Glycolysis

Prerequisites

Knowledge of metabolism

Concept of electron transfer

Concepts of metabolic pathways

RECAP

Fat catabolism takes place in mitochondria

Various enzymes are involved

Electron transfer takes place along with protons

Learning Outcomes

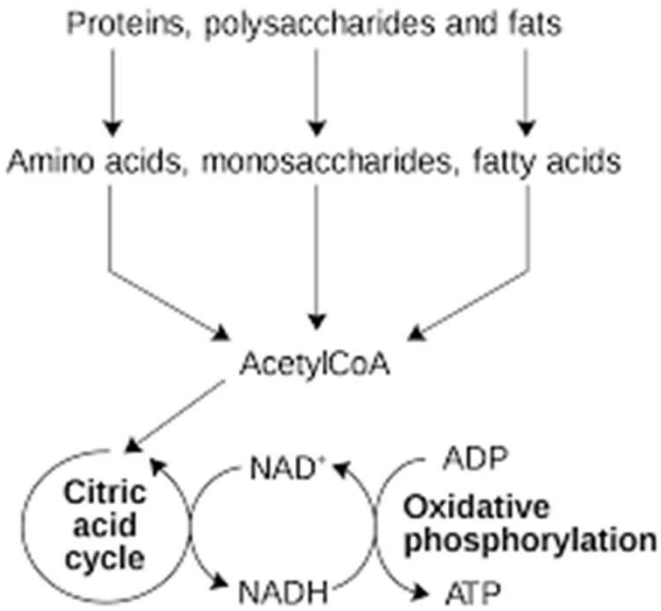
Metabolism of fats & calorie content

Glycolysis – pathway for glucose breakdown

Agents of Electron transfer

Phosphorylation

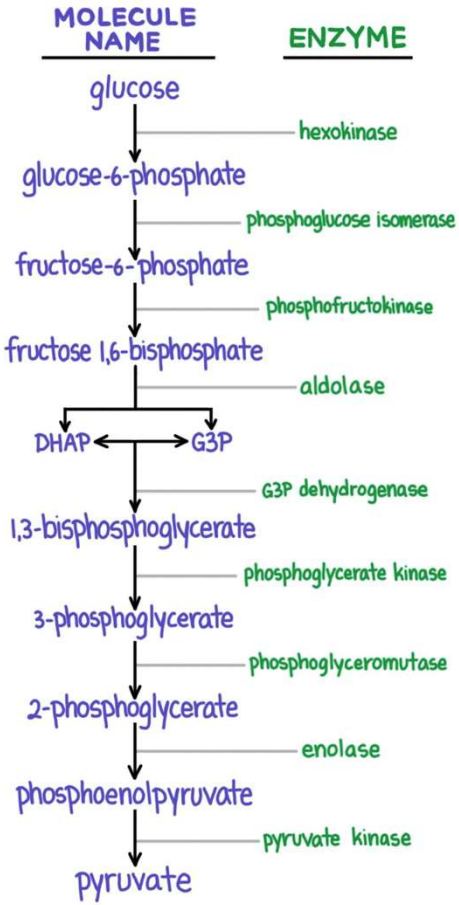
Overview of catabolic pathways of fat and protein

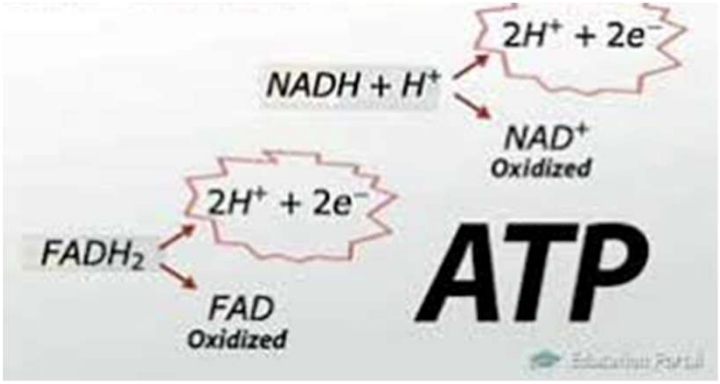


STEPS OF GLYCOLYSIS

Glycolysis does not depend on oxygen and a pathway for metabolism. It is an ancient metabolic pathway. Indeed, the reactions that constitute glycolysis and its parallel pathway, the pentose phosphate pathway, occur metal-catalyzed under the oxygen-free conditions of the oceans, also in the absence of enzymes.

https://www.youtube.com/watch?v=A1nJRoPGkRs

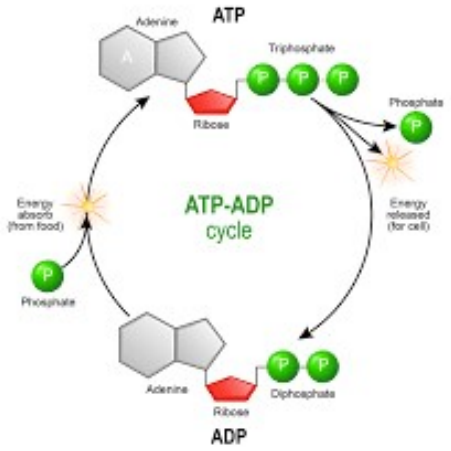




Agents for transfer of electrons in biological redox systems: NAD^+, FAD

Phosphorylation

As a glucose molecule is gradually broken down, some of the breakdowns steps release energy that is captured directly as ATP. In these steps, a phosphate group is transferred from a pathway intermediate straight to ADP, a process known as substrate-level phosphorylation. Many more steps, however, produce ATP in an indirect way. In these steps, electrons from glucose are transferred to small molecules known as electron carriers. The electron carriers take the electrons to a group of proteins in the inner membrane of the mitochondrion, called the electron transport chain. As electrons move through the electron transport chain, they go from a higher to a lower energy level and are ultimately passed to oxygen (forming water). Energy released in the electron transport chain is captured as a proton gradient, which powers production of ATP by a membrane protein called ATP synthase. This process is known as oxidative phosphorylation.



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THANK YOU