

- Shown to exist in 1956 •
 - Phosphorylase modified by phosphorylase kinase
 - Activated by Ca⁺ levels
 - Released during muscle contraction
 - Glycogen broken down

Enzyme cascades and GP/GP

- Hormonal regulation
 - Hormones (glucagon, adrenaline) activate adenylyl cyclase
- Hormones (glucagon, adrenaline) activate adenylyl cyclase cAMP activates kinases and phosphatases that control the mosp orylation of glycogen *phosphorylase* agon vs adrenaline Glycogenolytic Adrenaline Pighoffuen Arts on muscles and line Rapid mobilisation of the
- Glucagon vs adrenaline
 - Glycogenolytic

 - - Acts on muscles and here
 Rapid mobilisation of a
 - Glucagon

.

- □ Maintenance of steady-state glucose levels
- □ Liver only
- The cAMP cascade prompts transition of glycogen phosphorylase to relaxed (active) state
 - Less sensitive to inhibitors
 - Even with high ATP and G-6P phosphorylase is active
- Needs of the organisms outweigh the needs of the cell



- The cAMP cascade moves glycogen synthase to the less active state
 - Less synthesis happens



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Fatty Acids

02 March 2015 11:02

Lipids

- Fats and oils
- Important sources of energy
- Insulation layer
- Cell membranes

Saturated or Unsaturated

- Only single C-C bonds
 - Saturated
- One or more double C=C bonds
 - Unsaturated

Nomenclature

- Carboxylic acid functional group
- Individual fatty acids can be identified by 2 systems
 - n-designation
 - Numbering from methyl end
 - Δ-designation
 - Starts from carboxyl group
- Triacylglycerols in adipose
 Constitute 84% of stored everge)
 Protein 15%
 Crecolydrate <1%
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Fat Storage

Nutritional use

- Other functions
 - Allow fat-soluble nutrients to be absorbed
 - Structural element of cell
 - Components of hormones

Glycerol and FAs

Different Kinds of Lipids

- Triglycerides
 - Energy storage
 - Triglycerides with long saturated fats tend to form hard fats
 - Lard and butter
 - Shorter unsaturated for soft/liquid fats
 - Oil and thin wax
- Phospholipids
 - Main component of cell membranes
 - 2 fatty acid chains
 - These form hydrophobic tail
 - o Hydrophilic head



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Lipoproteins and Transportation

04 March 2015 12:58

Lipid Transport

- Lipids transported as lipoproteins
- Chylomicrons
 - \circ $\,$ Transport cholesterol and lipids to adipose tissues and live via blood
- Very Low Density Lipoproteins
 - Synthesised in liver
 - Transport triacylglycerol and cholesterol from liver to adipose and muscle
 - Lipoprotein lipases degrade VLDL
- LDL
 - Remnants of VLDL
 - Given up triacylglyceride
- HDL
 - Assembled from degradation of other lipoproteins
 - Mop up excess cholesterol and deliver to liver
- The lipoprotein formed depends on the constituent apoprotein and lipids

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Aromatic Amino Acids

• Involve Shikimate and Chorismate pathways



Overview of Amino Acid Synthesis

Oxidative Phosphorylation

18 March 2015 12:46



<u>Mitochondria</u>

- Outer membrane very permeable to small molecules and ions
- Inner membrane almost completely impermeable to ions and polar molecules



- Spontaneous electron transfer through complexes 1, 3, and 4 is coupled to H⁺ ejection from the matrix into the intermembrane space
- Free energy of spontaneous e⁻ transfers conserved as H⁺ electrochemical gradient