SNS COLLEGE OF PHARMACY AND HEALTH SCIENCES

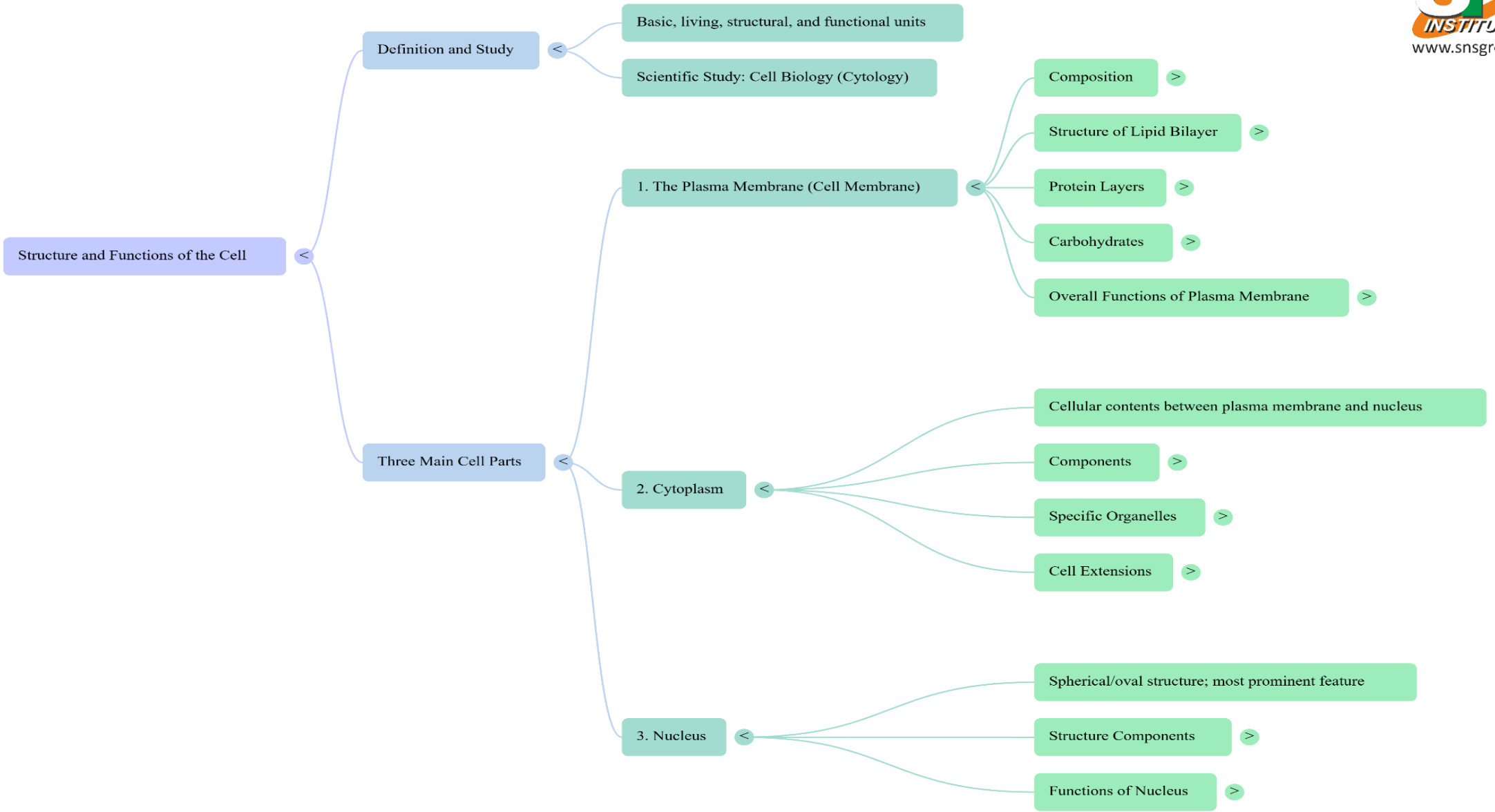
Affiliated To The Tamil Nadu Dr. MGR Medical University, Chennai
Approved by Pharmacy Council of India, New Delhi.
Coimbatore -641035

