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Downregulation of islet hormone-sensitive lipase during long-term high-fat feeding.

AU

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DT

Article

LA

English

ED

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AB

Lipid accumulation in pancreatic beta-cells during high-fat (HF) feeding may be involved in inducing a defective insulin secretion due to lipotoxicity. Hormone-sensitive lipase (HSL) is expressed and active in beta-cells, but its importance for islet dysfunction during the development of type 2 diabetes is not known. In this study, prolonged HF feeding of C57BL/6J mice, resulted in decreased HSL expression in islets, representing only 25 +- 4% of the levels observed in controls. This was paralleled by triglyceride accumulation and blunted insulin secretion both in vivo and in vitro. After switching the HF diet to a LF diet, HSL expression increased 10-fold compared to the HF fed mice. This was accompanied by reduced triglyceride levels and a restored insulin secretion. These results support the notion that HSL plays a critical role in the regulation of intracellular triglyceride levels in beta-cells, and that down-regulation of the enzyme may serve to protect against fatty acid-induced islet dysfunction.

CC

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IT

Major Concepts
Endocrine System (Chemical Coordination and Homeostasis); Enzymology (Biochemistry and Molecular Biophysics); Nutrition

IT

Parts, Structures, & Systems of Organisms
pancreatic beta-cell: endocrine system

IT

Diseases
type 2 diabetes: endocrine disease/pancreas, metabolic disease
Diabetes Mellitus, Non-Insulin-Dependent (MeSH)

IT

Chemicals & Biochemicals
fat: nutrient; fatty acid; hormone-sensitive lipase: downregulation; insulin; lipid: toxicity; triglyceride

ORGN

Classifier
Muridae 86375
Super Taxa
Rodentia; Mammalia; Vertebrata; Chordata; Animalia
Organism Name
mouse (common)
Taxa Notes
Animals, Chordates, Mammals, Nonhuman Vertebrates, Nonhuman Mammals, Rodents, Vertebrates

RN

9001-62-1 (hormone-sensitive lipase)
9004-10-8 (insulin)