

Figure 21-2 p564

CELL MEMBRANE

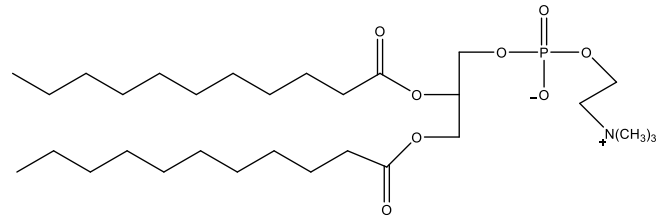
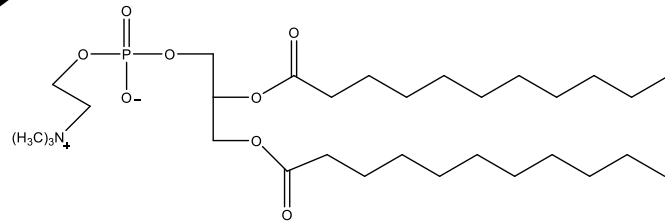


CYTOPLASM

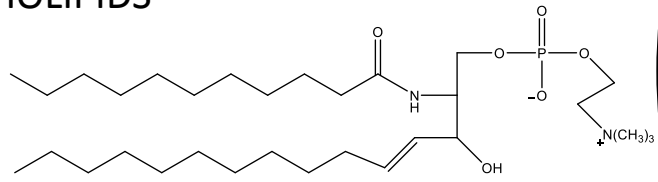
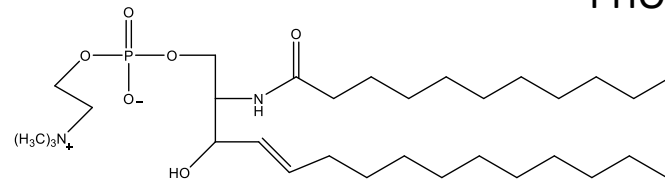
PHOSPHOLIPID BILAYER

**EXTRA
CELLULAR
FLUID**

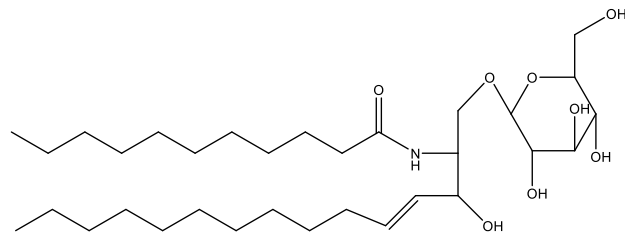
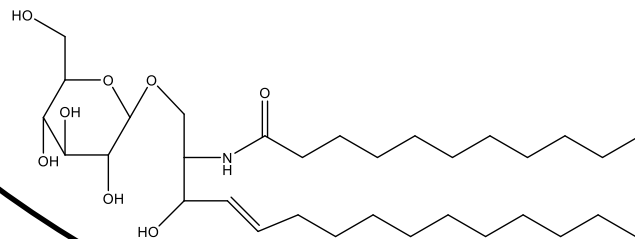
CELL MEMBRANE



