Pakistan School
Kingdom of Bahrain

Pakistan School, Kingdom of Bahrain.

Welcome to new class

Grade 11

Rules of the class

1) Be on time for all your classes.
2) Respect all the participants of the class.
3) Do not create any disturbance.
4) Pay attention to your teacher.
5) Raise hand if you have a question.
6) Enter into the class with your actual name and CPR number.

Chapter 1

Cell Structure and Function

OBJECTIVES:

At the end of this lesson students will be able to:

- Describe the function of plasma membrane.
- Analyze the nature and function of cytoplasm

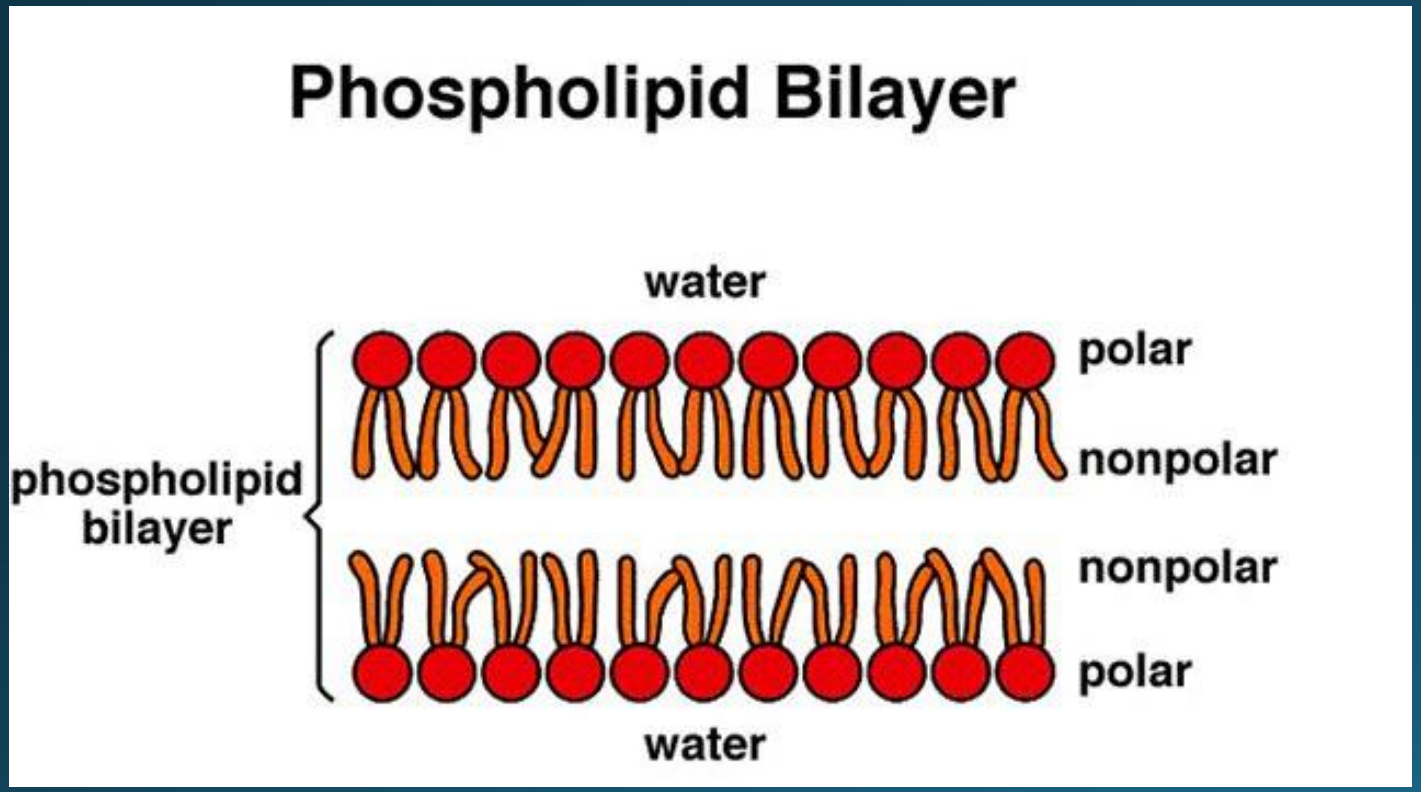
1. Functions of Plasma Membrane Lipids:

