

## Cell Membrane—Structure and Function

### Composition of the Cell Membrane and 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 carrying out metabolic reactions near the inner surface of the cell membrane. The phospholipids of the cell membrane have a “hydrophilic” (water loving/attraction) head (B) and two “hydrophobic” (water fearing/repelling) tails (C). 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 → low).

Another type of lipid in the cell membrane is cholesterol (D), which makes the membrane more fluid and adds to its flexibility. Embedded in the phospholipid bilayer are proteins that also aid in diffusion and cell recognition. Proteins called integral proteins (E) go all the way through the bilayer. Large molecules like glucose utilize these channel proteins to help move across cell membranes without the use of energy. Peripheral proteins (F) are a type of membrane protein that is permanently attached to the biological membrane. Some membrane proteins, called glycoproteins (G), have carbohydrate chains (H) attached to help cells recognize each other and certain molecules.

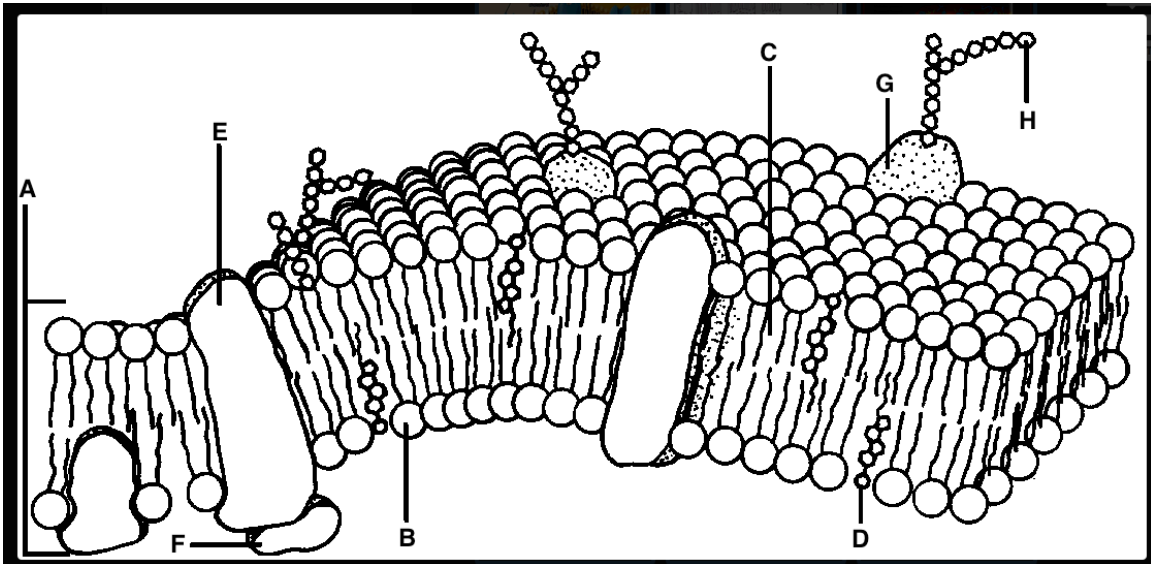
1. What is another name for the cell membrane? Generally speaking, identify the overall structure of the cell membrane.
  
2. Define hydrophilic. Which portion of the bilayer is hydrophilic?

3. Define hydrophobic. Which portion of the bilayer is hydrophobic?
4. When does the movement of materials in and out of the cell NOT require energy?
5. List the responsibilities of the cell membrane?
6. Describe the function of the proteins embedded in the cell membrane?
7. How are cells able to recognize various molecules and other types of cells?

## Cell Membrane Coloring

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

Letter	Name/Color	Letter	Name/Color
_____	Phospholipid Bilayer (no color)	_____	Peripheral protein (red)
_____	Integral protein (purple)	_____	Cholesterol (brown)
_____	Fatty acid tails (orange)	_____	Carbohydrate chain (green)
_____	Phospholipid head (yellow)	_____	Glycoproteins (blue)



Using the diagram above, label the hydrophobic and hydrophilic portions of the phospholipids.

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

- |   |                    |
|---|--------------------|
| _____ Attracts water  | _____ Repels water |
| _____ Helps maintain the flexibility of the membrane                        |                    |
| _____ Makes up the bilayer (2 answers)                                      |                    |
| _____ Involved in cell-to-cell recognition                                  |                    |
| _____ Helps transport materials (such as glucose) across the cell membrane. |                    |