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TI

Neuro-humoral regulation of lipolysis: Physiological and pathological aspects.

AU

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SO

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General Review; (Literature Review)

LA

French

ED

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AB

Lipolysis in white fat cells plays a central role in the regulation of energy balance. Triacylglycerols (TAG) stored in the adipocytes are hydrolysed consecutively to hormone sensitive lipase (HSL) activation during the stimulation of lipolysis. HSL catalyses the hydrolysis of TAG to diacylglycerol and then to monoacylglycerol. The hydrolysis of the monoacylglycerol-fatty acid bond is assured by a monoacylglycerol lipase. HSL is phosphorylated by the cAMP-dependent protein kinase. Genomic organization and functional domains of rodent and human hormone-sensitive lipase have recently been studied. Acute regulation of HSL by catecholamines and insulin is well documented. Non-esterified fatty acids and glycerol released by adipose tissue are taken up by other tissues where they are metabolized. The local blood flow in adipose tissue modulates the mobilization and the re-utilization of fatty acids. Local blood flow and lipolysis are regulated by hormonal factors and influenced by a number of physiological factors such as diets, exercise, aging and sex. Insulin and catecholamines are the major hormonal regulators of lipolysis. Their control of lipolysis is subjected to variations according to the anatomical localization of adipose tissue deposits. In human, lipolysis differs in visceral and subcutaneous deposits. Insulin exerts its antilipolytic action through the stimulation of adipocyte phosphodiesterase 3B. Four adrenoceptor subtypes are involved in the adrenergic regulation of white and brown fat cell lipolysis. The control of adenylyl cyclase activity involves stimulatory beta1-, beta2- and beta3-adrenergic receptors and inhibitory alpha2-adrenoceptors. Many clinical disorders are accompanied by alteration in adipocyte lipolysis. Alteration of hormone-sensitive lipase activity and of catecholamine-induced lipolysis have been reported in obesity, familial combined hyperlipidemia, insulin resistance syndrome and diabetes. Changes in beta- and alpha2-adrenoceptor ratios and function as well as impairment of HSL function have been proposed to explain the lipolytic disturbances.

CC

Metabolism - General metabolism and metabolic pathways 13002
Nervous system - General and methods 20501

IT

Major Concepts
Metabolism

IT

Parts, Structures, & Systems of Organisms
adipocyte, lipolytic disorders

IT

Diseases
obesity: nutritional disease
Obesity (MeSH)

IT

Chemicals & Biochemicals
hormone-sensitive lipase; triacylglycerols: hydrolysis

IT Miscellaneous Descriptors

clinical applications; lipolysis: neurohumoral regulation;
pathophysiology; physiology

ORGN

Classifier
Hominidae 86215
Super Taxa
Primates; Mammalia; Vertebrata; Chordata; Animalia
Organism Name
human: patient
Taxa Notes
Animals, Chordates, Humans, Mammals, Primates, Vertebrates

ORGN

Classifier
Rodentia 86265
Super Taxa
Mammalia; Vertebrata; Chordata; Animalia
Organism Name
rodent: animal model
Taxa Notes
Animals, Chordates, Mammals, Nonhuman Vertebrates, Nonhuman Mammals,
Rodents, Vertebrates

RN

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