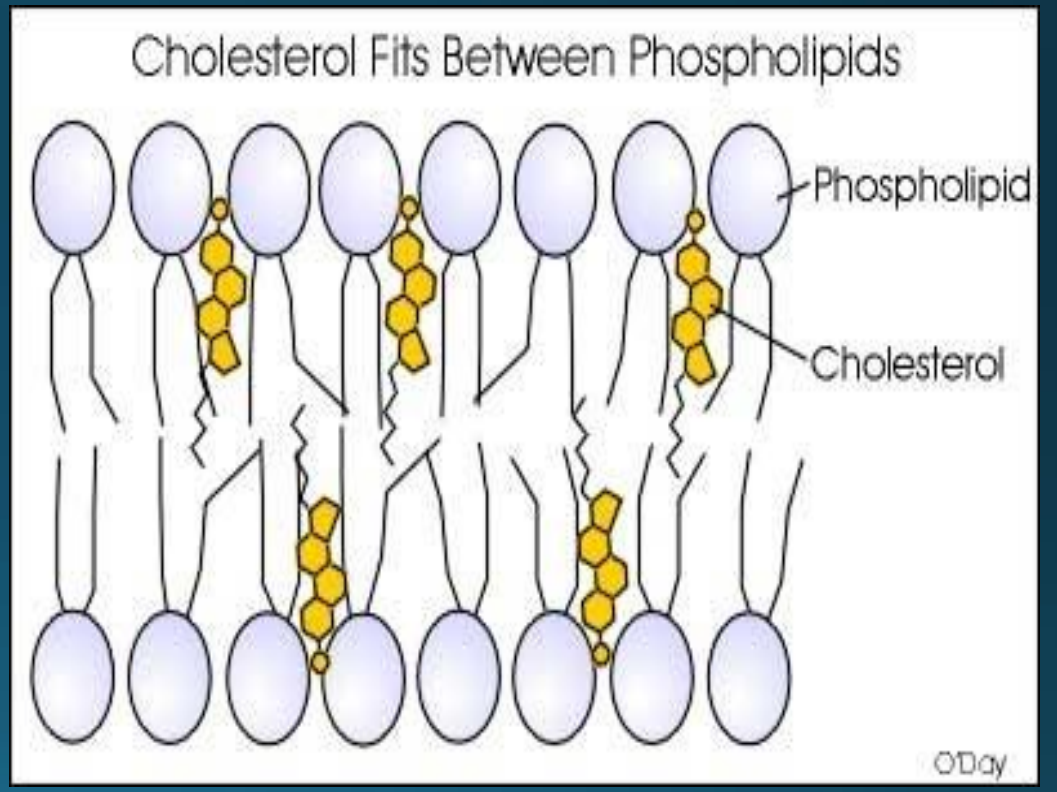
- Control the membrane fluidity
- Conc. of unsaturated fatty acids in **phospholipids** → high

  Bilayer fluidity → more

  Cell membrane = higher flexibility
- **Cholesterol** → stabilizes phospholipids at body temp.

  → keeps membrane fluid at lower temp.
- Lipid bilayer → basic structure + controls movement of ions and molecules
- **Glycolipids** → cell surface markers


Phospholipid Bilayer
water
polar
nonpolar
phospholipid bilayer
nonpolar
polar
water


Cholesterol Fits Between Phospholipids
Phospholipid
Cholesterol
©Day

2. Functions of Plasma Membrane Proteins:

Proteins may functions as : Transport channel, Carrier, Enzyme, Receptors or antigens

a. Channels Proteins + Carrier Proteins :

Involved in passage of molecules through membrane

Channel Proteins : Allows the transport of specific substances across a cell membrane passively.

