1. Why is olive oil (among other fats) so insoluble in water?

Compare to other fat, olive oil contains less unsaturated bonds.

1. Why are triacylglycerols such a good storage fuel, whereas carbohydrates are better as quick source of energy?

First, triacylglycerols are insoluble in water, whereas carbohydrates need water to solute them.

Second, triacylglycerols provides more energy than carbohydrates.

Third, triacylglycerols can also help animals to against low temperature.

1. Why can’t storage lipids function as membrane lipids? (you can leave this question until you learn Chapter 11).
2. Vegetable oil and solid shortening are both mixture of triacylglycerols. Why is shortening a solid and vegetable oil a liquid at room temperature?

Because triacylglycerols in shortening mainly contain fatty acids with longer chain and less unsaturated bonds.

1. Sheep shearers often have extremely soft, young looking skin on their hands. What aspect of their job might account for this?

Most mammals’ hair is covered by wax. When shearers deal with wool, the wax on wool are stick on their hands. For wax is highly hydrophobic, it prevents the losing of water on shearers’ hands so that keep their hands’ skin soft and young looking.

1. What is the nonpolar portion of phosphatidylcholine?

Fatty acids.

1. What is the molecular basis for the suggestion that ether-linked fatty acids may confer resistance to phospholipases?

In organic chemistry, ester is much more active to be hydrolyzed than ether.

1. Compare sulfolipids and phospholipids. How are they similar? How are they different?

Similar: Contain negative charge. Groups are linked by glycerol

Different: Sulfolipids don’t have phosphates group between glycerol and glucose residues. Sulfolipids mainly exist on chloroplasts membrane in plants, whereas phospholipids can be widely found on bio membranes.

1. What is the polar portion of sphingomyelin?

Phosphocholine or phosphoethanolamine.

1. Why must there be several phospholipases to degrade phospholipids?

Because the reaction needs high activation energy. In this case, this reaction is not easy to react so that enzymes are crucial to catalyze the reaction.

1. How are steroid hormones able to be transported through the aqueous bloodstream?

By binding to specific transport proteins.

1. What are the symptoms of deficiencies of vitamins A and D?

Vit A: Nyctalopia (Night blindness), dryness of skin, eye, and mucous membranes.

Vit D: Rickets and defective bond formation.

1. What are the symptoms of deficiencies of vitamins E and K?

Vit E: Genital system problems.

Vit K: Slows blood clotting.

1. What are the polar and nonpolar portions of each of the following classes of lipids?

a. triacylglycerol b. glycerophospholipid c. ganglioside d. cholesterol

triacylglycerol: nonpolar: fatty acid; polar: ester.

Glycerophospholipid: nonpolar: fatty acid; polar: phosphatidyl- groups.

Ganglioside: nonpolar: sphingosine’s hydrocarbon chain and fatty acid; polar: oligosaccharide.

Cholesterol: nonpolar: cyclopentanoperhydrophenanthrene; polar: hydroxyl group.

1. What does the term amphipathic mean?

In organic chemistry, this word is to describe molecules which contain both hydrophobic and hydrophilic groups.

1. Coconut oil contains only a very small amount of unsaturated fatty acids. How can it still have a low melting point?

For the main fatty acids are dodecanoic acids which contain short carbon chains.