

Organic Chemistry 212

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Notes: *Chapter Thirteen - Lipids*

Lipids are found in living organisms, insoluble in water, soluble in nonpolar solvents and are defined by their functions: they store energy within fat cells, they are parts of membranes that separate compartments of aqueous solutions from each other and they serve as chemical messengers.

Lipids may be classified into four groups:

Simple lipids

Complex lipids

Steroids

Prostaglandins, thromboxanes and leukotrienes

Triglycerides are the most common lipid materials. Summarize the structures of triglycerides:

Animal fats and vegetable oils are mixtures of fatty acids.

What is rancidity?

What are three ways to slow down the process of rancidity?

Plant and animal waxes are simple esters. Paraffin wax is not an ester. Ear wax is not a simple ester. What are the names of some important waxes?

There is a schematic diagram of simple and complex lipids. Take some time to study this diagram.

Define:

Phospholipid

Glycolipid

What is a lipid bilayer? Which parts are polar? Which parts are non-polar?

What are the key features of the fluid mosaic model of membranes?

What is another name for glycerophospholipids?

Draw the structure of choline:

Lecithin is an example of a glycerophospholipid. Where can you find lecithin?

What is myelin? To what category of complex lipids does it belong?

Draw a ceramide:

Steroids

What ring system do steroids all share?

Draw a molecule of cholesterol:

What role does cholesterol play in our bodies?

How is cholesterol transported?

List the four types of lipoproteins:

How does cholesterol accumulate in the blood?

What is atherosclerosis?

List some steroid hormones.

Describe the steroid concentrations in the blood throughout a typical menstrual cycle:

Possible short essay questions:

- How do oral contraceptives work?
- How do anabolic steroids work?
- What are bile salts?

List properties of:

prostaglandins

thromboxanes

leukotrienes