Carrier Proteins : Bind the specific solute to be transported and undergo a series of conformational changes to transfer the bound solute across the membrane passively through facilitated diffusion, or via secondary active transport.

b. Enzymes :

- Perform metabolic reactions directly
- Example :
  - Adenylated cyclase → catalyzes transformation of ATP to cAMP

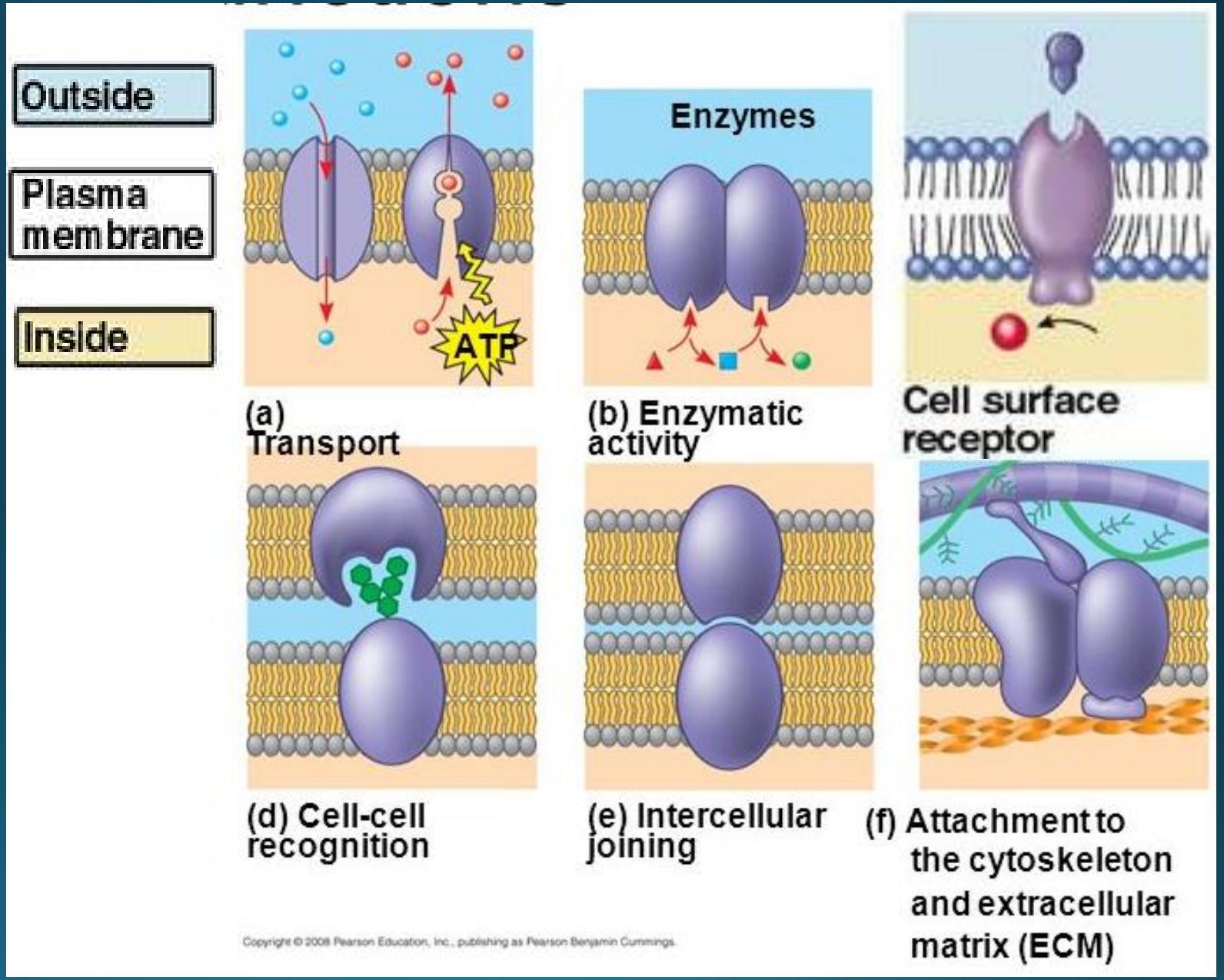
c. Receptor Molecules :

- Receive signals from other cells (nature of some = glycolipid)
- Specific shape allows binding of specific charge
- Protein shape changes
- Intracellular response occurs
- Example :

  Hormones binding to target cells via receptor sites

b. Antigens :

- Recognition of other cells a toxin or other foreign substance which induces an immune response in the body, especially the production of antibodies.



