diabetes, they will be much more motivated to change things such as their diet to reduce their chances of developing the disorder. We can also use what we know about the specific genetic mutations associated with type-2 diabetes to develop better treatments."

The scientists reached their conclusions after comparing the genetic makeup of 700 people with type-2 diabetes and a family history of the condition, with 700 controls. They looked at mutations in the building blocks, called nucleotides, which make up DNA.

There are mutations in around one in every 600 nucleotides and the scientists examined over 392,000 of these mutations to find the ones specific to type-2 diabetes. The mutations are known as single-nucleotide polymorphisms.

The researchers confirmed their findings by analysing the genetic makeup of a further 5,000 individuals with type-2 diabetes and a family history of the disorder, to verify that the same genetic mutations were visible in these individuals.

Professor David Balding, co-author on the study from Imperial's Division of Epidemiology, Public Health and Primary Care, said: "Until now, progress in understanding how genes influence disease has been painfully slow. This study is one of the first large studies to report results using the new genome-wide technology that governments and research charities have invested heavily in during the past few years.

"Our research shows that this technology can generate big leaps forward. The task now is to study the genes identified in our work more

intensively, to understand more fully the disease processes involved, devise therapies for those affected and to try to prevent future cases," he added.

Source: Imperial College London