Membran Sel

Definisi Membran Sel

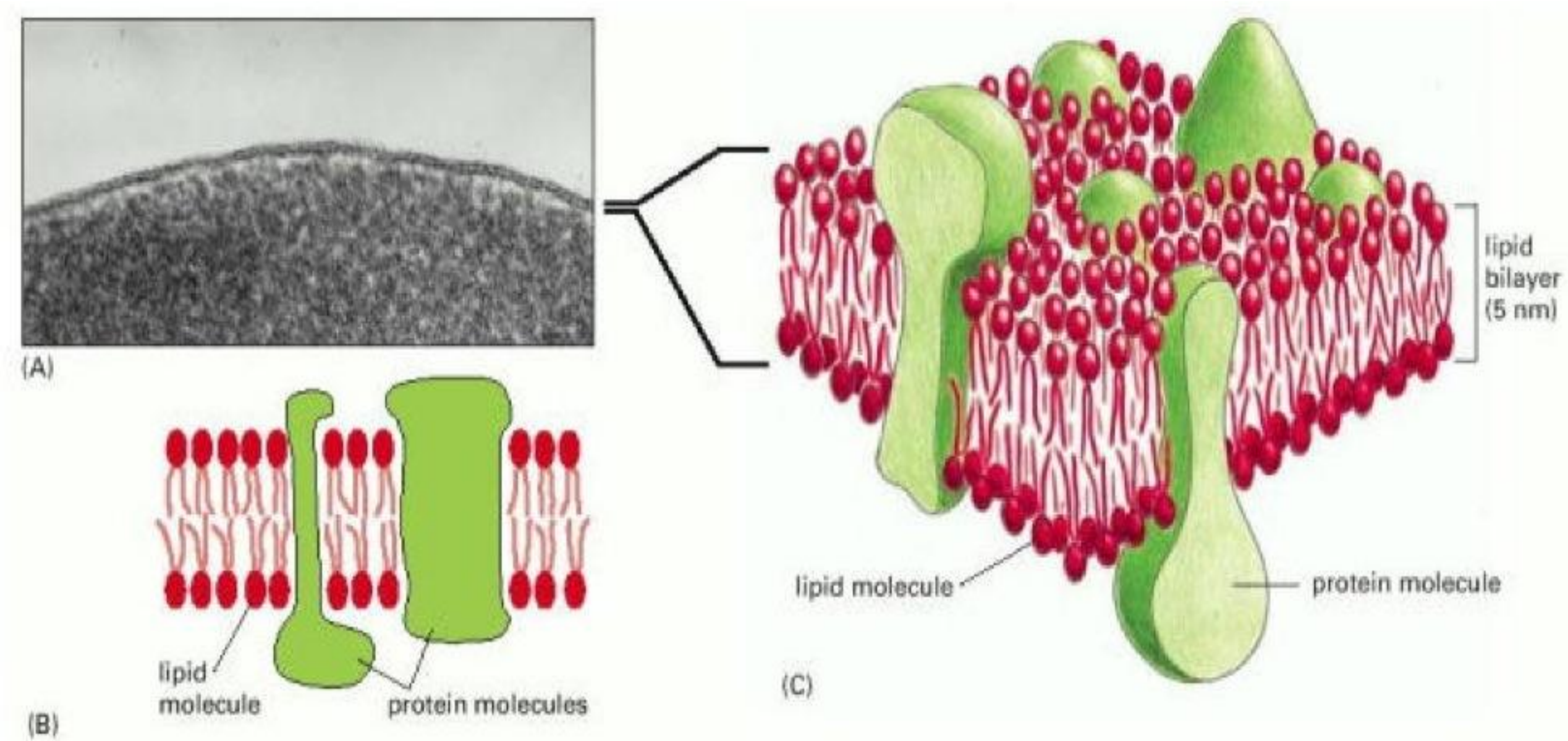
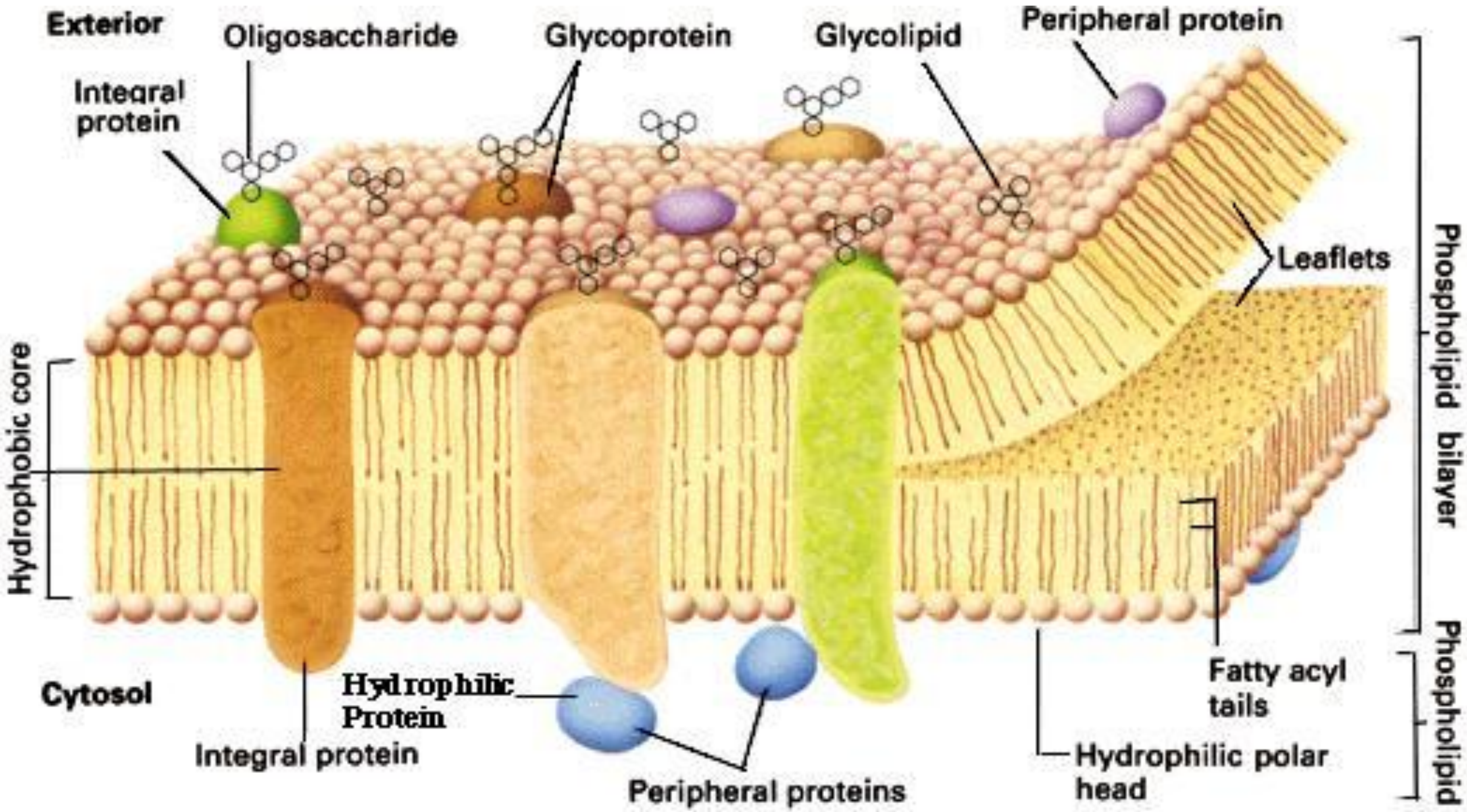