3. Role of Glycolipids and Glycoproteins:

- They are **Cell Surface/Identity Markers**
- Location : Outer surface of membrane
- Functions : Provides recognition of particular cell type
  Cell-cell recognition
  Sticking correct cells together in tissues

Regulation of Cell's interaction with environment :

- By controlling transport of materials that occurs to:
  - Obtain nutrients
  - Excrete wastes
  - Secrete useful substances
  - Generate ionic gradients important for nervous and muscular activity
  - Maintain suitable pH and ionic conc. in cell for enzyme activity

- Uses semi permeability property → allows some , inhibits others
- Lipid soluble + neutral substances → Easy access

Examples: small gas molecules (O_2 + CO_2), water, glucose etc.

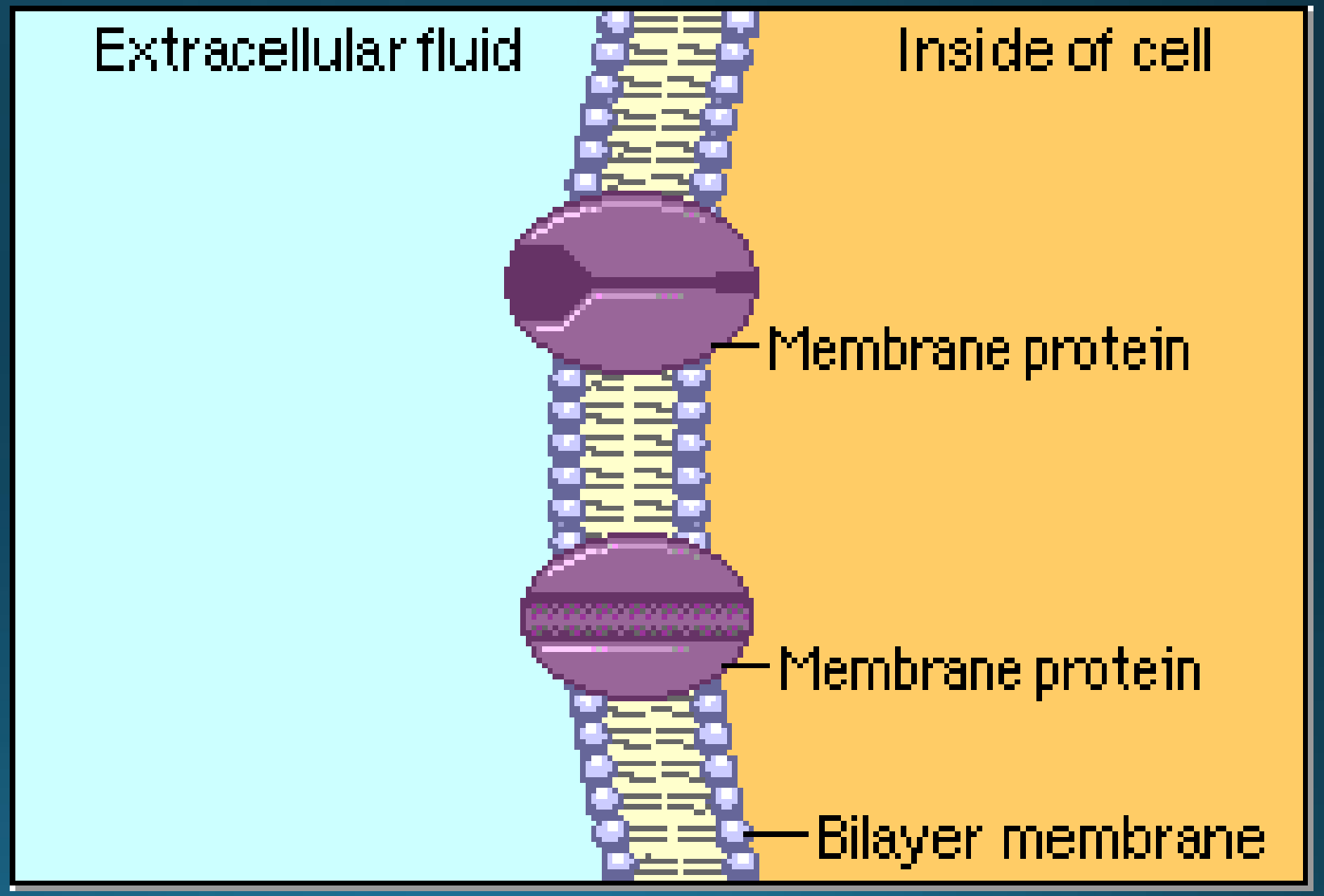
- Charged molecules → difficult access

Examples: ions etc.