COURSE NAME : HUMAN ANATOMY AND PHYSIOLOGY

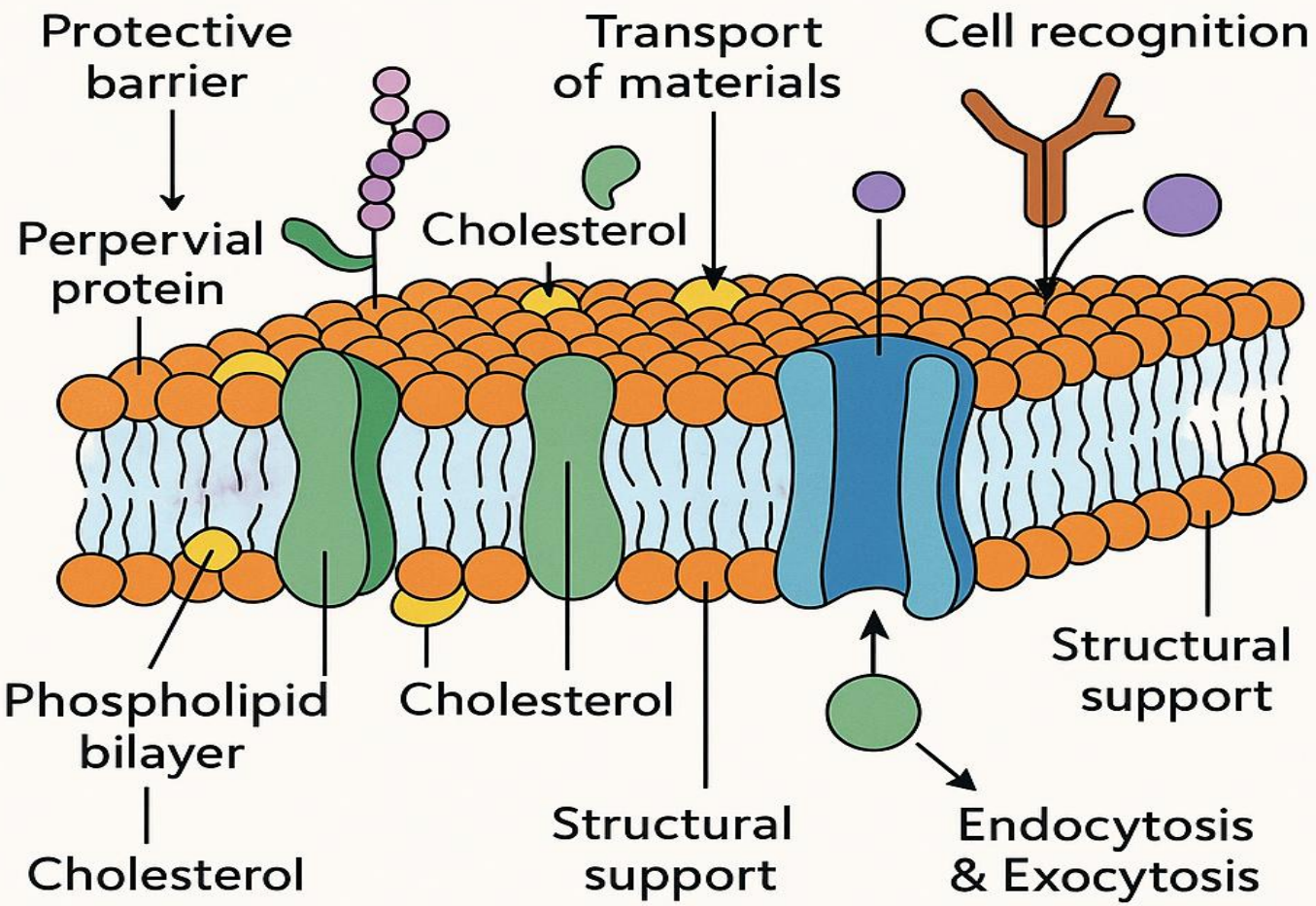
PHARMD 1 ST YEAR

TOPIC 1 :CELL AND ITS COMPONENTS -II

MINDMAP


Structure and Functions of the Cell
Definition and Study
Basic, living, structural, and functional units
Scientific Study: Cell Biology (Cytology)
Three Main Cell Parts
1. The Plasma Membrane (Cell Membrane)
Composition
Structure of Lipid Bilayer
Protein Layers
Carbohydrates
Overall Functions of Plasma Membrane
2. Cytoplasm
Cellular contents between plasma membrane and nucleus
Components
Specific Organelles
Cell Extensions
3. Nucleus
Spherical/oval structure; most prominent feature
Structure Components
Functions of Nucleus

