

Chapter 9 Answers lipids

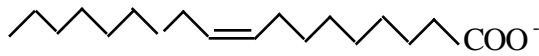
Book study excersizes 1, 2, 3, 4 and 5. Book questions, 1, 4, 6, 8, 9 and 10

1) Arrange the following fatty acids in an increasing order of melting point: *Look at each lipid from the book. Remember as the lipid gets longer or as the more saturated the lipid is the higher the melting point will be.*

Oleate	<i>Linolenate</i>
Lingocerate	<i>Oleate</i>
Stearate	<i>Stearate</i>
Lignolenate	<i>Lingocerate</i>

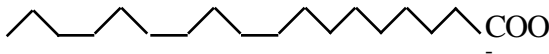
2) Draw and name the following structures:

C 18:1 *cis*-⁹; -9



Palmitate; Hexadecanoic acid

C 18:3 *cis, cis, cis*-^{9, 12, 15}; -3



Linolenic; Octadecatrienoic acid

C 18:1 *cis*-⁹; -9

C 18:3 *cis, cis, cis*-^{9, 12, 15}; -3

3) Describe how triacylglycerols stored in adipose tissue are released into the blood stream?

All of the acylated glycerols are stored in the cytosol of specialized adipose cells. The The acyl chains from the sn3 carbon are hydrolyzed (addition of water across the ester bond) by hormone sensitive lipase. The newly formed free fatty acids can then be transported throughout the body. The transport isn't as a free fatty acid. Instead it is bound and transported by albumin.

4) Explain why aspirin is a potent anti inflammatory agent.

Aspirin acetylates a specific serine in the enzyme cycooxygenase. This will inhibit the formation of prostaglandin synthesis which mediate the inflammation response.

5) Explain the difference in lipid when a trans fatty acid is formed.

Most unsaturations are cis in nature. The resulting cis double bond forms a bend or kink in the fatty acid. Depending on if the acyl chain is bound to a

TAG or a phospholipid, the resulting kink causes an increase in disorder and decreases the number of hydrocarbon chain interactions. The ultimate result is in a lowering of the melting point. A trans desaturation does not result in a bend and the differences in the hydrocarbon chain association is not different. Finally, several studies have found that trans double bonds have been linked to increases in cardiovascular disease.

6) How important is altering the desaturation in arachadonic acid? What are the possible results of such eating omega 3 fatty acids?

The key to this question is to realize that arachanoids are the precursors to the ecosanoids. Some of the omega 3 series of arachidonates lead to different forms of thromboxanes and leukotrienes. This of course will decrease the formation foam cells and decrease the formation of arterial plaques.

7) The female hormone estrogen has a unique feature that is found in no other steroid hormone. What is this feature?

This compound is a sterol that closely resembles testosterone and estradiol. It is likely to exert it's effects by influencing physiological processes that depend on the sex hormones. In fact, it is dehydroepiandrosterone (DHEA) a metabolic precursor of androgens and estrogens.

8) What is the function of diacylglycerol?

DAG is a produce of two different lipases, hormone sensitive lipase and phospholipase C. Diacylglycerol provides an energy storage source – the two remaining acyl chains, and DAG serves to activate protien kinase C. An important signaling protein that phosphorylates several proteins and altering there activities.

9) If you were to incubate phosphatidylinositol with phospholipase D. What would be the most likely product?

- Diacylglycerol and inositol phosphate
- Phosphatidic acid and inositol
- Phosphatidic acid and glycerol
- Phosphatidic acid and choline
- None of the above

None of the above – you should remember that most PLDs are specific for PC, whereas most forms of PLC are specific for PI.

10) T/F Dietary triacylglycerides (TAGs) are transported through the intestinal wall into the lymphatic system unchanged.

F – the TAGs are hydrolyzed transported and reformed across the intestinal tissues

11) In fat cells the initial liberation of fatty acid from triacylglycerol is due to

- a) phospholipase A
- b) triacylglycerolipase
- c) hormone sensitive lipase ****
- d) fatty acid-hydrolyase
- e) I don't know I have only stored fatty acids never released them

12) Aspirin inhibits the formation of:

- a) Steroid hormones
- b) Epinephrine
- c) Glucagon

- d) Prostaglandins ****
 e) Phosphatidic acid
 f) Fatty acids
- 13) The primary storage form of energy in humans is
 a) The big fat head of your professors (be careful)
 b) Glycogen
 c) Glucose
 d) Protein
 e) Triacylglycerol****
 f) myelin
- 14) T/F cholesterol is decreases the membrane fluidity at low levels
- 15) Which of the following are major physiological functions of free fatty acids
 They stabilize the structure of membranes
 They serve as precursors of phospholipids and glycolipids
 They serve as fuel molecules
 They are precursors of triacylglycerol
 They are precursors of certain hormones and intracellular messengers
- 16) A very bright scientist from MSUM has determined that mammals synthesize fatty acids from acetate. How do you think she figured this one out?

