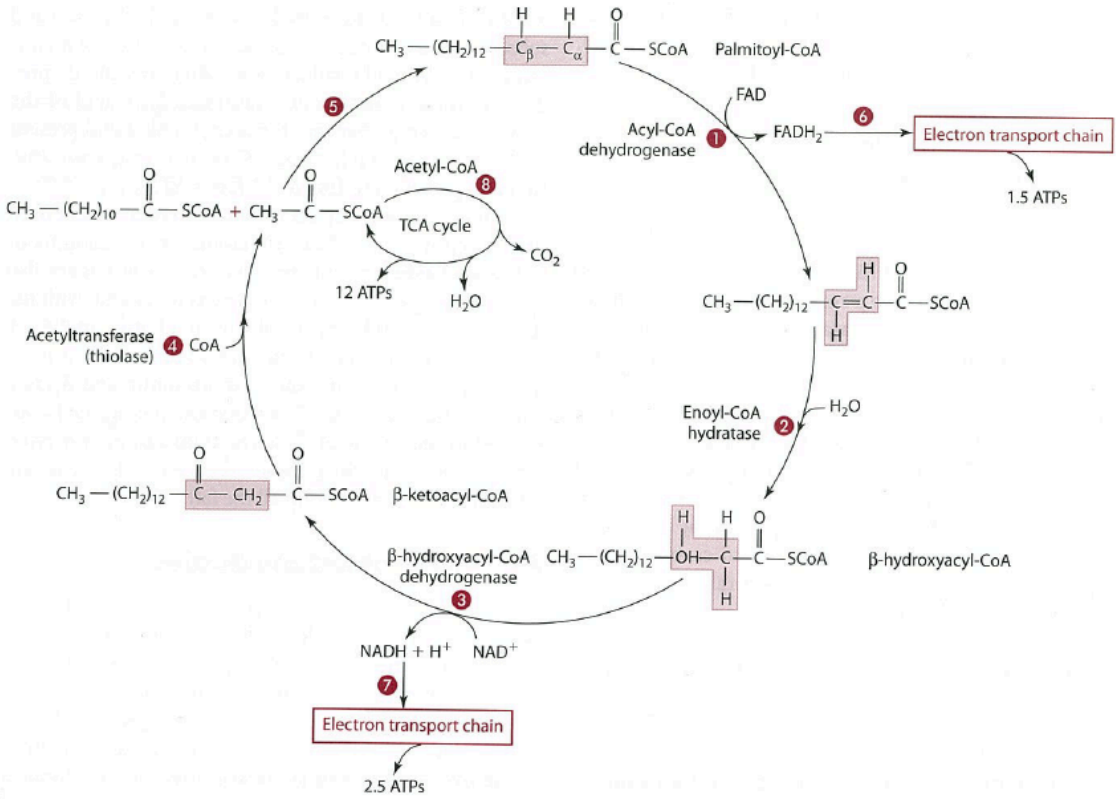
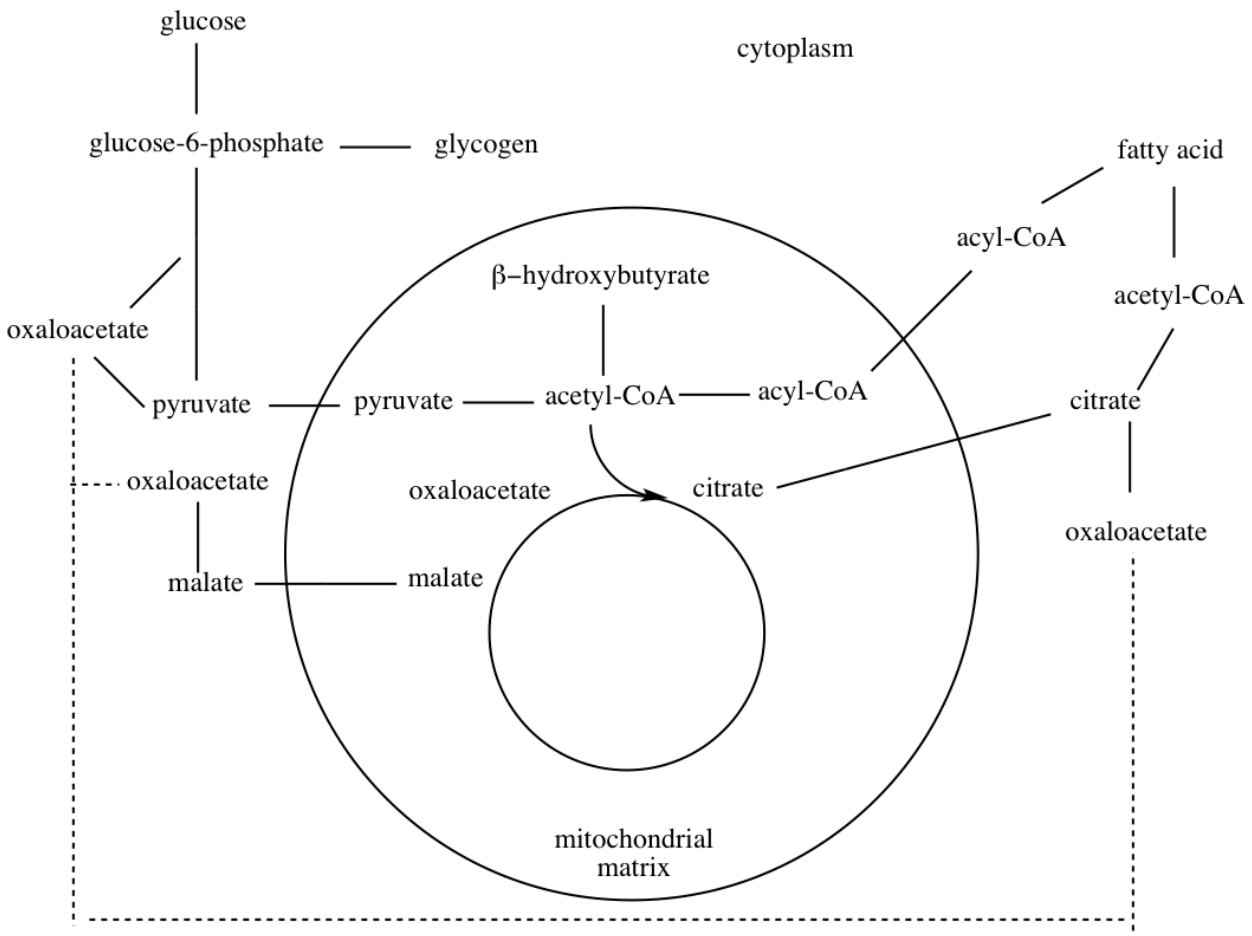
NAME:_____

