

1. Do cells exposed to an inhibitor of the carnitine:acylcarnitine antiport still have the ability to synthesize acetyl-CoA from any type of fatty acid? Why?
2. Long chain fatty acids are broken down in the peroxisomes. In the process, the energy from the  $\text{FADH}_2$  produced is used to generate  $\text{H}_2\text{O}_2$ , usually followed by degradation of the  $\text{H}_2\text{O}_2$ . Why is this necessary? (Hint: how is the energy conserved in normal  $\beta$ -oxidation? What is different in the peroxisome?)
3. Triacylglycerols are used to store energy. What percentage of the energy (in terms of ATP per carbon) is incorporated in the three acyl chains of tristearoyl glycerol compared to the energy in the glycerol backbone? (Please assume maximal efficiency of ATP synthesis – *i.e.* 3 ATP/NADH, and 2 ATP/ $\text{FADH}_2$ , remember to subtract activation steps, and **think** about your final answer.)
4. In the  $\beta$ -oxidation of unsaturated fatty acids with even-number position double bonds, the 2,4-dienoyl-CoA reductase uses NADPH to convert two conjugated double bonds into a single double bond. Desaturases use NADH in catalyzing the conversion of single bonds to double bonds.
  - a. Please explain why this is a discrepancy.
  - b. Why do the desaturase enzymes need NADH?
  - c. Which contains more extractable energy: an 18:0 or an 18:1 fatty acid?

Study questions (these do **not** have to be turned in).  
*Lehninger*: Chapter 17 and 21 problems