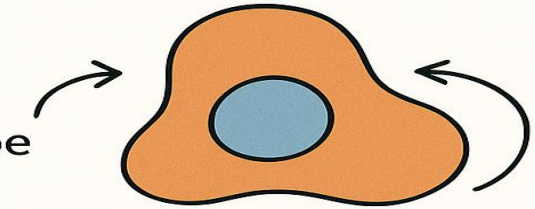
PLASMA MEMBRANE



CHARACTERISTICS OF THE PLASMA MEMBRANE

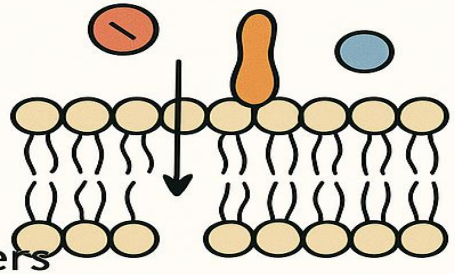
Flexible

allows the cell to change shape



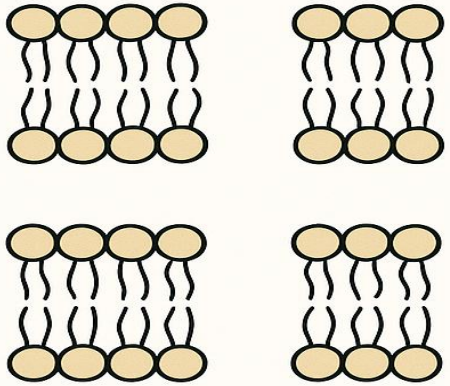
