

CHAPTER 3: CELLS

Part 1: Overview of Cells, Cell
Membrane

HUMAN CELLS

- ⦿ Basic unit of structure & function
- ⦿ 200 different cell types
- ⦿ Made of C, O, H, N + trace elements
- ⦿ 3 main parts:
 1. Plasma membrane
 2. Cytoplasm
 3. Nucleus

CELL DIVERSITY



Fibroblasts

Erythrocytes



Epithelial cells

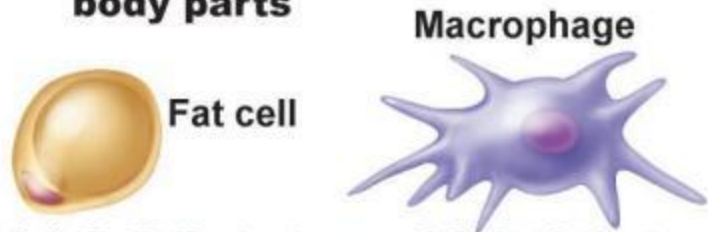
(a) Cells that connect body parts, form linings, or transport gases



Skeletal muscle cell

Smooth muscle cells

(b) Cells that move organs and body parts



Fat cell

Macrophage

(c) Cell that stores nutrients **(d) Cell that fights disease**



Nerve cell

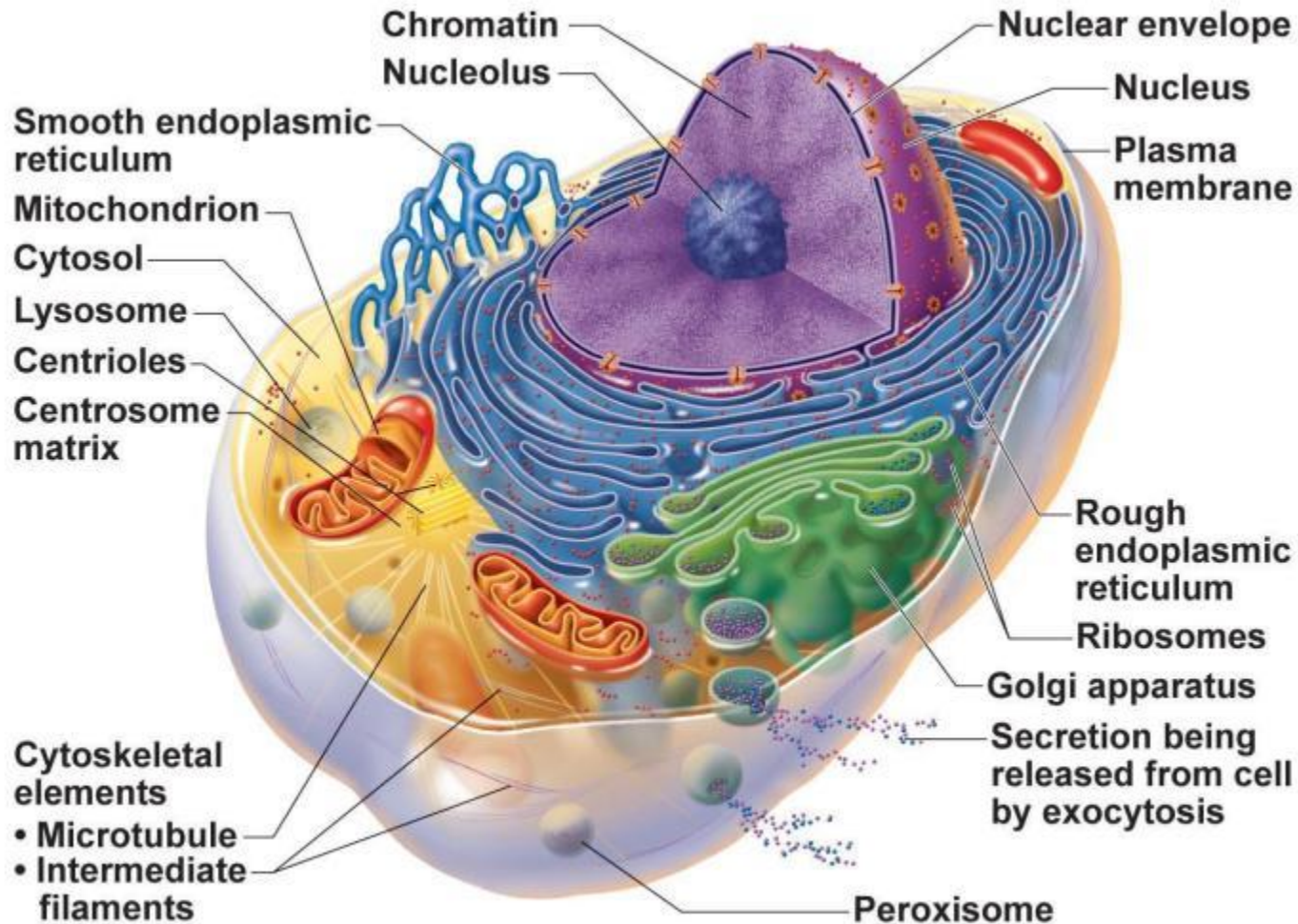
(e) Cell that gathers information and controls body functions