Figure 10-1. Three views of a cell membrane. (A) An electron micrograph of a plasma membrane (of a human red blood cell) seen in cross section. (B and C) These drawings show two-dimensional and three-dimensional views of a cell membrane. (A, courtesy of Daniel S. Friend.)

Definisi Membran Sel

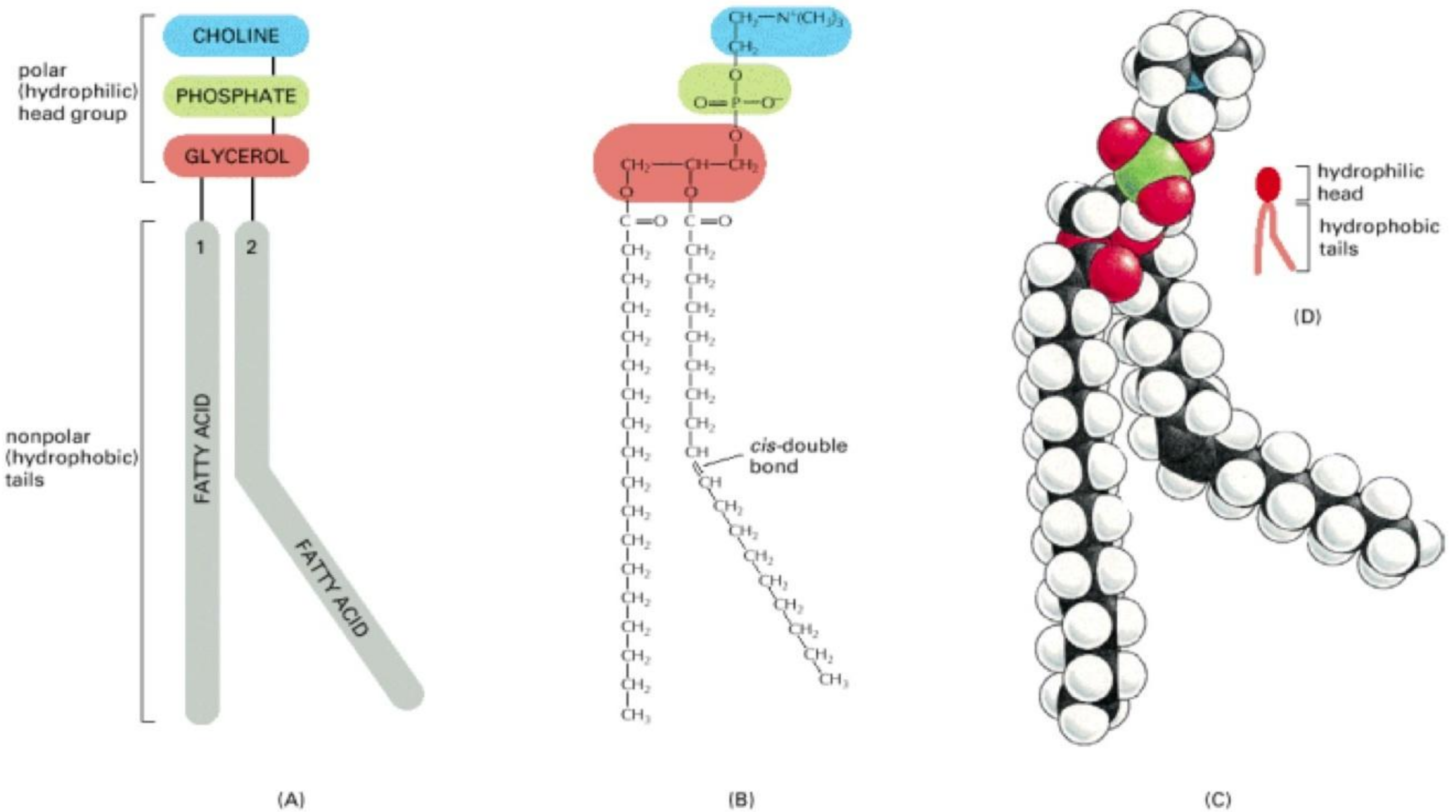


Fungsi

- Pembatas fisik sel atau organel organel sel yang dapat mempertahankan bentuk dan kompartemen sel
- Transport molekul, baik kedalam keluar sel maupun antar kompartemen sel
- Media penghantar sinyal kimia ataupun energi dari satu bagian ke bagian yang lain
- Mempersiapkan lingkungan yang baik untuk berlangsungnya proses biokimia