Selectively permeable

allows certain substances to pass while blocking others

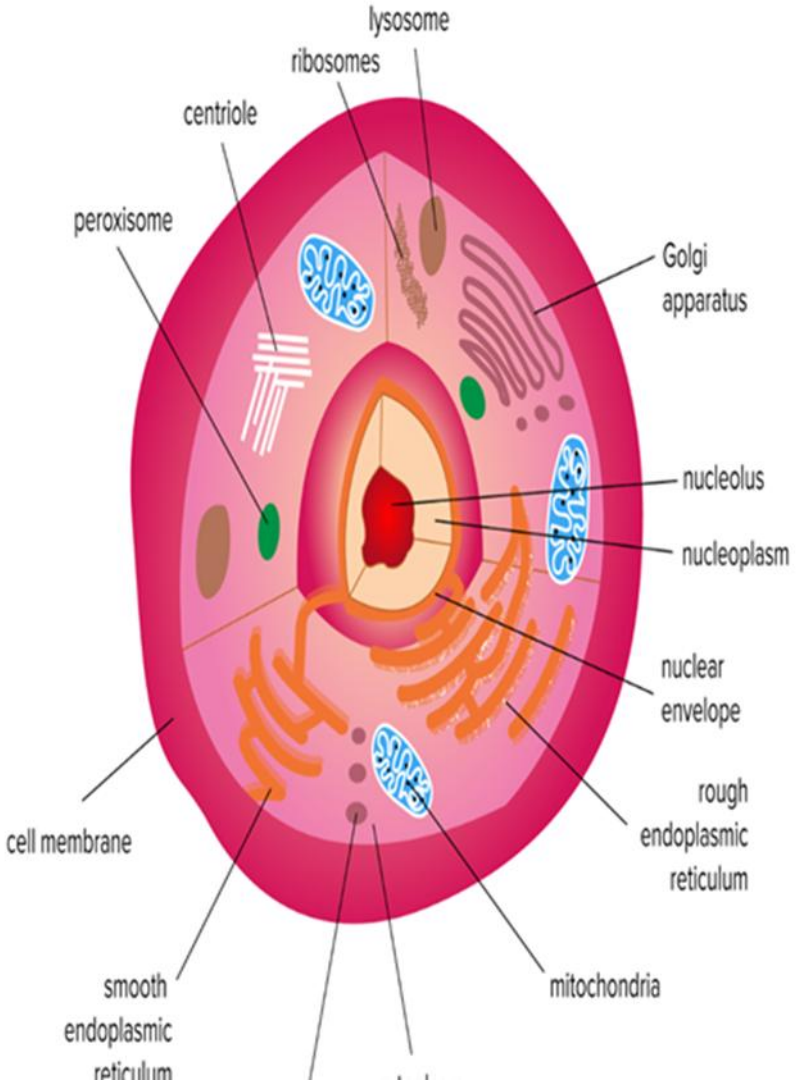


Self-healing

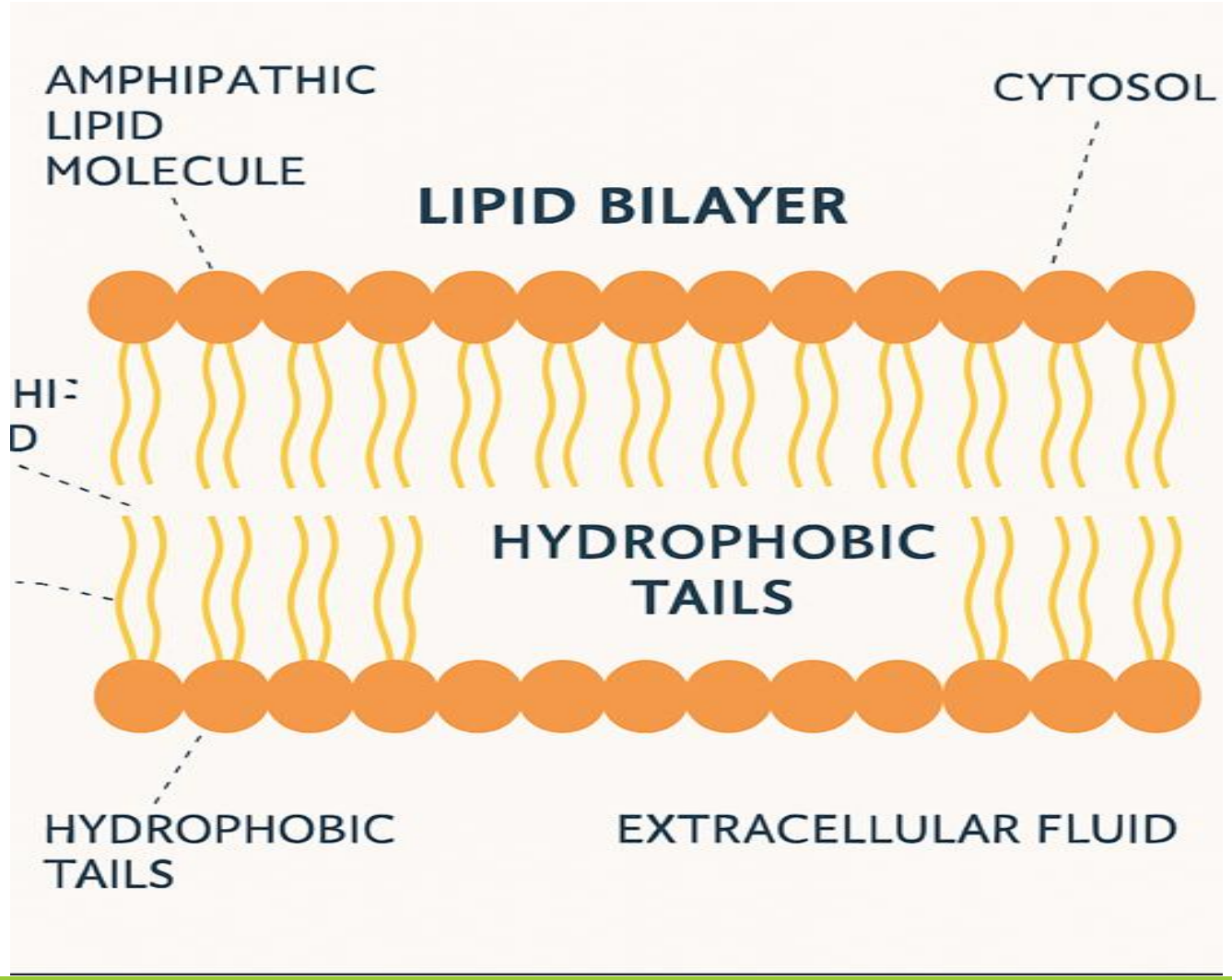