Sperm

(f) Cell of reproduction

CELL STRUCTURE



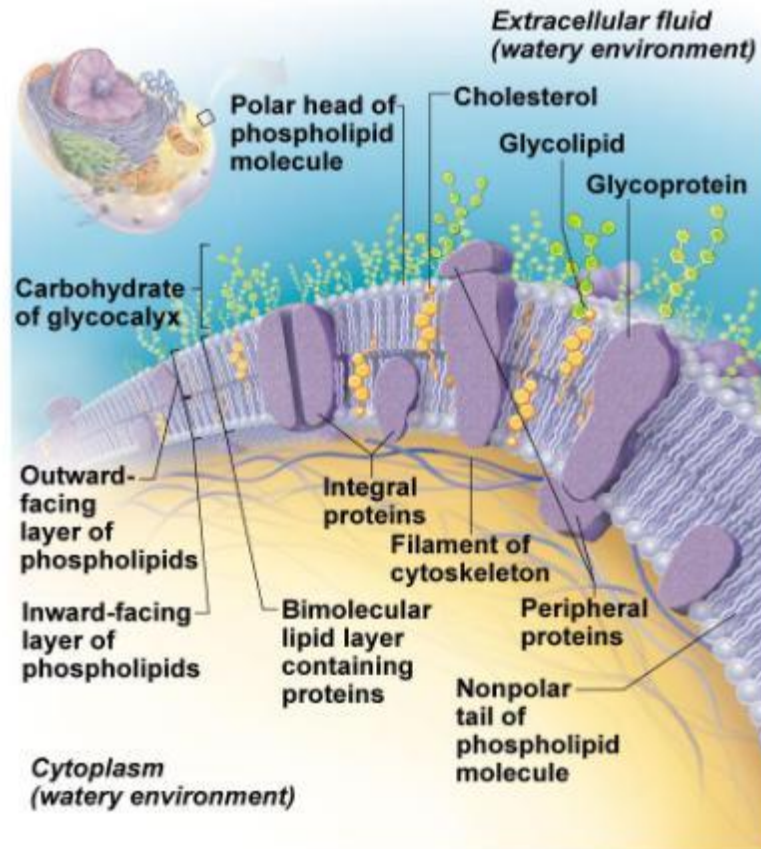
PLASMA MEMBRANE

PLASMA MEMBRANE

- **Function**: enclose cell contents, control exchange of substances with environment, cell communication
- Made of:
 - Lipid bilayer
 - Cholesterol
 - Glycolipids
 - Proteins