The image below is Figure 5.24 from your textbook. It depicts the process of β-oxidation within the mitochondria.



1. **Figure 5.24 contains at least one significant error in its depiction of the chemical process of β-oxidation.**
   a. **Identify the error**
   b. **Correct the error**

2. **Describe how to make 1 mL of a solution of cholesterol at 0.1 mM from a stock of 100 mM cholesterol if the smallest volume that you can transfer is 5 µL.**



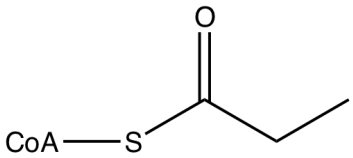
3. **Add "arrow" ends and "X" to line segments in the above image to indicate the flux of metabolism in a fed hepatocyte.**

4. **In the fed state:**
   a. **[Insulin] in the bloodstream is:**
   b. **[Glucagon] in the bloodstream is:**
   c. **[cAMP] in a hepatocyte is:**
   d. **The level of phosphorylation of regulated metabolic enzymes is:**

Eunsook and co-workers [Influence of Liver Triglycerides on Suppression of Glucose Production by Insulin in Men. (2015). **Journal of Clinical Endocrinology and Metabolism 100:** 235-243] found that hepatocytes of subjects with high intrahepatic triglyceride levels produced significantly more glucose when blood insulin levels where elevated approximately 35-fold than subjects with low intrahepatic triglyceride levels.

5. **Explain why the result for subjects with high intrahepatic triglyceride levels is considered abnormal.** Only one to two sentences are need, and only the first two will be graded.

Eunsook and co-workers [Influence of Liver Triglycerides on Suppression of Glucose Production by Insulin in Men. (2015). **Journal of Clinical Endocrinology and Metabolism 100:** 235-243] fed subjects propionate which is converted into propionyl-CoA and metabolized through the citric acid cycle.



propionyl-CoA

6. **To understand how propionyl-CoA is metabolized through the citric acid cycle:**
   a. **Replace a hydride (-H) with a carbonate (-COO$^-$) on C2 using propionyl-CoA carboxylase (analogous to pyruvate carboxylase and acetyl-CoA carboxylase).**
      i. **Draw the chemical structure of the product.**
      ii. **What additional reactants and/or products are involved in this reaction?**

   b. **A mutase moves the carbonate from C2 to C3.**
      i. **Draw the chemical structure of the product.**
      ii. **Name the product.**

7. **Draw <u>and name</u> the products that result from the β-oxidation of acyl-CoA [7:0].**