Research suggests that diabetes could be due to failure of beta cell 'hubs'

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The significant role of beta cell 'hubs' in the pancreas has been demonstrated for the first time, suggesting that diabetes may due to the failure of a privileged few cells, rather than the behaviour of all cells.

Researchers used optogenetic and photopharmacological targeting to precisely map the role of the cells required for the secretion of insulin.

The team believe that the findings, published in *Cell Metabolism*, could pave the way for therapies that target the 'hubs'.

Dr David Hodson, from the University of Birmingham, explained, "It has long been suspected that 'not all cells are equal' when it comes to insulin secretion. These findings provide a revised blueprint for how our pancreatic islets function, whereby these hubs dictate the behaviour of other cells in response to glucose."

According to the NHS, there are currently 3.9 million people living with diabetes in the UK, with 90% of those affected having type 2 diabetes.

Type 2 diabetes occurs when the pancreas fails to produce enough insulin to function properly, meaning that glucose stays in the blood rather than being converted into energy.

Beta cells (? cells) make up around 65-80% of the cells in the islets of the pancreas. Their primary function is to store and release insulin and, when functioning correctly, can respond quickly to fluctuations in blood glucose concentrations by secreting some of their stored insulin.

These findings show that just 1-10% of beta cells control islet responses to glucose.

Dr Hodson, who is supported by Diabetes UK RD Lawrence and EFSD/Novo Nordisk Rising Star Fellowships, continued, "These specialised beta cells appear to serve as pacemakers for insulin secretion. We found that when their activity was silenced, islets were no longer able to properly respond to glucose. "

Prof Guy Rutter, who co-led the study at Imperial College London, added "This study is interesting as it suggests that failure of a handful of cells may lead to diabetes".

Studies were conducted on islet samples from both murine and human models.

The team note that, though the findings present a significant step forward in understanding the cell mechanisms, the experiments therefore may not be reflected in vivo, where blood flow direction and other molecule dynamics may influence the role of the hubs and insulin secretion.

More information: *Cell Metabolism*, DOI: 10.1016/j.cmet.2016.06.020

Provided by University of Birmingham

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