FLUID MOSAIC MODEL

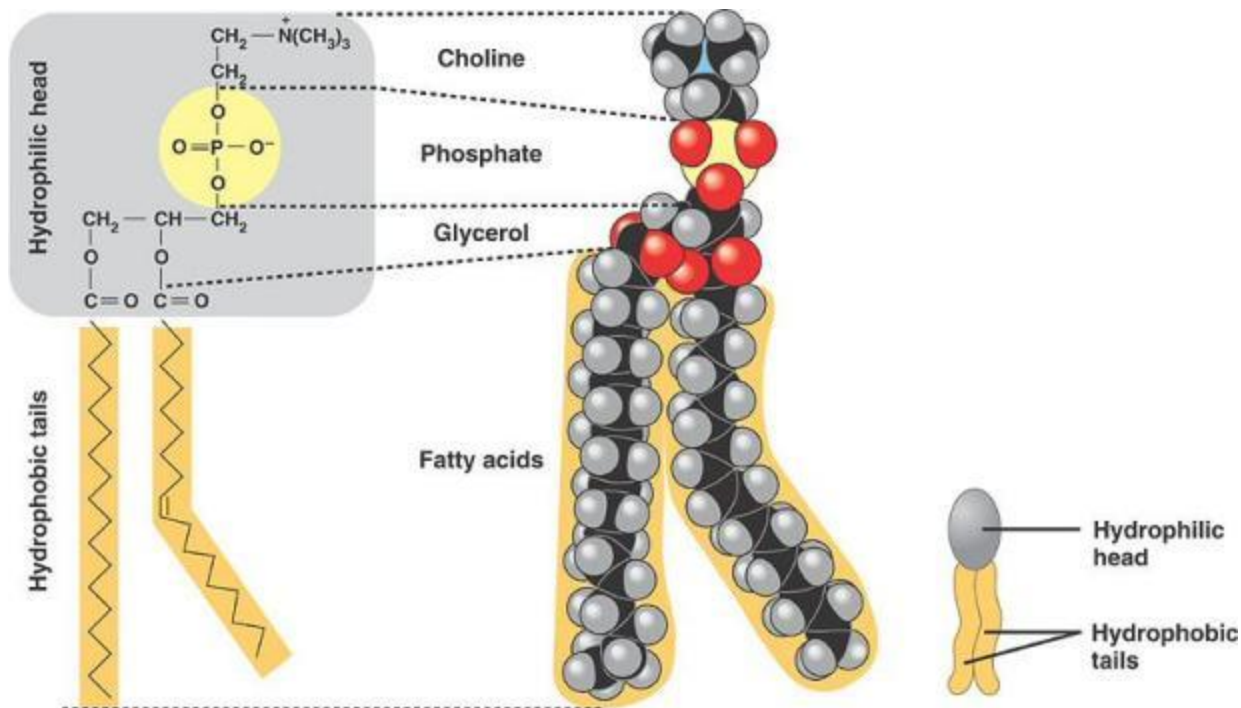
- Proteins float in fluid lipid bilayer



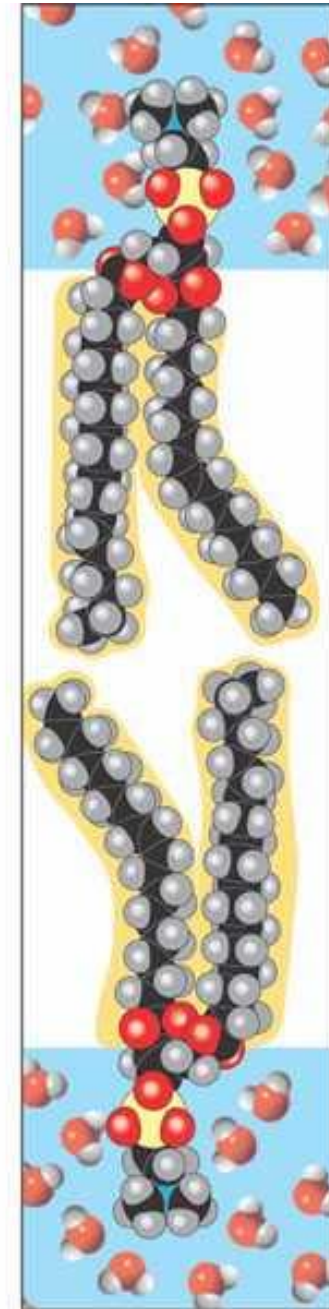
