**Sensory Neurons Control β Cell Stress and Islet Inflammation in Autoimmune Diabetes**

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**What is Diabetes?**

Diabetes mellitus is a metabolic disorder characterized by hyperglycemia (high blood sugar) and other signs, as distinct from a single disease or condition. Three types: type 1, type 2, and gestational diabetes. Type 1 is usually due to autoimmune destruction of the pancreatic beta cells, which produce insulin. Type 2 is characterized by tissue-wide insulin resistance and varies widely; it sometimes progresses to loss of beta cell function. Gestational diabetes is similar to type-2 diabetes, in that it involves insulin resistance.

**Current Treatments:**

Currently, type-1 diabetes can be treated only with insulin, with careful monitoring of blood glucose levels using blood-testing monitors. Emphasis is also placed on lifestyle adjustments (diet and exercise). Apart from the common subcutaneous injections, it is also possible to deliver insulin by a pump, which allows continuous infusion of insulin 24 hours a day at preset levels and the ability to program doses of insulin as needed at meal times. It is also possible to deliver insulin with an inhaled powder.

**New findings:**

In normal mice, a feedback loop involving islet β cells and sensory neurons expressing TRPV1 maintains balanced levels of insulin and substance P. In NOD mice, insulin secretion by islet β cells fails to properly stimulate the sensory neurons expressing TRPV1 to release neuropeptides due to the presence of a hypofunctional polymorphism in the trpv1 gene. Suboptimal local levels of neuropeptides lead to insulin resistance and β cell stress as well as a local proinflammatory milieu, while physiological cell death of neurons and islet β cells leads to the presentation of auto-antigens by professional antigen-presenting cells (APCs) in draining lymph nodes. Infiltration of Schwann cell and islet-specific T cells is sustained by the local proinflammatory milieu resulting from defective TRPV1 signals in sensory neurons.

**Works Cited:**

Journal:

TRPV1⁺ Sensory Neurons Control β Cell Stress and Islet Inflammation in Autoimmune Diabetes, Cell, Volume 127, Issue 6, 15 December 2006, Pages 1123-1135

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Wikipedia on Diabetes:
http://en.wikipedia.org/wiki/Diabetes#Type_1_diabetes_mellitus

Canadian National Post Article: