New sugar a treat for diabetes treatment

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Dr Simeonovic and Professor Parish. Photo by Karen Edwards.

(Medical Xpress) -- Researchers from The Australian National University have discovered a new treatment for Type-1 diabetes – an autoimmune disease which currently affects some 130,000 Australians.

Dr Charmaine Simeonovic and Professor Christopher Parish from The John Curtin School of Medical Research have identified a previously unknown process which causes destruction of the insulin-producing beta cells in the pancreas. The researchers found that the insulin-producing cells need a complex sugar, heparan sulphate, for their survival.

Beta cells are one of five cell types found in the pancreas and produce insulin – a hormone which helps move sugars from the food we eat into cells in our body for energy. In Type-1 diabetes the human body's immune system destroys these cells by mechanisms that are not well

understood.

Dr Simeonovic said that their research has shown that beta cells found in the pancreas need heparan sulphate for their survival and without it they die.

“We’ve discovered that replacement of heparan sulphate in the beta cells rescues the cells from dying and prevents them from damage caused by oxidation. This new work has identified heparan sulphate depletion in beta cells as a major cause of beta cell death.

“We attribute this cell death to loss of the beta cells’ normal defence against damage by oxidation caused by free radicals, or highly chemically reactive atoms, molecules or ions.”

The study also revealed that the autoimmune cells in the immune system damage beta cells by producing the enzyme heparanase, which degrades heparan sulphate in beta cells.

“Treatment with a heparanase inhibitor, PI-88, was shown to preserve heparan sulphate in the beta cells of the pancreas and protect against Type-1 diabetes,” said Dr Simeonovic.

“This has revealed a new understanding of the development of Type-1 diabetes and has identified a new therapeutic strategy for preventing progression of the autoimmune disease and associated complications.”

Professor Parish added that the researchers are already taking the medical breakthrough from the bench to the bedside.

“We’re developing new drugs to take advantage of this discovery. A start-up biotechnology company, Beta Therapeutics, has been set up to translate our findings to the clinic,” said Professor Parish.

The researchers' breakthrough has been published today in *The Journal of Clinical Investigation.*

Provided by Australian National University