- Four basic mechanisms used :

Active = Active transport , Bulk transport (exocytosis + endocytosis

Passive = Diffusion , Osmosis



3. Cytoplasm :

- Region between nuclear membrane and plasma membrane
- In both eukaryotic + prokaryotic cells (cytoplasm is _____?)

Physio-Chemical nature:

- 90 % water + biochemical molecules (aa…) → colloidal solution
- Two portions : 1) Cytosol 2) Cytogel

1) Cytosol :

- Inner Portion near the nucleus
- Less viscous

2) Cytogel :

- Near the membrane
- More viscous

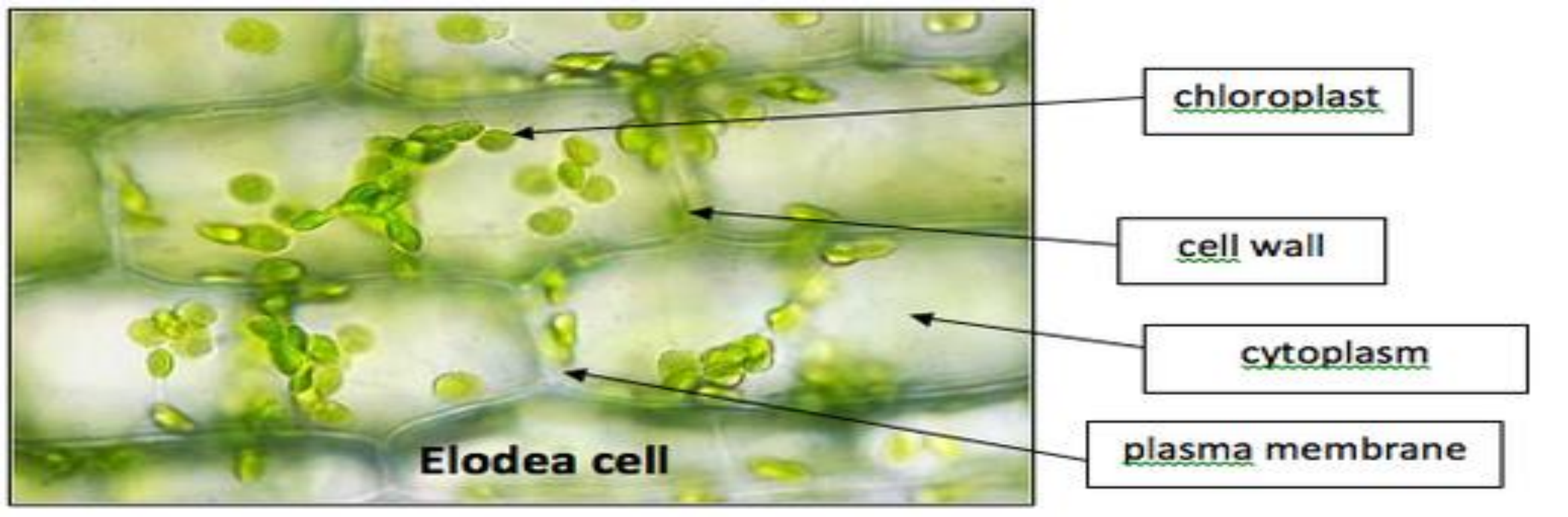
Cyclosis :

