

Glossary

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Lipoprotein lipase

Lipoprotein lipase is an enzyme that cleaves fatty acids from triacylglycerol contained within lipoproteins. It is an important enzyme involved in the delivery of fatty acids to tissues such as muscle and heart.

Leptin

Leptin is a peptide hormone synthesized by adipocytes that plays a key role in the regulation of appetite and energy expenditure. This can occur through direct actions of leptin on the hypothalamus or via direct actions on peripheral lipid and glucose metabolism.

Diabetic db/db mouse

The genetic leptin-resistant (db/db) mouse possesses a mutation in the leptin-receptor, resulting in a defective leptin-receptor. This leptin-receptor deficiency induces a hyperglycemic-hyperinsulinemic endometabolic environment that results in the development of type 2 diabetes.

Ob/ob mouse

The leptin-deficient (ob/ob) mouse is a genetically mutated mouse in which a leptin deficiency occurs. This leptin deficiency results in the development of a marked obesity, glucose intolerance and insulin-resistance. It is a very common experimental model in which to examine the consequences of leptin deficiency on obesity and insulin-resistance.

Serine/threonine kinase

Kinases are proteins that phosphorylate other proteins, usually resulting in a modification of that protein's function. Serine/threonine kinases are protein kinases that phosphorylate proteins on serine or threonine amino acids.

Acyl-CoA synthetase (MHC-ACS)

Long chain acyl-CoA synthetase is one of the first enzymes in the fatty acid metabolic pathway. It con-

verts long chain fatty acids to long chain acyl-CoA within the cell. Long chain acyl-CoA is then either metabolized by the mitochondria to produce energy, or is used to produce membrane and cellular lipids. MHC-ACS refers to an experimental approach to selectively express acyl-CoA synthetase (ACS) in muscle. This is achieved by linking the ACS gene to the myosin heavy chain (MHC) promoter. The production of transgenic mice from embryonic stem cells that contain the MHC-ACS gene will result in mice that overexpress ACS targeted to muscle.

Peroxisome proliferator-activated receptor alpha (MHC-PPAR α)

Peroxisome proliferator-activated receptor (PPAR α) is a nuclear receptor involved in transcriptional regulation of proteins. PPA0052 α has many functions, including regulating enzymes involved in the control of fatty acid oxidation in the heart. MHC-PPAR α refers to an experimental approach that is used to selectively express Peroxisome proliferator-activated receptor alpha in muscle. This is achieved by linking the Peroxisome proliferator-activated receptor α gene to the myosin heavy chain (MHC) promoter. The production of transgenic mice from embryonic stem cells that contain the MHC-PPAR α gene will result in mice that overexpress PPAR α targeted to muscle.

Glycophosphatidylinositol-linked lipoprotein lipase

One type of post-translational modification of protein involves the addition of a glycophosphatidylinositol (GPI) anchor that facilitates anchoring of proteins to cell membrane. A glycophosphatidylinositol-linkage on lipoprotein lipase is one way of linking lipoprotein lipase to the cell membrane.

Ectonucleotide pyrophosphatase/phosphodiesterase 1

Ectonucleotide pyrophosphatase/phosphodiesterase is a plasma cell membrane glycoprotein that functions to release nucleoside 5'-monophosphates from

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various nucleotides (such as ATP). There has been interest in the ectonucleotide pyrophosphatase/phosphodiesterase since a K121Q polymorphism in the enzyme has been shown to be associated with obesity, glucose intolerance and insulin resistance.

A number of variants of ectonucleotide pyrophosphatase/phosphodiesterase have now been identified to have a primary role in mediating insulin resistance and the development of obesity and type 2 diabetes.

Protein kinase (AMPK) pathway

AMP-activated protein kinase (AMPK) is a widely distributed cellular kinase that is activated during times of metabolic stress. It has been termed a cellular “fuel gauge”, and primarily functions to turn off

energy-consuming pathways and turn on energy-producing pathways during metabolic stress.

Leukotriene B

Leukotriene B is an eicosanoid that is synthesized from arachidonic acid by the 5-lipoxygenase pathway. Leukotrienes are involved in the inflammatory process, as well as in vasoconstriction and vascular permeability.

Endothelin-1 (ET-1)

Endothelin-1 is a vasoactive peptide produced by endothelial cells. Endothelin-1 is a potent vasoconstrictor that acts by binding to endothelin-1 receptors on vascular smooth muscle cells.