Komponen Biomembran dan Fungsinya

- Lipid
  - Lipid bilayer



Komponen Biomembran dan Fungsinya

- Molekul hidrofilik → larut dalam air
- Molekul hidrofobik → ice cage

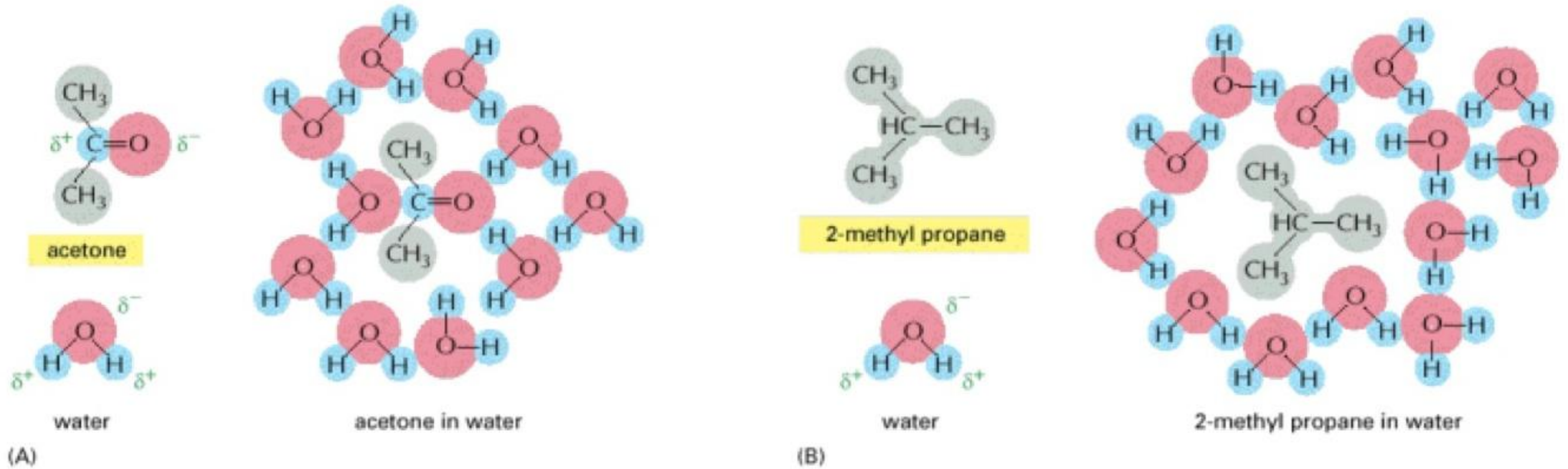


Figure 10-3. How hydrophilic and hydrophobic molecules interact differently with water. (A) Because acetone is polar, it can form favorable electrostatic interactions with water molecules, which are also polar. Thus, acetone readily dissolves in water. (B) By contrast, 2-methyl propane is entirely hydrophobic. It cannot form favorable interactions with water and it would force adjacent water molecules to reorganize into icelike cage structures, which increases the free energy. This compound therefore is virtually insoluble in water. The symbol δ^- indicates a partial negative charge, and δ^+ indicates a partial positive charge. Polar atoms are shown in color and nonpolar groups are shown in *gray*.