PHOSPHOLIPIDS

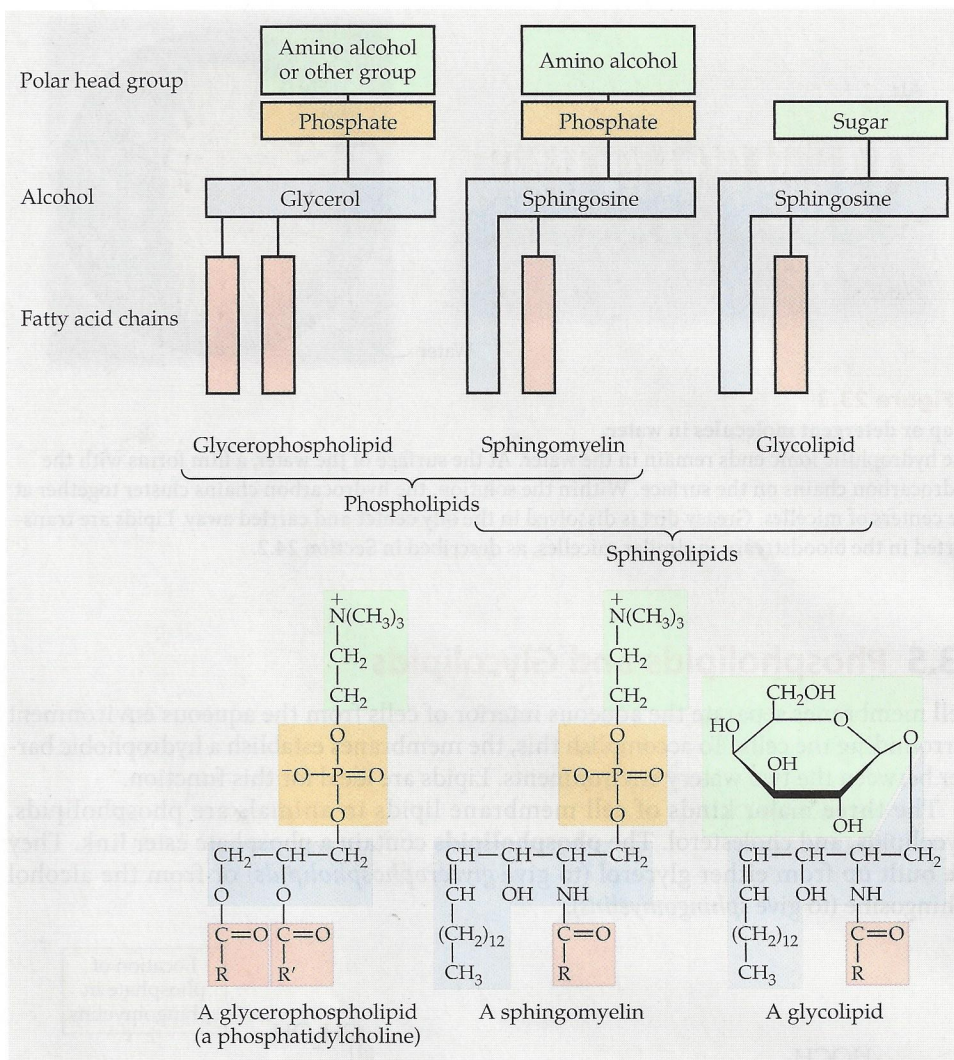


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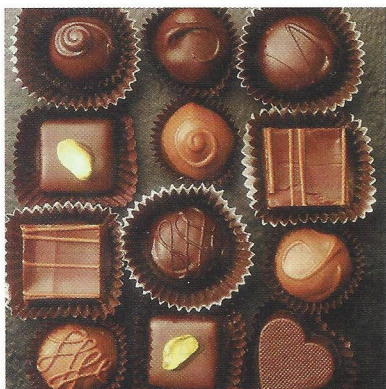
GYLCOLIPID

EXTRA CELLULAR FLUID



▲ **Figure 23.4**
Membrane lipids.

All have two hydrocarbon tails and polar, hydrophilic head groups. In the sphingolipids (sphingomyelins and glycolipids), one of the two hydrocarbon tails is part of the alcohol sphingosine (blue).



▲ **Lecithin (phosphatidylcholine)** is the emulsifying agent in most chocolates.

