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The Diabetes Research Project

A Research Project looking at the causes of type 2 diabetes and funded by Animal Free Research UK has found important insights into the changes that can occur in insulin-producing cells (known as beta cells) in people with diabetes, which could one day help protect them and find new ways to treat the condition.

Both type 1 and type 2 diabetes occur in part because of a loss of beta cells, meaning that the body does not produce enough insulin to regulate blood sugar. However, scientists know that the body retains some beta cells that still function long after diagnosis.

The new research, by the University of Exeter's Animal Free Research UK Centre of Excellence (ARC 2.0), is a step towards being able to protect these cells. Intervening early enough could be a route towards treating or preventing diabetes.

Previous research had found that some loss of beta cells occurs because the cells change identity in response to the stresses that can arise from changes in fats or sugars in the blood.

A proportion of these insulin-producing beta cells can become delta cells, which produce a different

Diabetes facts:

By 2035 more than 5 million people will be diagnosed with diabetes in England.

Rising rates of obesity: 66% of men and 57% of women in England are overweight or obese. Almost 10% of children aged 4 to 5 years old and 20% aged 10 to 11 are obese.

To put this in context, **every week more than 500 people with diabetes die prematurely**, with forecast of 169 amputations, 680 strokes, 530 heart attacks and more than 2,000 cases of heart failure.



ARC 2.0 (Animal Replacement Centre of Excellence) at the University of Exeter is making headlines in the scientific community with breakthrough projects like this one.



Dr Nicola Jeffery and her team have identified the gene which is responsible for turning insulin producing beta cells into delta cells, leading to diabetes.

hormone, somatostatin. This can further reduce the body's ability to respond to insulin.

Now, scientists have identified the gene responsible for changing the identity of beta cells in response to stress. Dr Nicola Jeffery conducted laboratory tests using entirely human cells and reagents.

By identifying which genes were differently activated in the cells which had changed, and inactivating these in turn, she found that a gene called HNRNPD was responsible for turning beta cells into delta cells, in a similar proportion to what the team had previously observed in humans.

Dr Nicola Jeffery, who led the research at the University of Exeter, said:

"Finding the gene responsible for transforming beta cells into delta cells is really exciting. Diabetes is a



major global health challenge, and we urgently need to find new treatments and prevention strategies. If we can intervene early enough, we may be able to protect surviving beta cells and find new routes to helping people continue to produce enough insulin to manage diabetes."

Professor Lorna Harries, who leads the University of Exeter's Animal Free Research UK Centre of Excellence (ARC 2.0), said:

"These are of course early days, and we now need to understand exactly how HNRNPD brings about the changes in pancreatic cell identity we have seen. Once we are armed with that information, we may be able to step in and intervene to prevent these changes in cell identity."

Dr Jarrod Bailey, Science Director at Animal Free Research UK, said:

"This is an exciting and potentially very important discovery, which illustrates the power of focusing on human biology from the off. This could not have been done using animals, due to genetic differences that complicate rather than facilitate our understanding of human diseases like diabetes."

The research is reported in the paper 'Changes to the identity of EndoC- β H1 beta cells may be mediated by stress-induced depletion of HNRNPD', published in *Cell & Bioscience*.



Professor Lorna Harries, who leads animal free research projects at ARC 2.0.

**This research is being entirely funded by donations.
Please support more humane animal free research like this.**