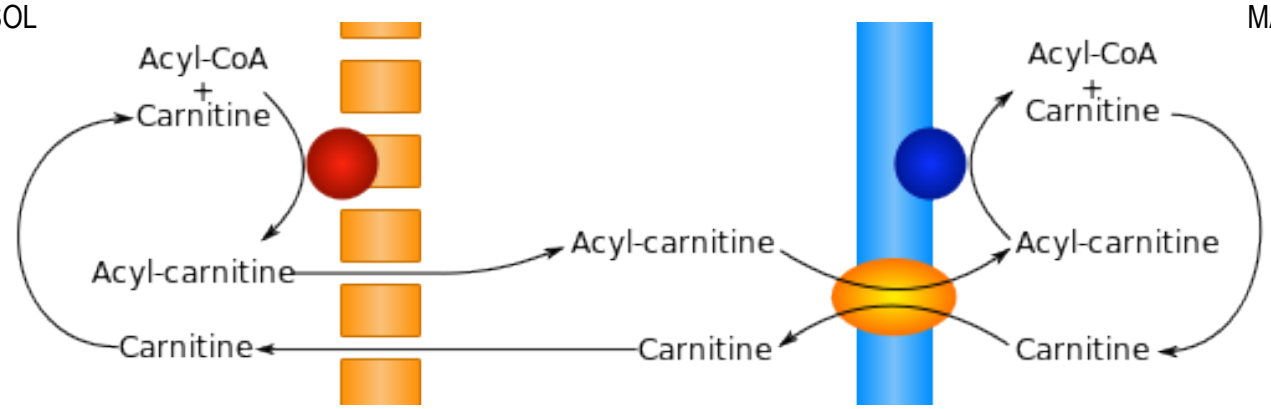
CONCEPT: FATTY ACID OXIDATION

- Fats are used for energy and water storage, and can be broken down into glycerol and fatty acids
  - □ Glycerol can be converted to DHAP (G3P) to enter glycolysis; yields 1 ATP and 2 NADH (nonfermentable sugar)
  - □ Fatty acids undergo ß-oxidation to enter the Citric Acid Cycle as acetyl-CoA (or succinyl-CoA in some cases)
    - Fatty acids are activated by converting them to fatty acyl-CoA (costs "2 ATP", or 2 acid anhydride bonds)
    - Transported into mitochondrial matrix bound to carnitine via antiporter that moves carnitine into cytosol
    - Carnityl acyl transferase I attaches carnitine to fatty acyl-CoA and carnityl acyl transferase II removes it

CYTOSOL MATRIX



- ß-Oxidation – removes 2 carbon units at a time, as acetyl-CoA, from fatty-acyl-CoA; occurs in mitochondrial matrix
  1. Oxidation of an –ane to –ene (acyl-CoA dehydrogenase); FAD→$FADH_2$, like succinate dehydrogenase
  2. Add water to –ene to form alcohol (enoyl-CoA hydratase); like fumarate to malate
  3. Oxidize alcohol (beta-hydroxyacyl-CoA dehydrogenase); NAD^+→NADH, like malate dehydrogenase
  4. Thiolase cleaves off acetyl-CoA, and adds CoA to new end of fatty acid; last round produces 2 acetyl-CoA*