Glycerophospholipid

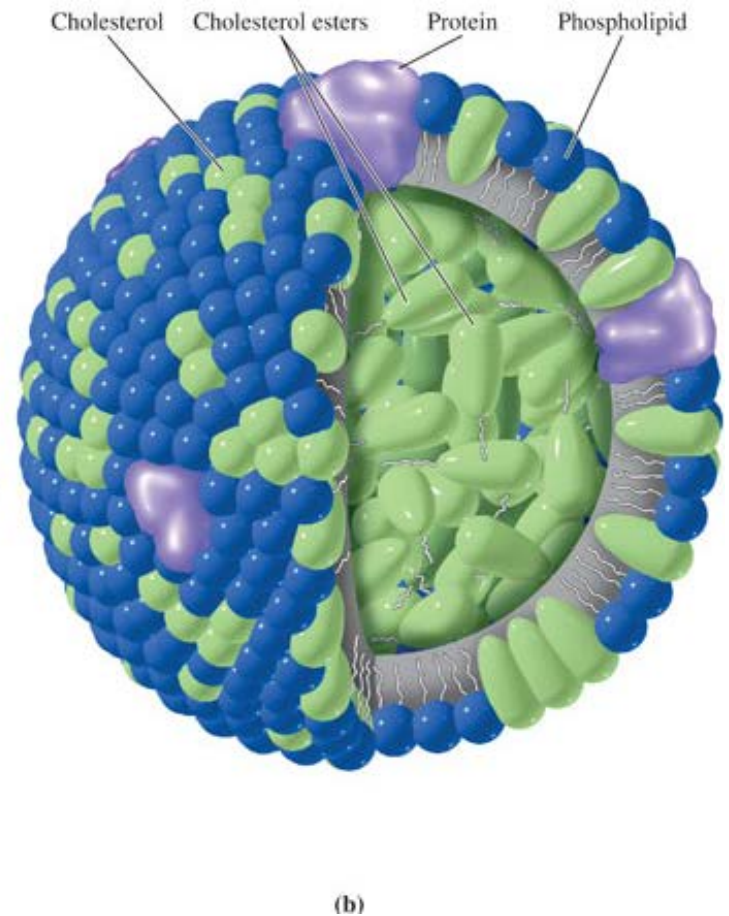
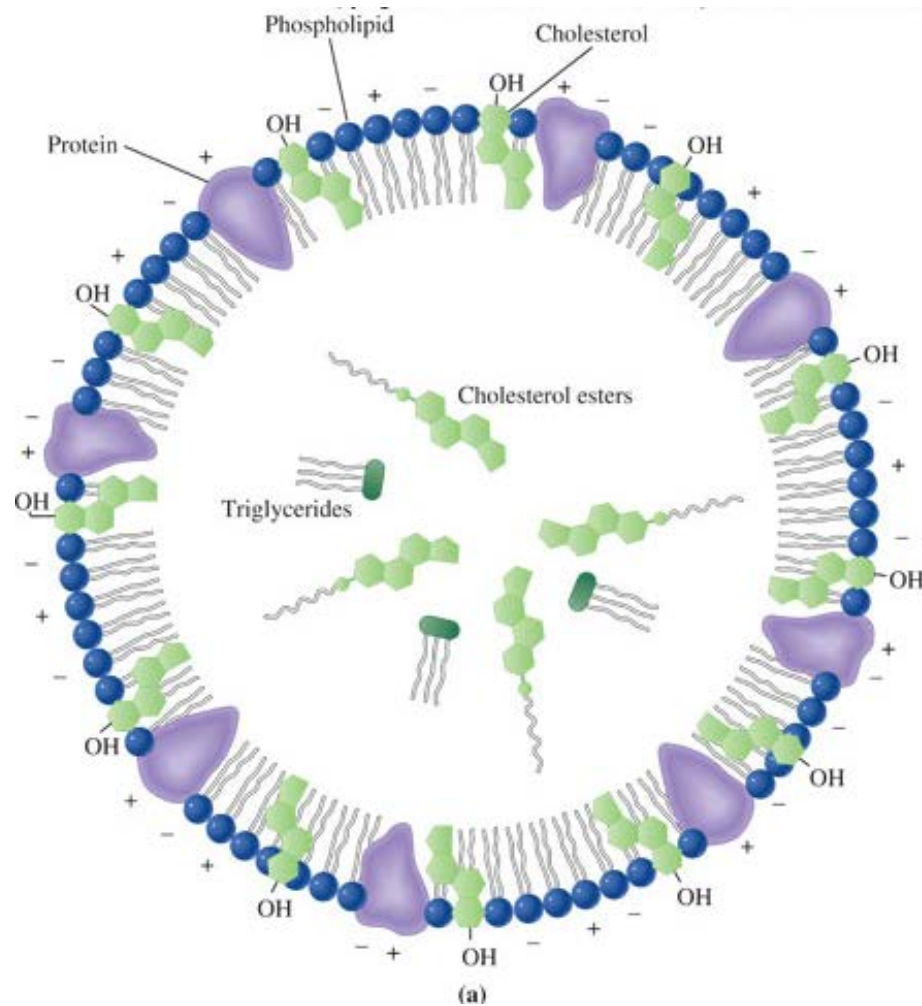
(phosphoglyceride) A lipid in which glycerol is linked by ester bonds to two fatty acids and one phosphate, which is in turn linked by another ester bond to an amino alcohol (or other alcohol).