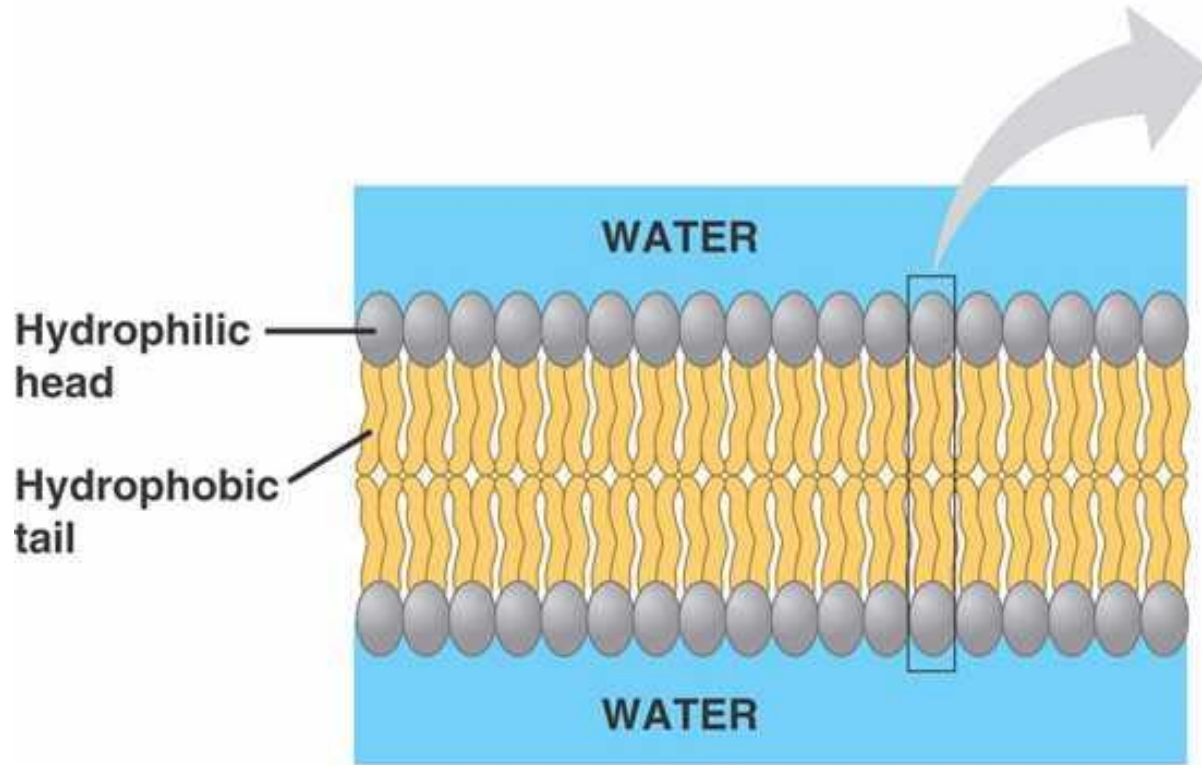
MEMBRANE LIPIDS:

1. Phospholipid:

- Polar/**hydrophilic** (water-loving) “head”
- Nonpolar/**hydrophobic** (water-fearing) “tail”