Komponen Biomembran dan Fungsinya

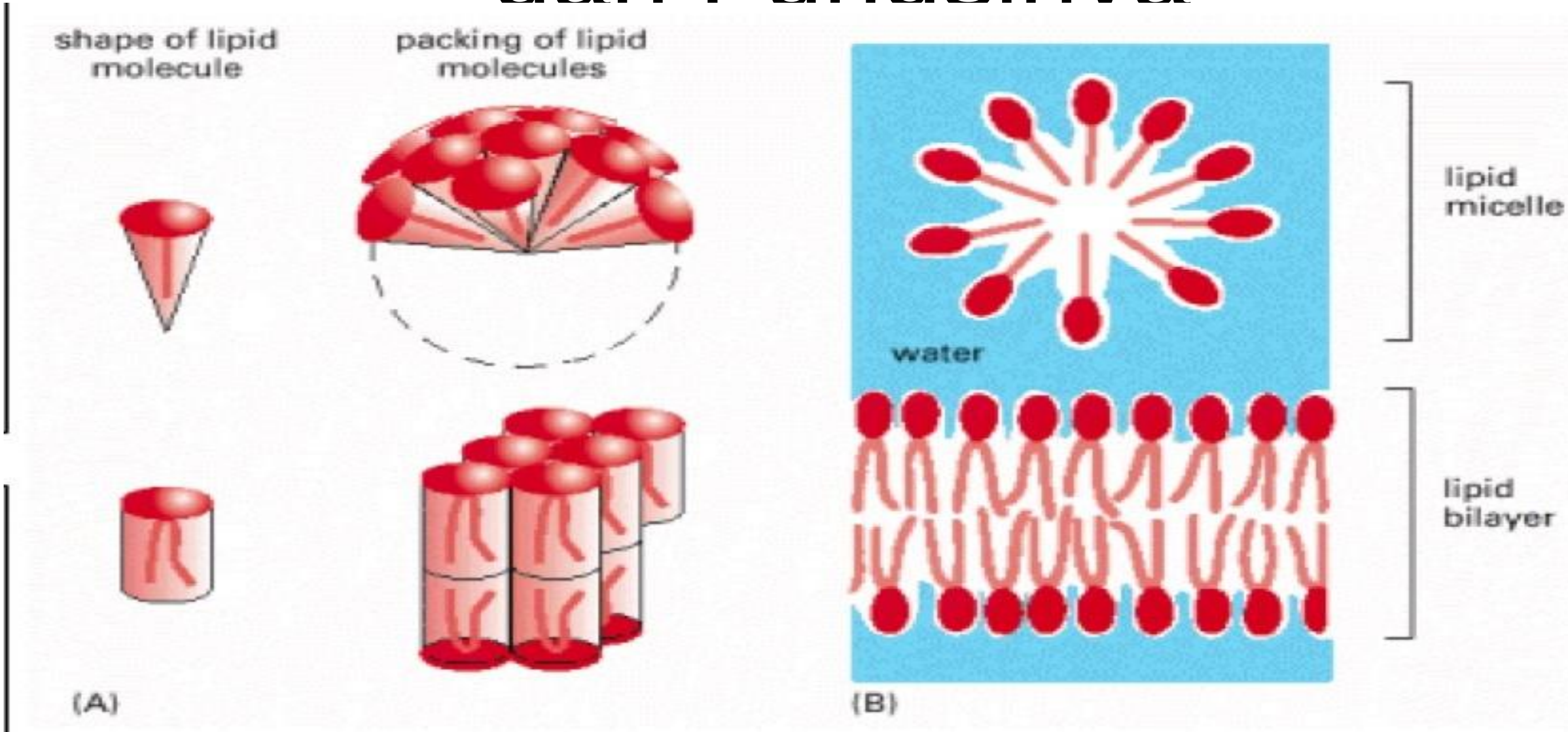


Figure 10-4. Packing arrangements of lipid molecules in an aqueous environment. (A) Wedge-shaped lipid molecules *(above)* form micelles, whereas cylinder-shaped phospholipid molecules *(below)* form bilayers. (B) A lipid micelle and a lipid bilayer seen in cross section. Lipid molecules spontaneously form one or other of these structures in water, depending on their shape.

