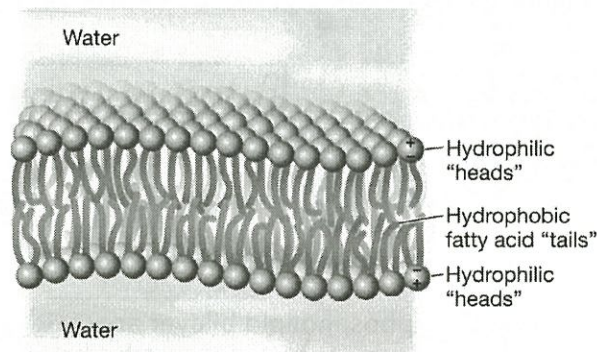


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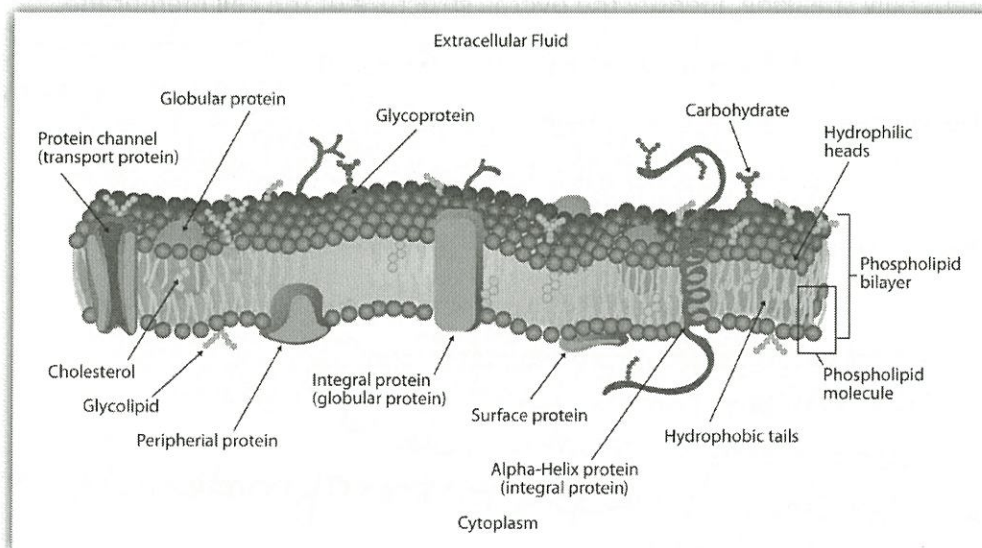
Cell Membrane Composition & Functions

The cell membrane is also called the **plasma** membrane and is made of a phospholipid **bilayer** (A). Some of the functions of the cell membrane include protecting and enclosing the cell, giving shape to the cell, allowing transportation of materials in and out of the cell, and carry out metabolic reactions near the inner surface of the cell membrane. The phospholipids of the cell membrane have a "hydrophilic" (water loving/attracting) **head** (G) and two "hydrophobic" (water fearing/repelling) **tails** (F). The head of a phospholipid is made of an alcohol and **phosphate** group, while the tails are chains of **fatty acids**. The cell membrane is constantly vibrating, creating small openings within the structure. Therefore, the phospholipids can allow water and other **smaller** molecules to pass through into or out of the cell, without the use of **energy**. This type of passive transport is known as **diffusion** because the molecules are moving **with** the concentration gradient (high to low).

(B) Phospholipid bilayer



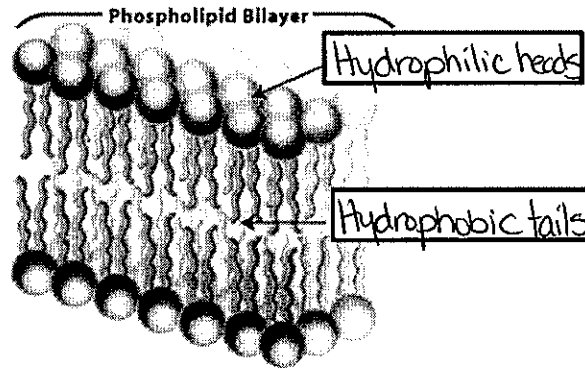
Another type of lipid in the cell membrane is **cholesterol** (I) that makes the membrane more fluid and adds to its flexibility. Embedded in the phospholipid bilayer are **proteins** that also aid in diffusion and in cell recognition. Proteins called **transport** proteins (B) go all the way through the bilayer. **Integral** proteins, also known as **membrane** proteins (H), are found only on one side of the membrane. Large molecules like **glucose** utilize these channel proteins to help move across cell membranes without the use of energy. Some membrane proteins, called glycoproteins (C), have carbohydrate **chains** (E) attached to help cells recognize each other and certain molecules.



Composition of the Cell Membrane & Functions

- ✓ I can describe the cell as a functioning open system and describe the role of the cell membrane in maintaining equilibrium while exchanging matter and energy
- ✓ I can describe how knowledge about semi-permeable membranes, diffusion and osmosis is applied in various contexts

The cell membrane is also called the plasma membrane and is made of a phospholipid bilayer. The phospholipids have a hydrophilic (water attracting) head and two hydrophobic (water repelling) tail. The head of a phospholipid is made of an alcohol and phosphate group, while the tails are chains of fatty acids. Phospholipids can move gases and allow water and other smaller molecules to pass through into or out of the cell. This is known as simple diffusion because it does not require energy and the water or molecules are moving with the concentration gradient.