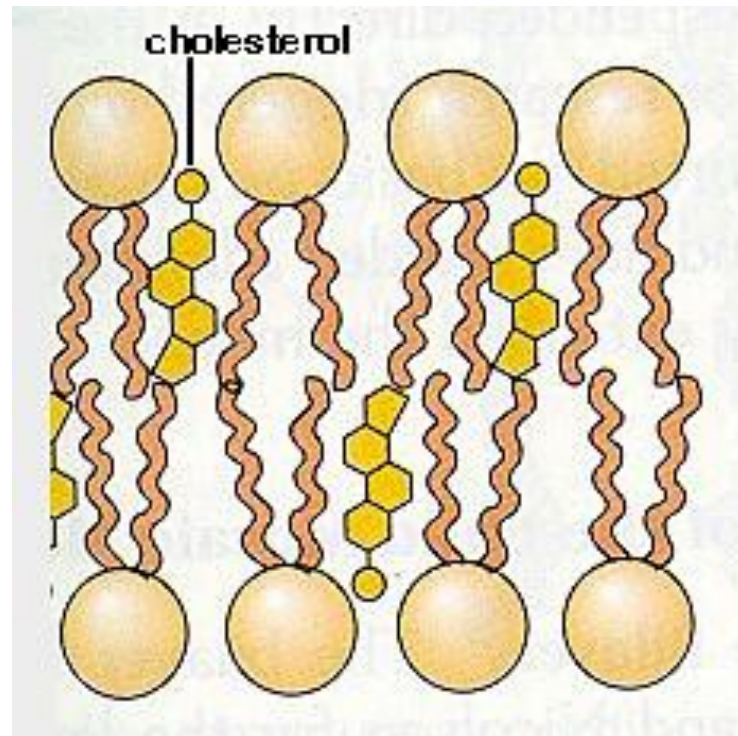
LIPID BILAYER



MEMBRANE LIPIDS

2. Cholesterol

- 20% of membrane lipid
- Stabilize membrane
- Maintain fluidity

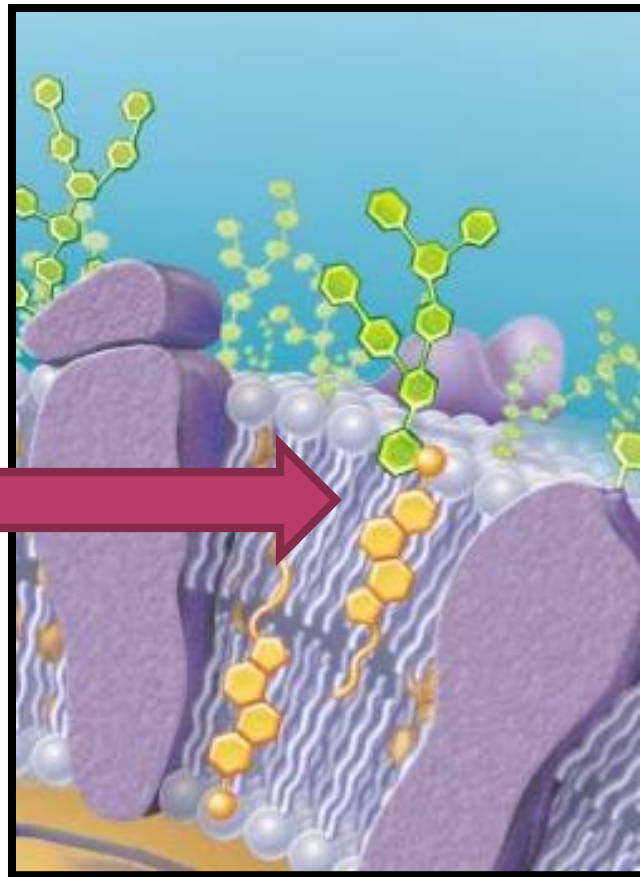
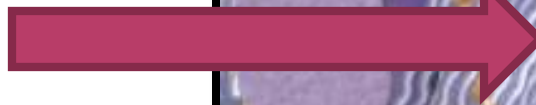