Komponen Biomembran dan Fungsinya

- Empat besar jenis fosfolipid

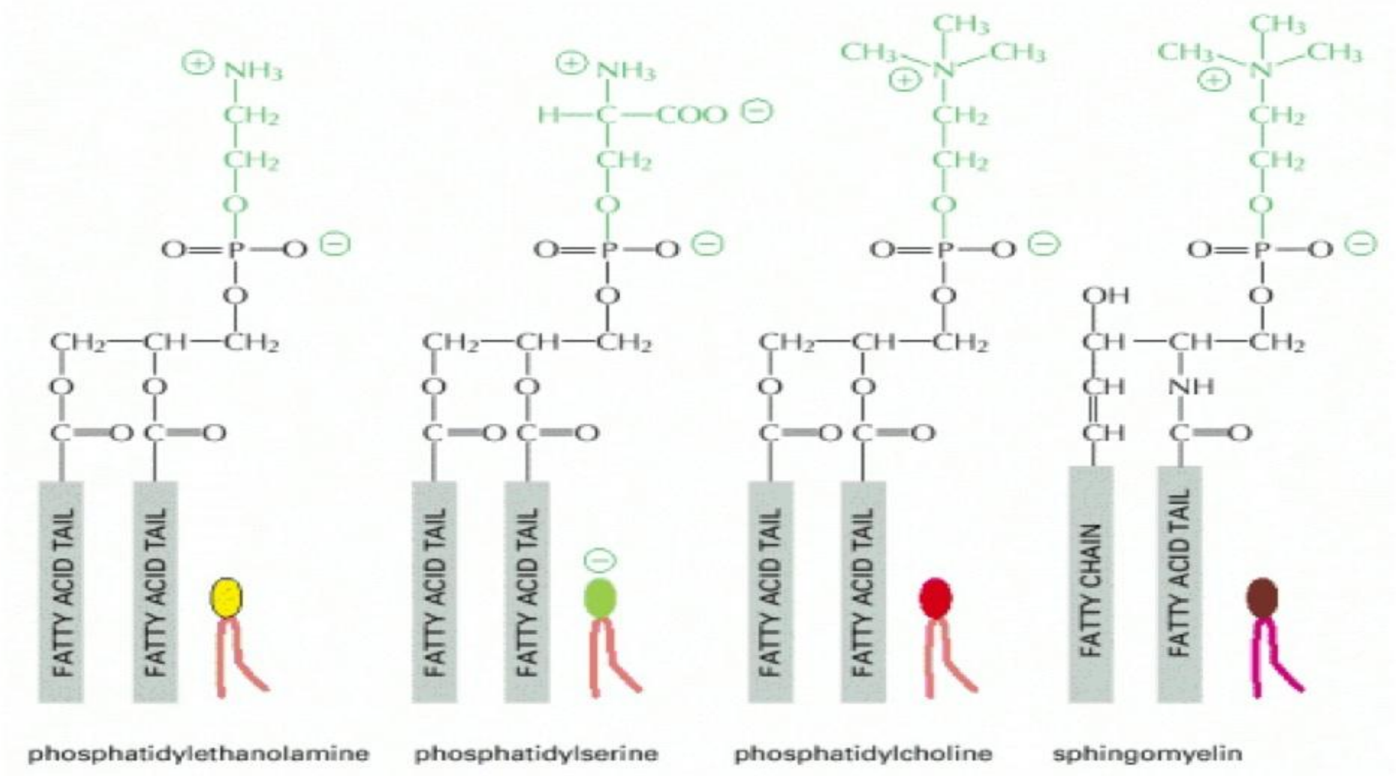


Figure 10-12. Four major phospholipids in mammalian plasma membranes. Note that different head groups are represented by different colors. All the lipid molecules shown are derived from glycerol except for sphingomyelin, which is derived from serine.

