

20.4: Fats and Lipids

The term lipid applies to any water-insoluble substance which can be extracted from cells by organic solvents such as chloroform, ether, or benzene. Two major categories may be identified. *Nonpolar lipids* have molecular structures which contain no electrically charged sites, few polar groups, and large amounts of carbon and hydrogen. They are similar to hydrocarbons in being almost completely insoluble in water, and so they are said to be **hydrophobic** (from the Greek, meaning water-hater). On the other hand, *polar lipids* consist of molecules which have polar groups (such as —OH) or electrically charged sites at one end, and hydrocarbon chains at the other. Since polar or charged groups can hydrogen bond to or electrostatically attract water molecules, one end of a polar lipid molecule is said to be **hydrophilic** (water-loving). Lipids with a polar and nonpolar end are sometimes called amphipathic lipids, because one end is hydrophilic, while the other is hydrophobic. Such substances often form structures which bury hydrophobic surface, while exposing hydrophilic surface to water. Some typical structures of both types of lipids are shown in Figure 20.4.1.

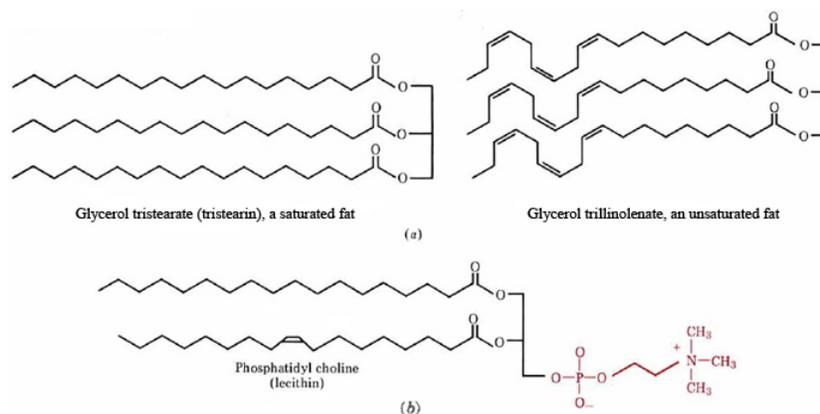


Figure 20.4.1 Structures of some typical lipids: (a) nonpolar; (b) polar. Hydrophilic portions are indicated in color. Only carbon-carbon bonds, but not the carbon and hydrogen atoms, are shown in long carbon chains. Therefore those chains appear as zigzag lines.

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