MEMBRANE LIPIDS

3. Glycolipids

- Lipid + sugar attached
- 5% membrane lipid
- For cell recognition

glycolipid

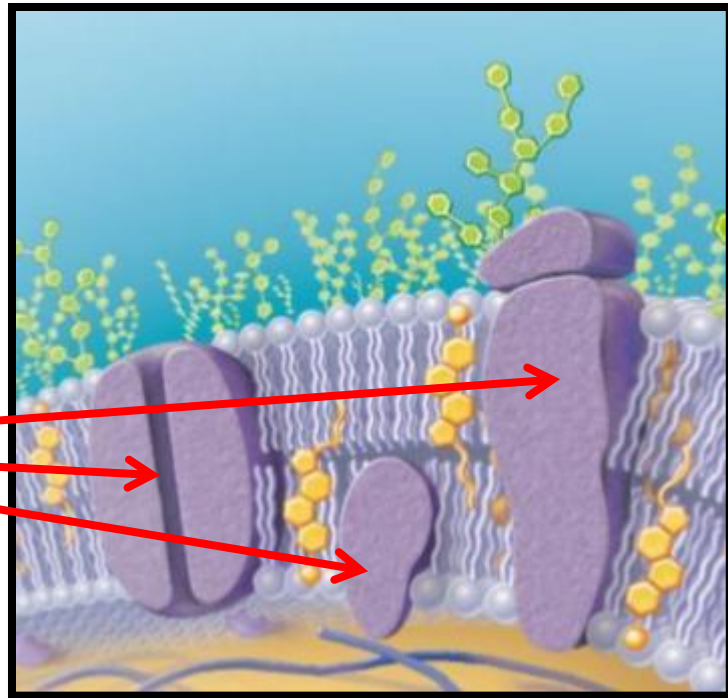


MEMBRANE PROTEINS

1. Integral Proteins

- Inserted into lipid bilayer
- Have both hydrophilic & hydrophobic regions
- **Functions**: enzymes, transport, receptors (relay messages)

integral
proteins

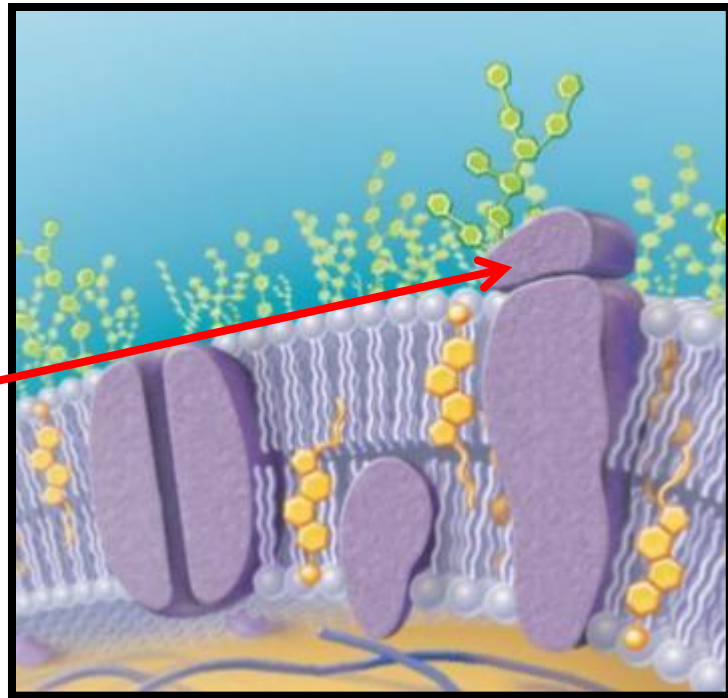


MEMBRANE PROTEINS

2. Peripheral Proteins

- Attached loosely to membrane
- **Functions**: support, enzymes, movement, linkage