Komponen Biomembran dan Fungsinya

- Kolesterol

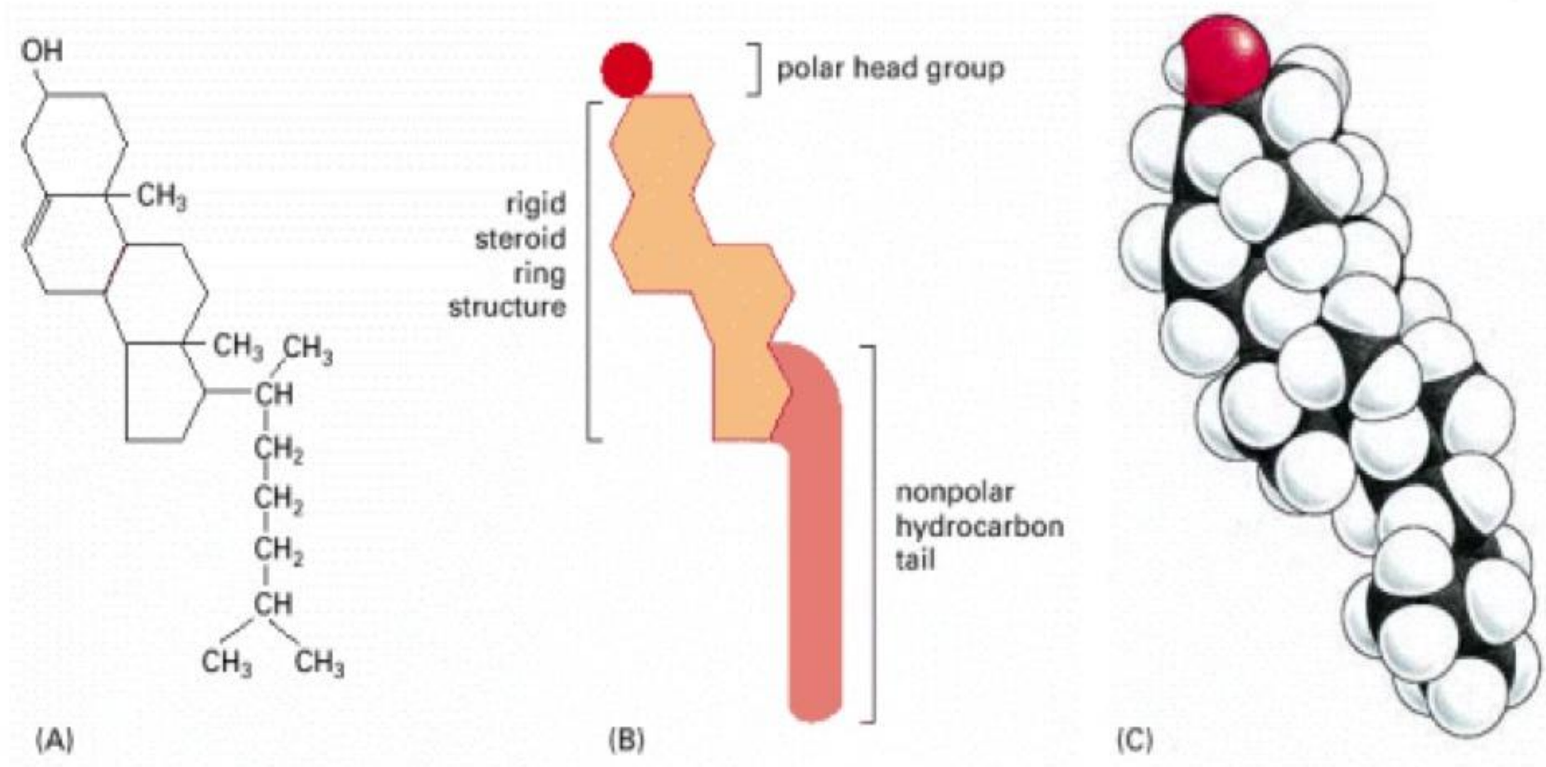


Figure 10-10. The structure of cholesterol. Cholesterol is represented (A) by a formula, (B) by a schematic drawing, and (C) as a space-filling model.

