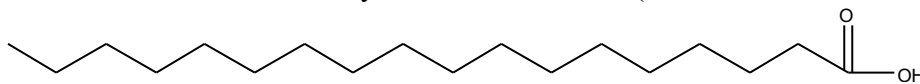


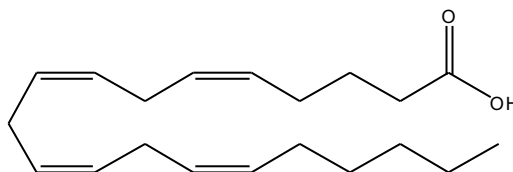
Lipids

Biomolecules that have the common property of being soluble in organic (nonpolar) solvents, but not in water.

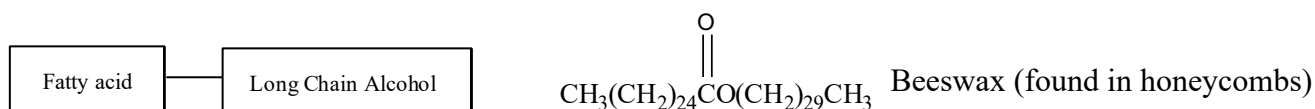
Fatty Acids – most lipids contain fatty acids (the simplest type of lipids) in their structures. They are carboxylic acids with an even number of carbon atoms, usually between 10 and 20 (memorize their common names).



Prostaglandins are formed from arachidonic acid (*all-cis-5,8,11,14-eicosatetraenoic acid*), which is an unsaturated fatty acid with 20 carbons. These hormone like substances increase or lower the blood pressure, inflammation and pain when tissues are injured. Prostaglandins are potent but have a short half-life before being inactivated and excreted. Therefore, they exert only a paracrine (locally active) or autocrine (acting on the same cell from which it is synthesized) function.

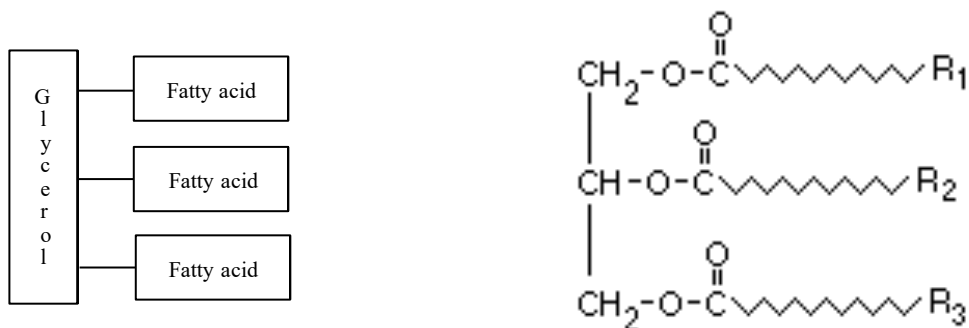


Waxes are esters of fatty acids with long chain primary alcohols.



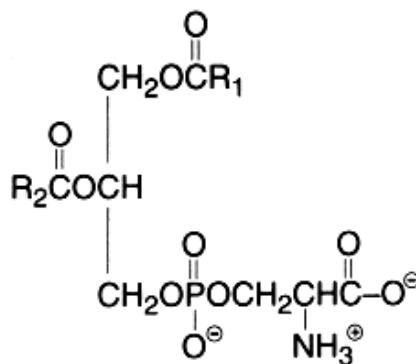
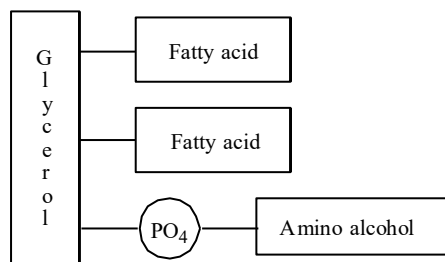
The leaves and fruits of many plants have waxy coatings, which may protect them from dehydration and small predators. The feathers of birds and the fur of some animals have similar coatings which serve as a water repellent. Waxes are also used in wax polishes for furniture and other wood products, footwear and vehicles, as mold release agents in mold making, as a coating for Edam and Gouda cheeses, and to waterproof leather and fabric.