can reseal minor breaks or tears



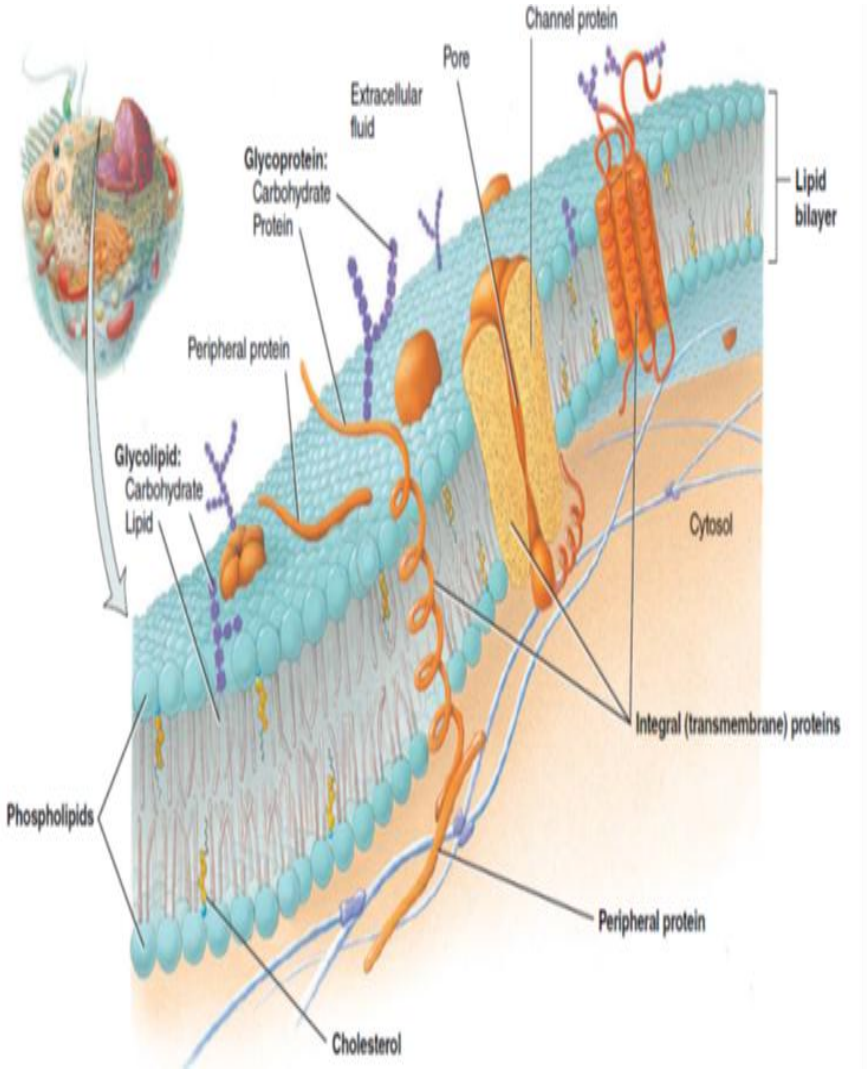
Components of a cell



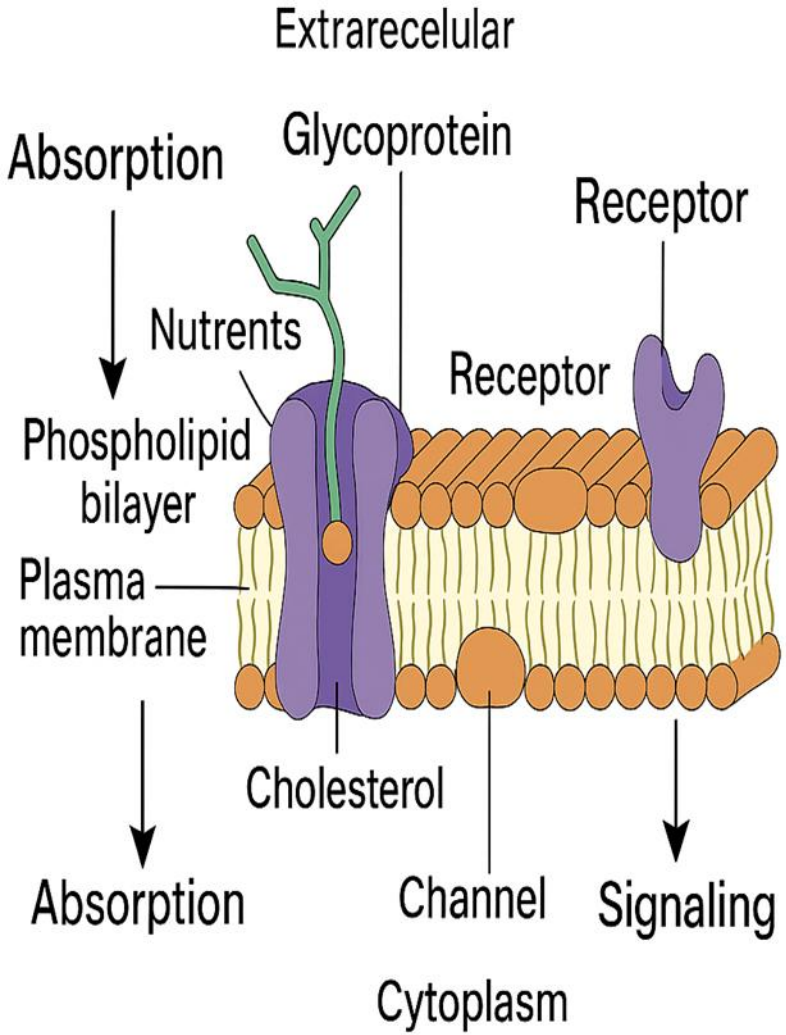
Structure of Plasma Membrane – Lipid Bilayer



Plasma Membrane – Role of Cholesterol & Glycolipids



Functions of Plasma Membrane



- Protective functiòn
- Selective permeability
- Absorptive function
- Excretory function
- Exchange of gases
- Maintains shape & size
- Cell signaling