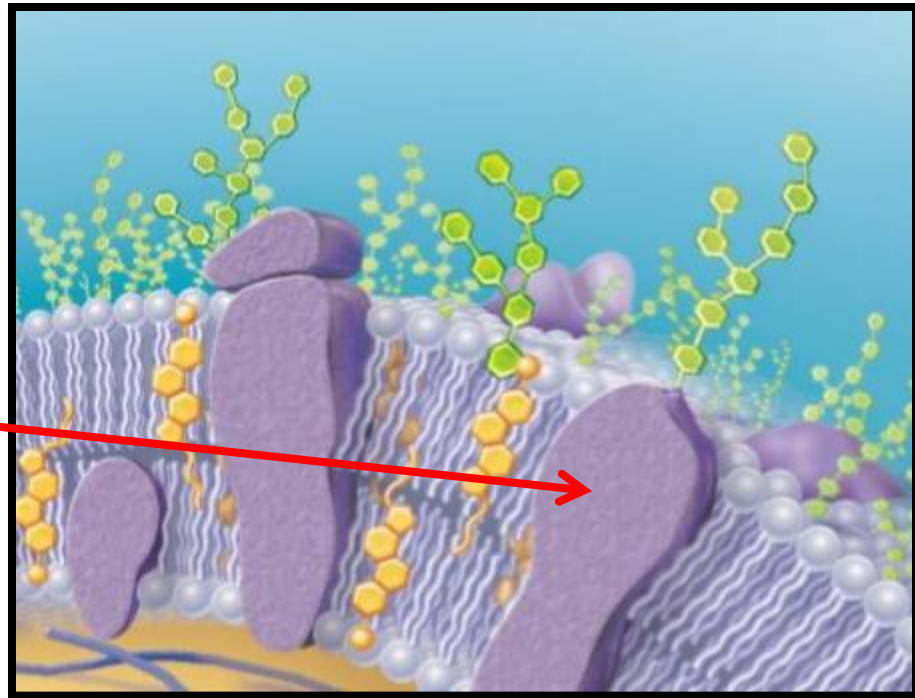
peripheral
protein



GLYCOPROTEIN

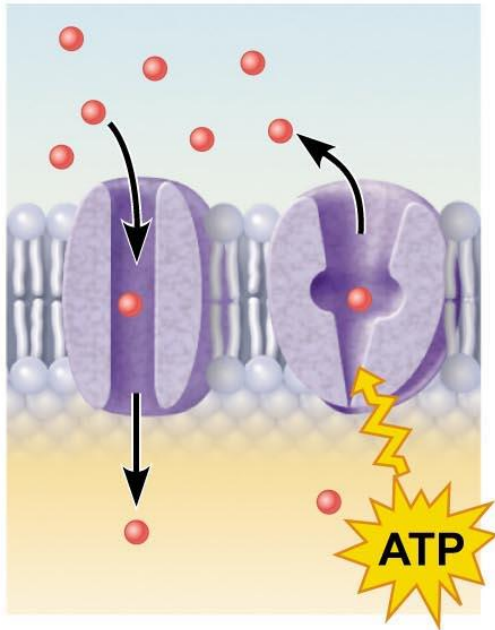
- ◉ protein + sugar attached
- ◉ Serves as specific biological marker → cell recognition

glycoprotein



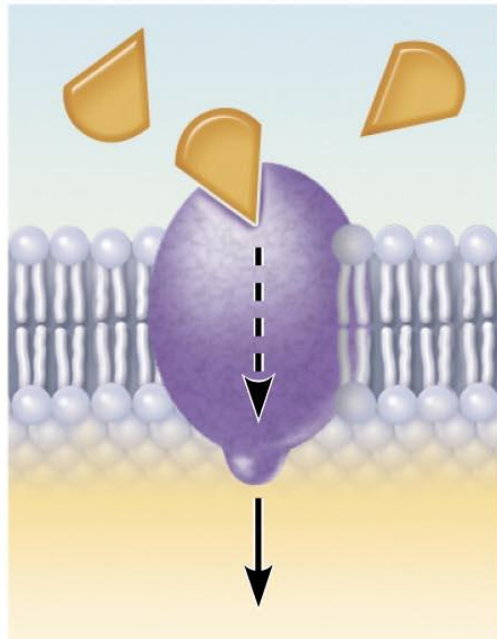
MEMBRANE PROTEIN FUNCTIONS

(a) Transport



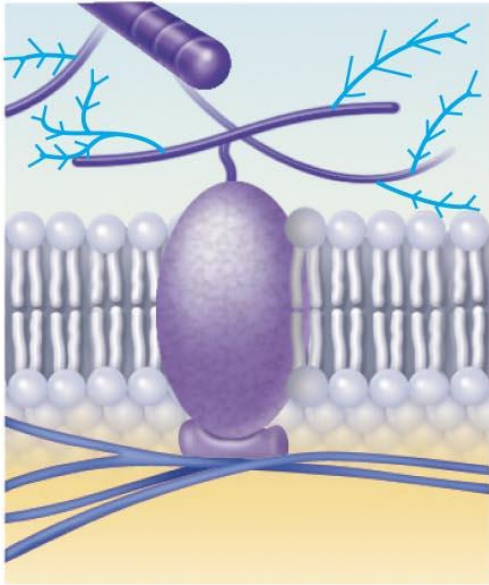
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MEMBRANE PROTEIN FUNCTIONS



