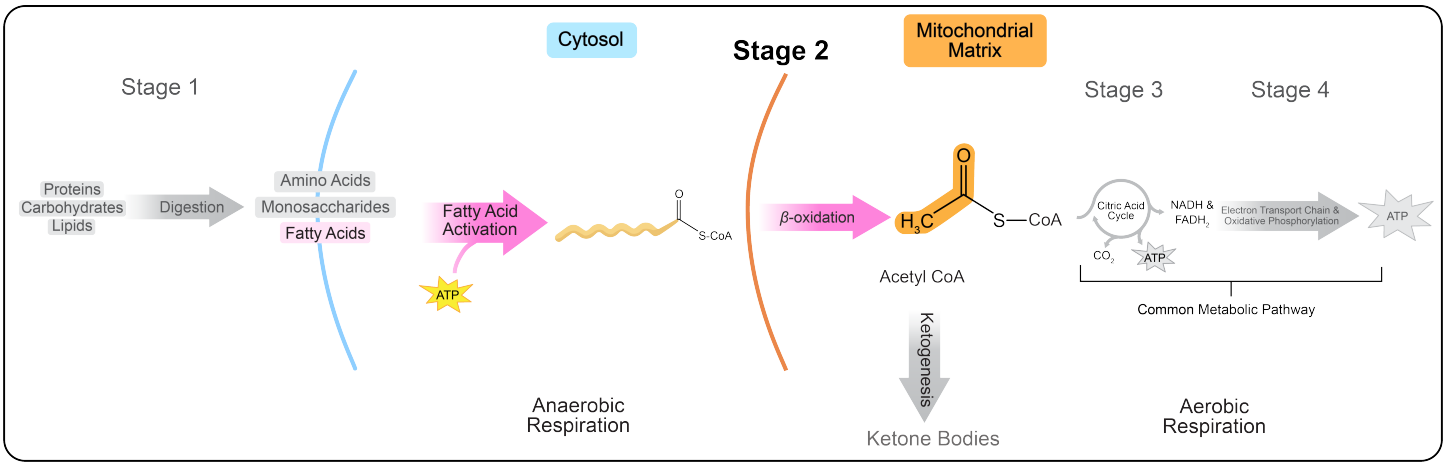
CONCEPT: INTRO TO FATTY ACID OXIDATION

- Fatty acid oxidation is part of stage 2 of food catabolism.
  - □ Oxidizes fatty acids to yield **acetyl CoA** and high-energy molecules (_____ and _____).



- Fatty acids are prepared (activated) for oxidation in the _____.
  - □ Oxidation takes place _____ the mitochondrial matrix.

EXAMPLE: Which of the following statements is not true for fatty acid oxidation?

a) Fatty acid oxidation is a catabolic process that degrades fatty acids to acetyl CoA.

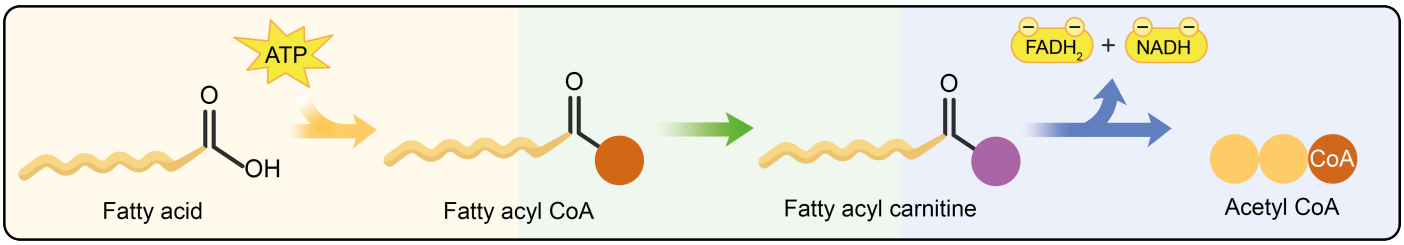
b) Fatty acids are activated in the cytosol and oxidized inside the mitochondrial matrix.

c) High-energy molecules produced in fatty acid oxidation are $FADH_2$ and NADH.

d) Fatty acid oxidation directly produces many ATP molecules.

Phases of Fatty Acid Oxidation

- Fatty acid oxidation takes place in ___ successive phases.
  - (A) **Activation:** prepares fatty acid for oxidation by converting it into fatty acyl CoA.
    - □ Consumes _____.
  - (B) **Transport:** fatty acyl CoA moves from cytosol to the mitochondrial matrix through the CAR (_____) shuttle.
  - (C) **Oxidation:** the β-oxidation pathway breaks the fatty acid chain into _____ acetyl CoA.
    - □ Produces (_____ and _____ in addition to acetyl CoA.



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EXAMPLE: Which of the following is an incorrect description of a phase in fatty acid oxidation?

a) In the cytosol, fatty acids are activated by conversion into fatty acyl CoA.

b) Fatty acids activated by carnitine are transported into the mitochondrial matrix by the malate-aspartate shuttle.

c) Fatty acids undergo β-oxidation in the mitochondrial matrix to produce acetyl CoA, $FADH_2$, and NADH.

d) The carnitine shuttle transports activated fatty acids from the cytosol to the mitochondrial matrix.

PRACTICE: Red blood cells do not have mitochondria. Can red blood cells use fatty acid oxidation to produce energy?

a) Yes

b) No

PRACTICE: For the biochemical pathways listed below, indicate which of the following energy carriers are produced in each: ATP (A), $FADH_2$ (F), NADH (N), or none (X).

a) Glycolysis (_____)

b) β-Oxidation (_____)

c) Kreb's cycle (_____)

d) Fatty acid activation (_____)