

Onwughalu Chiamaka Vivian

18/MHS07/044

BCH204

Assignment: Describe the three (3) stages of beta oxidation. (Show pathways where necessary)

Answer:

Catabolism of fatty acid pathway is beta oxidation.

It is called beta oxidation because the oxidation starts from the beta carbon (the third carbon)

Fatty acid **oxidation** is the mitochondrial aerobic process of breaking down a fatty acid into **acetyl-CoA** units. Fatty acids move in this pathway as CoA derivatives utilizing NAD and FAD.

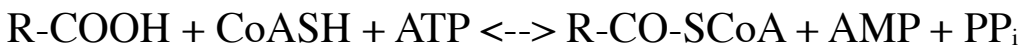
There are three stages of fatty acid oxidation;

- Activation of fatty acid (takes place in the outer mitochondrial membrane) to give fatty acyl CoA
- Transportation of the fatty acid (transport to the mitochondria)
- Oxidation/degradation of the fatty acid (inside mitochondria)

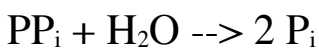
Activation;

Fatty acids are activated by fatty acyl CoA synthetase.

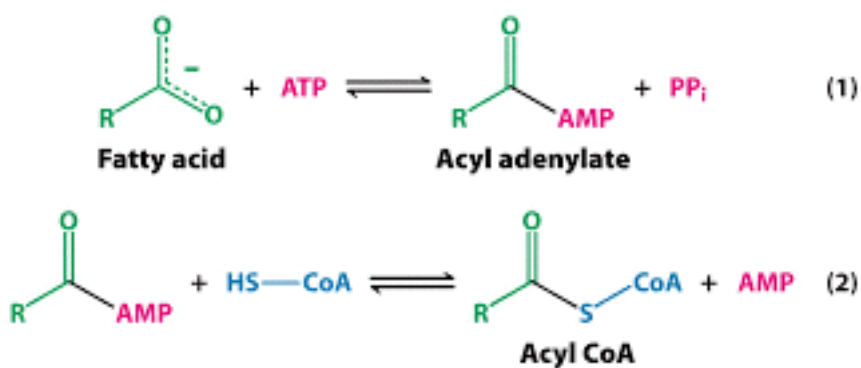
The reaction:



The subsequent hydrolysis of PP_i draws the reaction in the forward direction, maintaining a low cytosolic free fatty acid concentration:



The reaction occurs in the endoplasmic reticulum and the outer



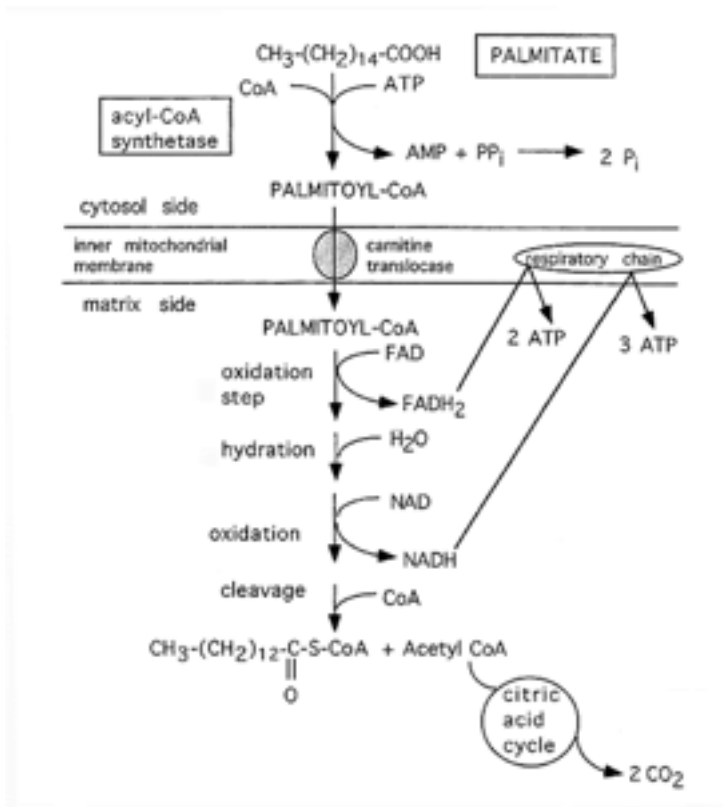
Unnumbered 27 p1666
Biochemistry: A Short Course, Second Edition
© 2011 W. H. Freeman and Company

mitochondrial membrane.

There are different Acyl-CoA Synthetases for fatty acids of different chain lengths. It is associated with endoplasmic reticulum membranes and the outer mitochondrial membrane.

Fatty acid degradation; is the process in which **fatty acids** are broken down into their metabolites, in the end generating **acetyl-CoA**, the entry molecule for the **citric acid cycle**, the main energy supply of animals. It includes three major steps:

- Lipolysis of and release from adipose tissue
- Activation and transport into mitochondria
- β -oxidation



Beta-oxidation is the process by which long chain fatty acyl CoA is degraded. The **products of beta-oxidation** are: acetyl CoA, FADH₂, NADH and H.

THE REACTION OF BETA OXIDATION

This pathway degrades fatty acids, 2C a time.

- Oxidation of acyl CoA by an acyl CoA dehydrogenase to give enoyl CoA.

β oxidation pathway