Komponen Biomembran dan Fungsinya

- Untuk mengatur fluiditas dan stabilitas membran
- Mecegah asam lemak lebih merapat dan mengkristal dengan meningkatkan suhu pretransisi

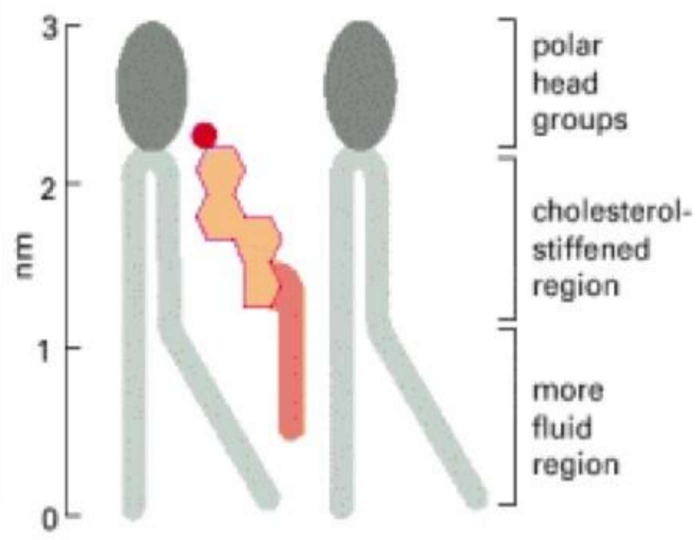


Figure 10-11. Cholesterol in a lipid bilayer. Schematic drawing of a cholesterol molecule interacting with two phospholipid molecules in one monolayer of a lipid bilayer.

Komponen Biomembran dan Fungsinya

- Karbohidrat

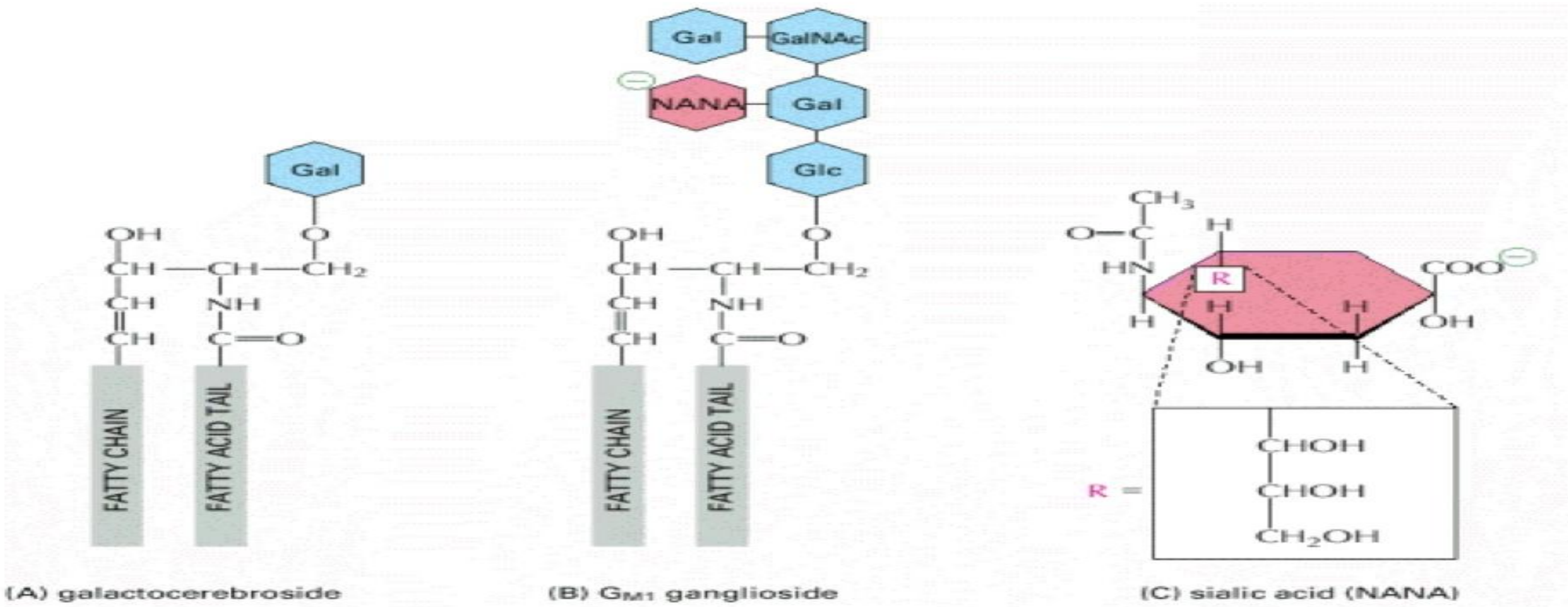


Figure 10-16. Glycolipid molecules. (A) Galactocerebroside is called a *neutral glycolipid* because the sugar that forms its head group is uncharged. (B) A ganglioside always contains one or more negatively charged sialic acid residues (also called *N*-acetylneuraminic acid, or NANA), whose structure is shown in (C). Whereas in bacteria and plants almost all glycolipids are derived from glycerol, as are most phospholipids, in animal cells they are almost always produced from serine, as is the case for the phospholipid sphingomyelin (see Figure 10-12). Gal = galactose; Glc = glucose, GalNAc = *N*-acetylgalactosamine; these three sugars are uncharged.

