Glossary

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Adenine nucleotide translocase 1 (ANT1)

ANT-1 is an enzyme located in the mitochondrial membrane that is responsible for the transport of ATP out of the mitochondrial matrix. It is also a component of the mitochondrial permeability transition (MPT) complex, a protein aggregate connecting the inner with the outer mitochondrial membrane. Recent research interest has focused on the role of the role of this MPT complex in mediating apoptosis. ANT1 has also been impicated as a specific target for the autoantibody response in idiopathic dilated cardiomyopathy.

Cytosolic (CTE1) and mitochondrial (MTE1) thioesterase

Long chain acyl-CoA is both an intermediate in for the synthesis of complex lipids (phospholipids, triacylglycerol, etc) in the cytoplasm, and as a substrate for fatty acid oxidation in mitochondria and peroxisomes. However, an alternative fate of long chain acyl-CoA is to have the CoA group cleaved from the fatty acids by a thioesterase enzyme. This includes either a cytosolic thioesterase (CTE1) or a mitochondrial thioesterase (MTE1). Recent research interest has focussed on these thioesterases because of their potential to prevent the accumulation of potentially toxic levels of long chain acyl-CoA in the cytoplasmic and mitochondrial compartments of cells.

e-NOS

e-NOS stands from endothelial nitric oxide synthase. Nitric oxide synthase is the enzyme responsible for synthesizing nitric oxide. Nitric oxide has received considerable research attention, since it is not only a vasodilator but is also important in numerous other processes, including apoptosis. Nitric oxide synthase produced by e-NOPS in endothelial cells is an important source of nitric oxide.

ec-SOD

Superoxide is a free radical. It is an oxygen molecule that has an unpaired electron. This molecule can react with lipids, proteins, DNA, and RNA, causing tissue damage. Superoxide dimutase (SOD) is present in many cells to detoxify superoxide by converting it to hydrogen peroxide. An isoform of SOD present in endothelial cells called ec-SOCD.

F_0F_1-ATPase

F_0F_1-ATPase is a multisubunit enzyme located on the inner mitochondrial membrane that reversibly synthesizes adenosine triphosphate (ATP) from adenosine diphosphate (ADP). The energy necessary for ATP synthesis is derived from protons moving down a electrochemical gradient from the inter-membrane space into the mitochondrial matrix. Under certain conditions, the normal ATP synthase function can be reversed, resulting in an ATPase activity. The large multisubunit enzyme has an F_O portion located within the membrane, and the F_1 portion located above the membrane. The F_OF_1-ATPase resembles a mushroom, with the head and stalk being the F_1 portion of the enzyme, and the the F_O portion being the base embedded in the membrane.

OXPHOS proteins

Oxidative phosphorylation is a mitochondrial metabolic pathway that uses energy released by the oxidation of nutrients to produce adenosine triphosphate (ATP). Oxidative phosphorylation involves the transfer of electrons from electron donors to electron acceptors such as oxygen, in a redox reaction. These redox reactions release energy, which is used to form ATP. The redox reactions are carried out by a series of proteins located in the inner mitochondrial membrane, called oxidative phosphorylation proteins or ''OXPHOS proteins''. Collectively the OXPHOS proteins constitute what is called the mitochondrial electron transport chain.

Peroxisome proliferator-activated receptor α (PPARα)

PPARα is a nuclear receptor involved in the transcriptional regulation of proteins. PPARα has many

functions, including regulating the expression of many enzymes involved in the control of fatty acid oxidation in muscle.

Reactive oxygen species (ROS)

ROS, or oxygen-derived free radicals, are highly reactive compounds that can react with and damage cellular components (lipid membranes, protein, and DNA/RNA). In order to protect the cell from ROS, cells have a number of different oxygen radical scavenger enzymes that are used to neutralize these free radicals.

Uncoupling proteins (UCPs)

Uncoupling proteins (UCP) are proteins that are present in the inner mitochondrial membrane of cells that dissipate the proton gradient across this membrane. As a result of this action, mitochondrial respiration produces heat instead of ATP. Heart and skeletal muscle contain two isoforms of UCPs, UCP2 and UCP3. The exact function of these UCP's is not clear, but they may be involved in decreasing reactive oxygen species production by the mitochondria or transporting excess fatty acids out of the mitochondria. The expression of UCPs in the mitochondria is increased in muscle exposed to high fats.