

Durable reversal of beta cell failure by calorie restriction

Date/Time (Embargo): Wednesday, 13 September 2017, 09:01 (WEST)

Location: Fröbe Hall

“Using a low energy diet as a tool, it has been possible to identify the cause of type 2 diabetes. The mechanisms underlying the disease can now be understood,” says Prof Roy Taylor, Newcastle University, UK.

In 2008, a new hypothesis, The Twin Cycle Hypothesis, suggested that type 2 diabetes occurs only during long term excess intake of food and would lead to accumulation of excess fat in the liver. This would cause the liver to respond poorly to insulin. As insulin controls the normal process of making glucose, the liver would produce too much glucose. Simultaneously, excess fat in the liver would increase the normal process of export of fat to all tissues. In the pancreas, this excess fat would cause the insulin producing cells to fail.

Importantly, the hypothesis predicted that if the excess food intake was sharply decreased, all the abnormal effects would be reversed. Since then, the hypothesis has been tested and confirmed. The Counterpoint study showed a profound fall in liver fat content resulting in normalisation of hepatic insulin sensitivity within 7 days of starting a very low calorie diet in people with type 2 diabetes. Fasting plasma glucose became normal in 7 days. Over 8 weeks, the raised pancreas fat content fell and normal first phase insulin secretion became re-established, with normal plasma glucose control.

“Subsequently, the Counterbalance study has shown that type 2 diabetes remains reversible for up to 10 years in most people, and also that the complete metabolic normality persists long term, providing weight regain is avoided,” says Prof Taylor. “*In vitro* work has shown that the excess fat in the insulin producing cell causes loss of specialised function. The cells go into a survival mode, merely existing and not contributing to whole body wellbeing. Removal of the excess fat allows resumption of the specialised function of producing insulin. The observations of the clinical studies can now be fully explained.”

He adds: “Surprisingly, it was observed that the diet devised as an experimental tool was actually liked by research participants. It was associated with no hunger and no tiredness in most people, but with rapidly increased wellbeing. The ‘One, Two’ approach used in the Counterbalance study was a defined two phase programme. The Phase 1 is the period of weight loss – calorie restriction without additional exercise. A carefully planned transition period leads to Phase 2 - long term supported weight maintenance by modest calorie restriction with increased daily physical activity.”

The One, Two approach reproducibly brings about 15kg average weight loss. This has since been applied clinically following release of details on the Newcastle University website (<http://www.ncl.ac.uk/magres/research/diabetes/reversal.htm>). Motivated individuals can reverse their type 2 diabetes and remain normoglycaemic over years. The Diabetes Remission Clinical Trial (DiRECT) is now underway to determine the applicability of this general approach to routine Primary Care practice. DiRECT will report 12 month findings in December 2017.

Prof Taylor concludes: “The 2008 Twin Cycle hypothesis has led to a paradigm shift in understanding. Early type 2 diabetes is a potentially reversible condition.”

Contact: Prof Roy Taylor

Newcastle Magnetic Resonance Centre, Newcastle University, UK

Email: roy.taylor@newcastle.ac.uk

Mobile: +44 7946 429123

Or the EASD Press Team: press@easd.org