Komponen Biomembran dan Fungsinya

- Karbohidrat
  - Terdapat dalam bentuk yang berikatan dengan lipid atau protein (glikolipid dan glikoprotein)
  - Terdapat pada permukaan sel dan berfungsi dalam interaksi sel dan sekitarnya
  - Sel epitel → glikolipid terdapat pada permukaan apikal yang terpapar → proteksi thd pH rendah dan degradasi enzim.

Komponen Biomembran dan Fungsinya

- Protein

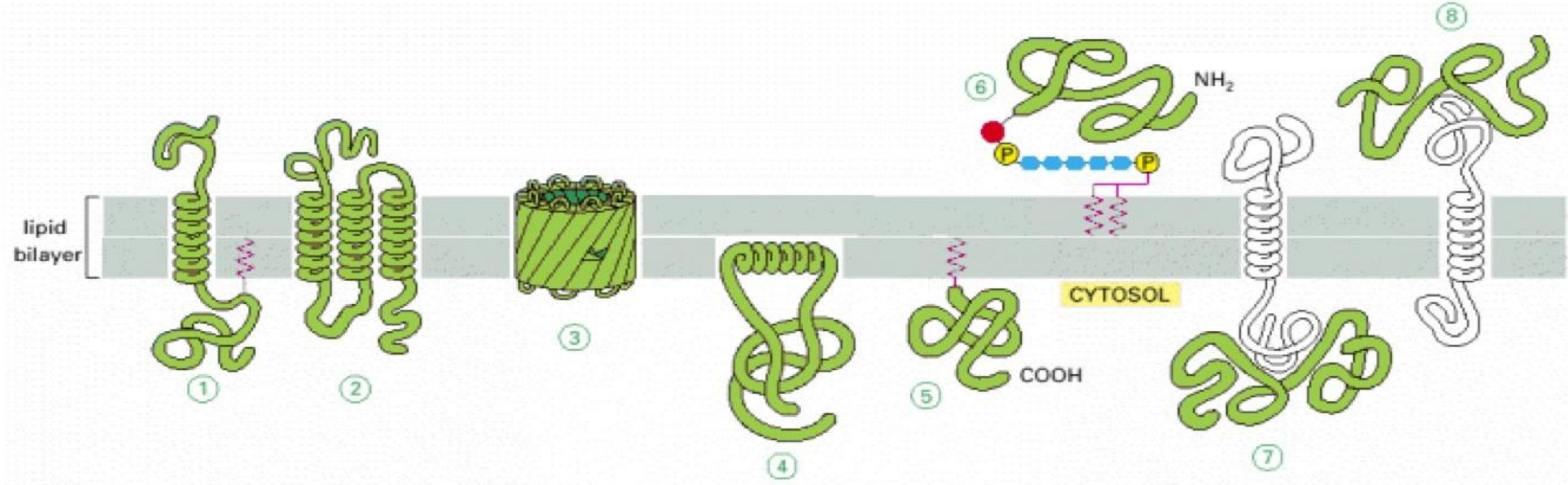


Figure 10-17. Various ways in which membrane proteins associate with the lipid bilayer. Most trans-membrane proteins are thought to extend across the bilayer as (1) a single α helix, (2) as multiple α helices, or (3) as a rolled-up β sheet (a β barrel). Some of these "single-pass" and "multipass" proteins have a covalently attached fatty acid chain inserted in the cytosolic lipid monolayer (1). Other membrane proteins are exposed at only one side of the membrane. (4) Some of these are anchored to the cytosolic surface by an amphipathic α helix that partitions into the cytosolic monolayer of the lipid bilayer through the hydrophobic face of the helix. (5) Others are attached to the bilayer solely by a covalently attached lipid chain—either a fatty acid chain or a prenyl group—in the cytosolic monolayer or, (6) via an oligosaccharide linker, to phosphatidylinositol in the noncytosolic monolayer. (7, 8) Finally, many proteins are attached to the membrane only by noncovalent interactions with other membrane proteins. The way in which the structure in (5) is formed is illustrated in Figure

Komponen Biomembran dan Fungsinya

- Protein
  - Transport molekul
  - Signaling Intraseluler

Daftar Pustaka

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