Another type of lipid in the cell membrane is cholesterol that makes the membrane more fluid. Embedded in the phospholipid bilayer are proteins that also aid in diffusion and in cell recognition. Proteins called transport proteins go all the way through the bilayer, while integral proteins are only on one side. Integral proteins are also called membrane proteins. Large molecules like glucose or carbohydrates use proteins to help move across cell membranes. Some of the membrane proteins have carbohydrate chains attached to help cells in recognize each other and certain molecules.

1. What is another name for the cell membrane?

plasma membrane

2. Generally speaking, identify the overall structure of the cell membrane.

phospholipid bilayer = hydrophilic heads
hydrophobic tails

3. Define hydrophilic. Which portion of the bilayer is hydrophilic?

water loving / attracting

4. Define hydrophobic. Which portion of the bilayer is hydrophobic?

water fearing / repelling

5. List 4 functions of the cell or plasma membrane:

- protecting and enclosing the cell
- giving shape to the cell
- allowing transportation of materials in and out of the cell
- permitting out metabolic reactions near the inner surface of the cell membrane

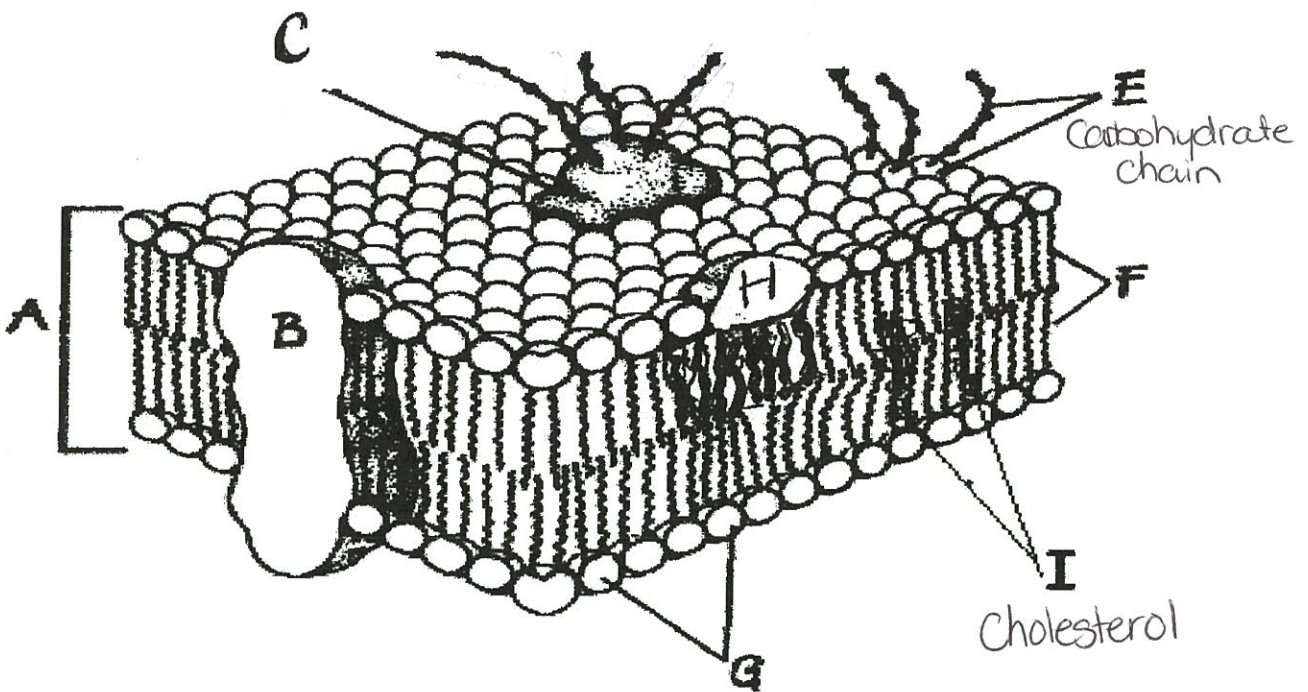
transport proteins - *carrier*
 integral / membrane proteins - *carrier* proteins
 glycoproteins - communication

6. Describe the different types of the proteins embedded in the cell membrane and their specific functions?

peripheral proteins - outer proteins

7. Correctly **color code and identify** the name for each part of the cell membrane.

Letter	Name(Color)	Letter	Name(Color)
A	Phospholipid bilayer (no color)	H	Peripheral protein (red)
B	Integral protein (pink)	I	Cholesterol (blue)
F	Fatty acid tails (orange)	C	Glycoprotein (green)
G	Phosphate heads (yellow)	E	Glycolipids (purple)



Match the cell membrane structure or its function with the correct letter from the cell membrane diagram.

Letter	Structure/Function	Letter	Structure/Function
G	Attracts water	F	Repels water
I	Helps maintain flexibility of membrane	A	Make up the bilayer
E	Involved in cell-to-cell recognition	B	Help transport certain materials across the cell membrane

