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

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Winzell, Maria Sorhede [Reprint Author]; Holm, Cecilia; Ahren, Bo

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Department of Cell and Molecular Biology, Sec. for Molecular Signalling, Biomedical Center, Lund University, S-221 84, Lund, Sweden  
Maria.Sorhede\_Winzell@medkem.lu.se

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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)