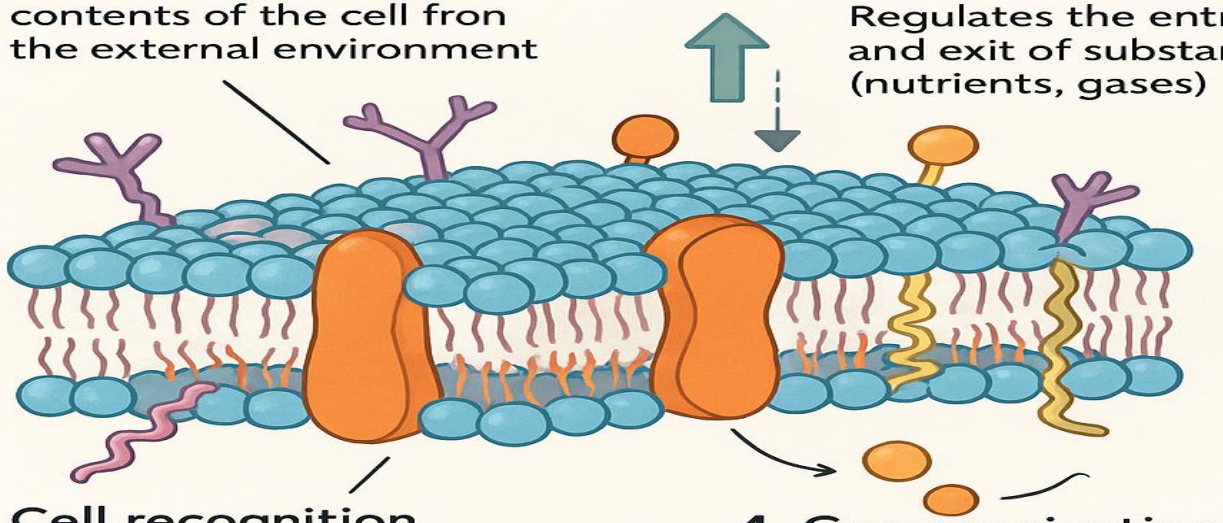
Participates in ṣize

Provides structural support

FUNCTIONS OF THA PLASMA MEMBRANE

1 Profective barrier
Separates the internal contents of the cell fron the external environment

2 Selective permeaibilitiy
Regulates the entry and exit of substances (nutrients, gases)



5 Cell recognition
Glycoproteins and glycolipids help in identifying other cells (e.g., immune response)

4 Communication
Contains receptor proteins that receive chemical signals (e.g., immune response)

7 Endocytosis & Exocytosis
Helps in the intake (endocytosis) and release (exocytosis) of large molecules

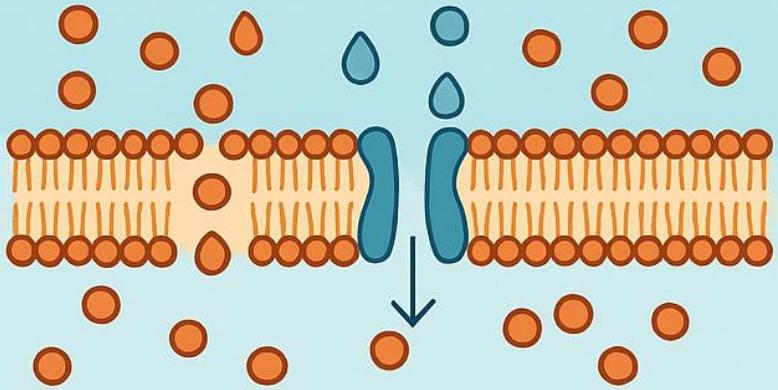
6 Structural support
Anchors the cytoskeleton and maintains cell shape

Types of Transport Across the Membrane

PASSIVE TRANSPORT
(NO ENERGY REQUIRED)