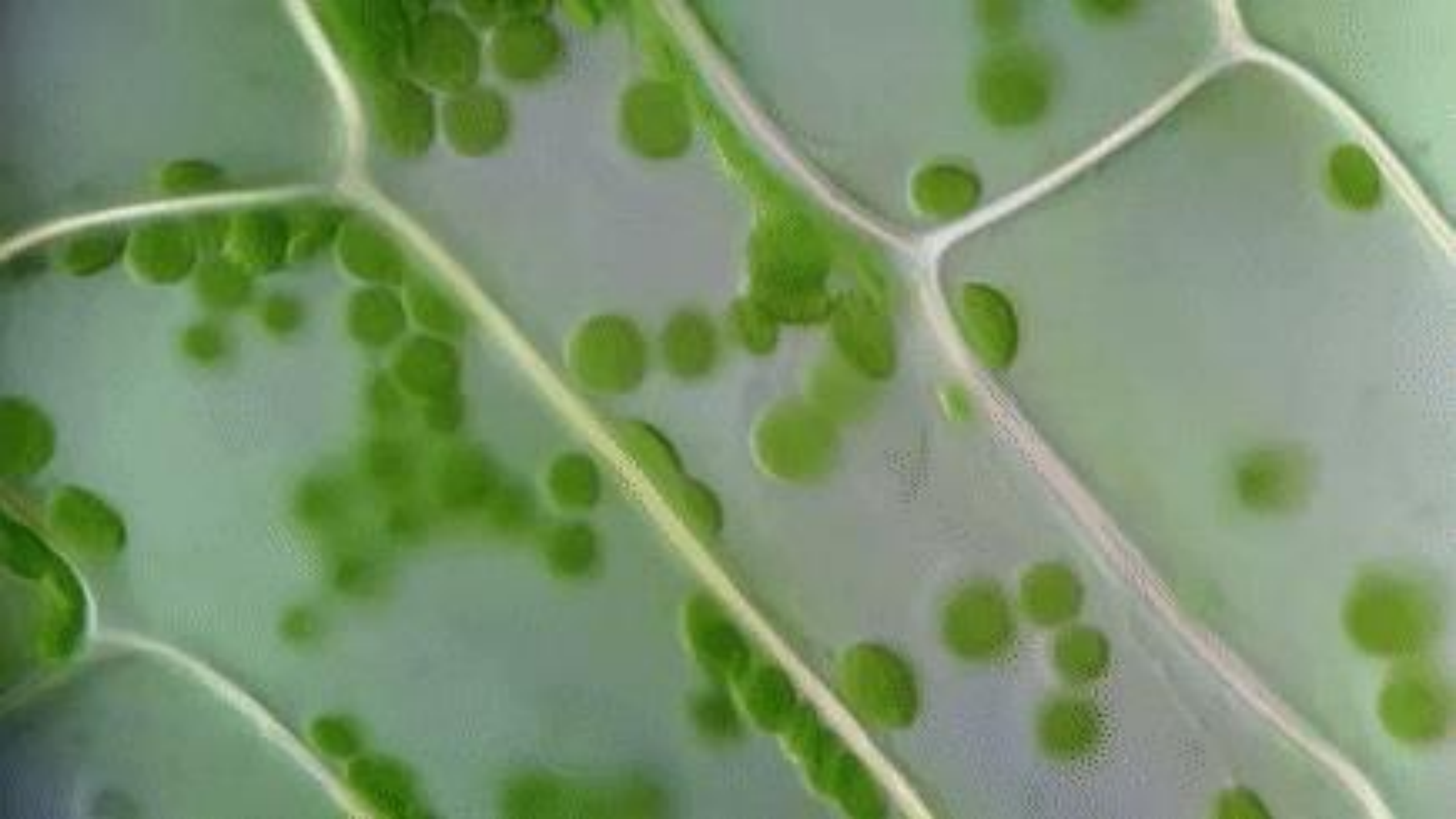
- Circular streaming movement
- due to contractile activity of microfilaments
- Distribution of materials in cytoplasm

Metabolic and Storage Role:

- Metabolic pathways that occur in cytosol of cytoplasm are:
  - Protein Biosynthesis
  - Glycolysis
  - Glycogenolysis
  - Gluconeogenesis
- In cytogel storage of substances used in cellular activities occurs + waste compounds which are later eliminated.

CYTOPLASM:


chloroplast
cell wall
cytoplasm
plasma membrane
Elodea cell



Plenary:

1. Describe the functions of protein in plasma membrane.

2. Which of the following substances requires a protein carrier in order to cross a membrane

a. Water
b. Glucose
c. Sodium ion
d. An amino acid
e. All of the above

3. What is meant by semi permeability of the plasma membrane.


STAY
HOME
STAY SAFE

Allah Hafiz