Fats and Oils – Triglycerides (triacylglycerols or TAG's) are triesters of glycerol and fatty acids. They are the major form of energy storage in animals. Fats are solids at room T and most come from animal sources. Oils are liquids at room T and the most commonly used oils come from plant sources.

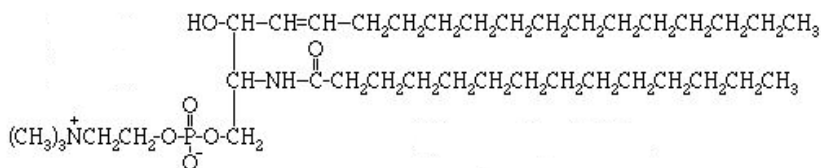
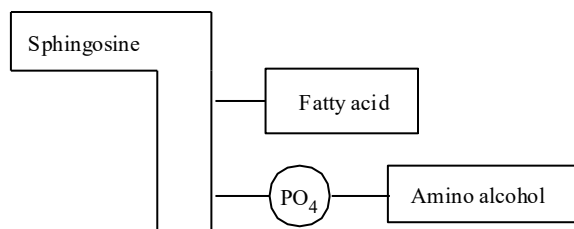


Saturated fatty acids have higher melting point than unsaturated fatty acids because they can pack together more tightly. Animal fats usually contain more saturated fatty acids than do vegetable oils. Therefore the melting points of animal fats are higher than those of vegetable oils.

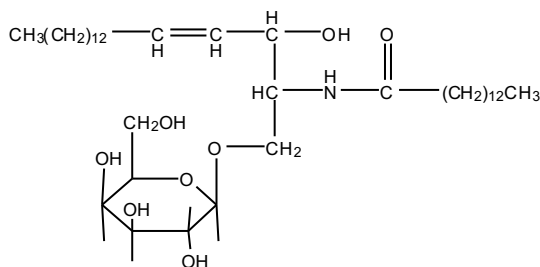
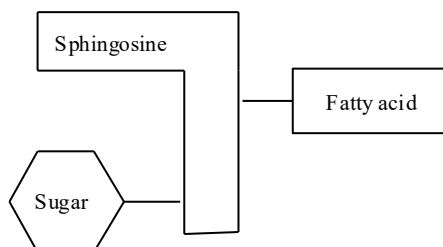
Glycerophospholipids (or phospholipids) are a family of lipids similar to TAG's except that one hydroxyl group of glycerol is replaced by the ester of phosphoric acid and an amino alcohol, bonded through a phosphodiester bond. Depending on the amino alcohol, these can be **Lecithins** (containing choline) or **Cephalines** (containing ethanolamine or serine). These are the most abundant lipids in cell membranes.



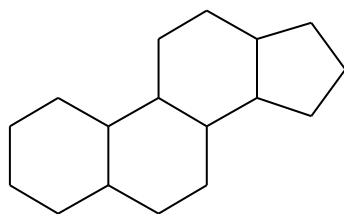
Sphingolipids – This is another group of phospholipids. They are esters of an 18 carbon alcohol called sphingosine (instead of glycerol). We find them in the biological membranes of the brain and nerve tissues.



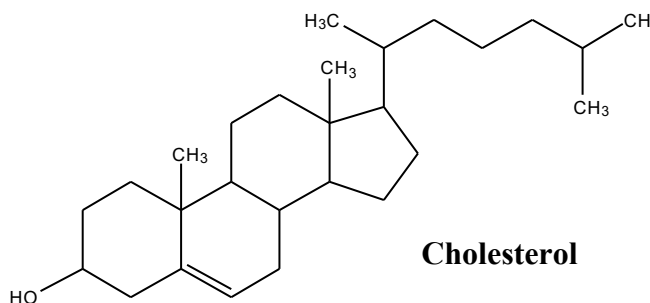
Some sphingolipids contain a carbohydrate such as galactose or glucose and they are known as **Glycosphingolipids**. **Cerebrosides** contain a monosaccharide and **Gangliosides** are similar, but they contain two or more monosaccharides.



Steroids are compounds containing the steroid nucleus, which consists of three cyclohexane rings and one cyclopentane ring fused together.



Steroid nucleus



Cholesterol

This is one of the most important and abundant steroids in the body.

Vitamins – Some vitamins (A, D2, E and K1) are fat soluble, therefore, considered lipids. They have important roles in vision, bone growth, and blood clotting.