(b) Receive chemical messages

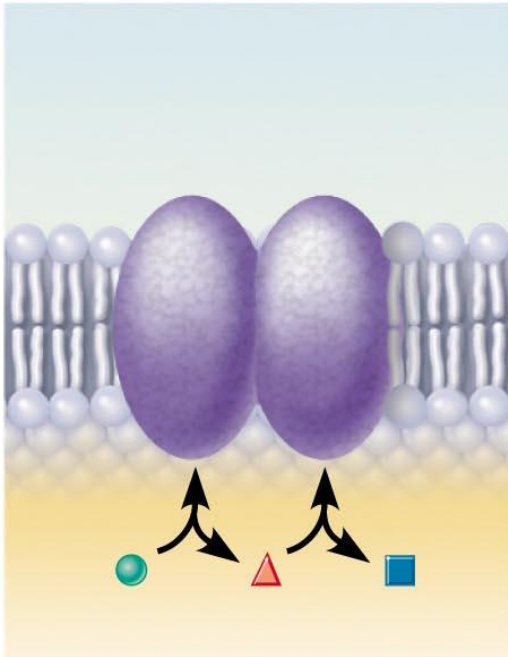
MEMBRANE PROTEIN FUNCTIONS



(c) Maintain cell shape

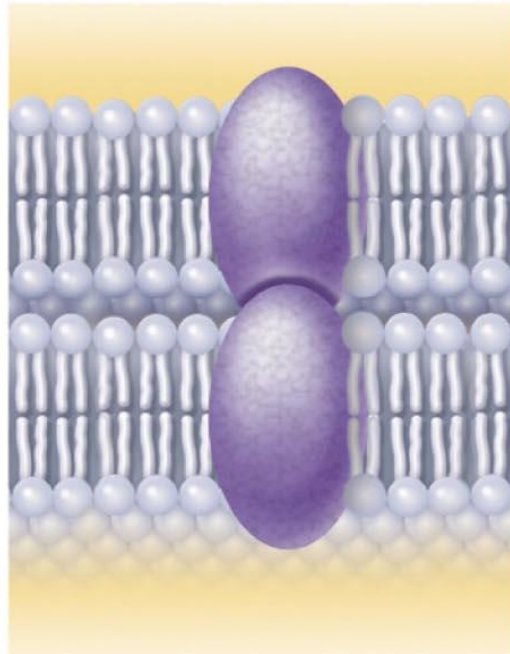
MEMBRANE PROTEIN FUNCTIONS

(d) Enzyme activity



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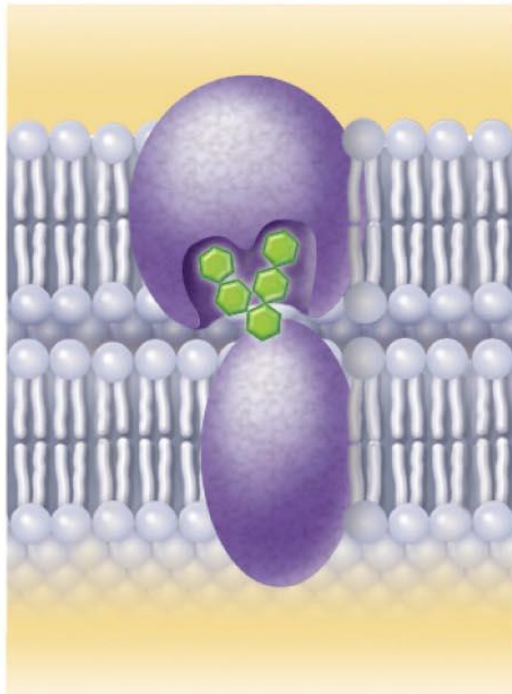
MEMBRANE PROTEIN FUNCTIONS



(e) Intercellular joining

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MEMBRANE PROTEIN FUNCTIONS



**(f) Cell-cell recognition
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