Phospholipids

Because phospholipids have ionized phosphate groups at one end, they are similar to soap and detergent molecules in having ionic, hydrophilic heads and hydrophobic tails (see Figure 23.3). They differ, however, in having *two* tails instead of one.

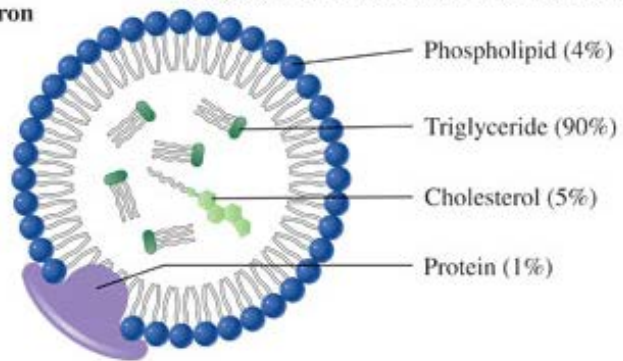
Glycerophospholipids (also known as **phosphoglycerides**) are triesters of glycerol 3-phosphate and are the most abundant membrane lipids. Two of the ester bonds are with fatty acids, which provide the two hydrophobic tails (pink in the general glycerophospholipid structure in Figure 23.4). The fatty acids may be any of the fatty acids normally present in fats or oils. The fatty acid acyl group ($\text{R}-\text{C}=\text{O}$) bonded to C1 of glycerol is usually saturated, whereas the fatty acyl group at C2 is usually unsaturated. At the third position in glycerophospholipids there is a phosphate ester group (orange in Figure 23.4). This phosphate has a second ester link to one of several different OH-containing compounds, often ethanolamine, choline, or serine (green in Figure 23.4; see structures in Table 23.3).

Model of Lipoprotein

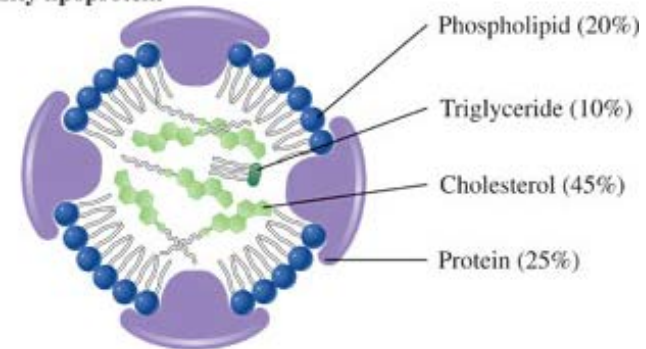


Types of Lipoproteins

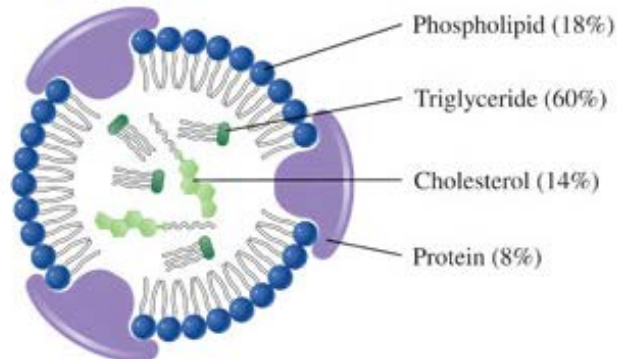
Chylomicron



Low density lipoprotein (LDL)



Very low density lipoprotein (VLDL)



High density lipoprotein (HDL)