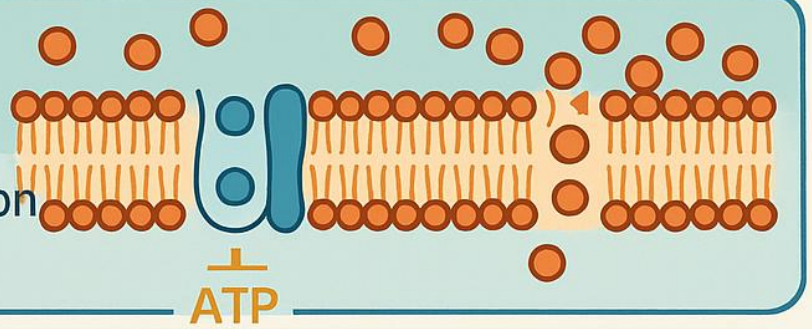
Diffusion: movement of molecules from high to low concentration

Osmosis: movement of water through a semi-permeneable membrane



ACTIVE TRANSPORT
(ENERGY REQUIRED)

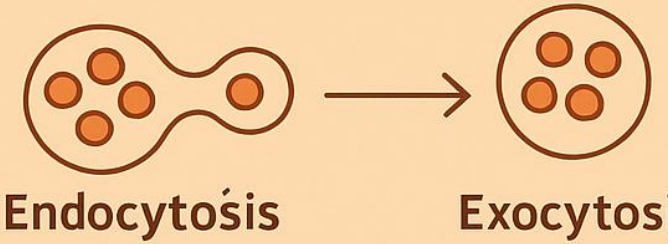
Moves moolecules against the concentration gradient using ATP (e.g., Na^+/K^+ pump)



BULK TRANSPORT

Endocytosis: taking in large particles (e.g. phagocytosis, pinocytosis)

Exocytosis: releasing materials out of the cell



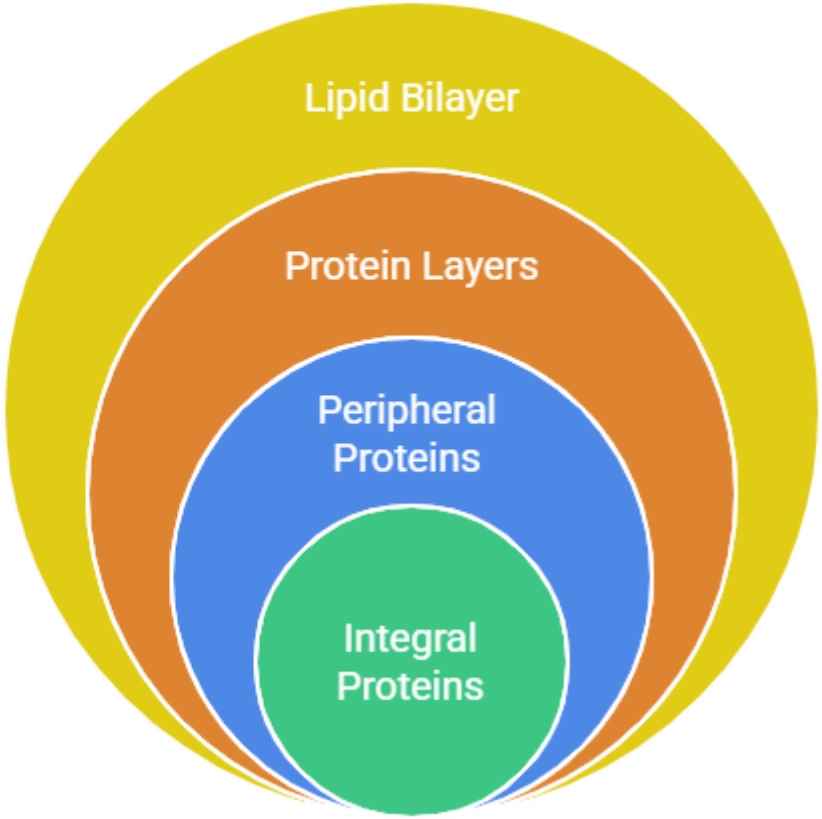
Cell Membrane Protein Structure

Central core of the cell membrane

Protective layers covering the lipid bilayer

Proteins attached to the membrane surface

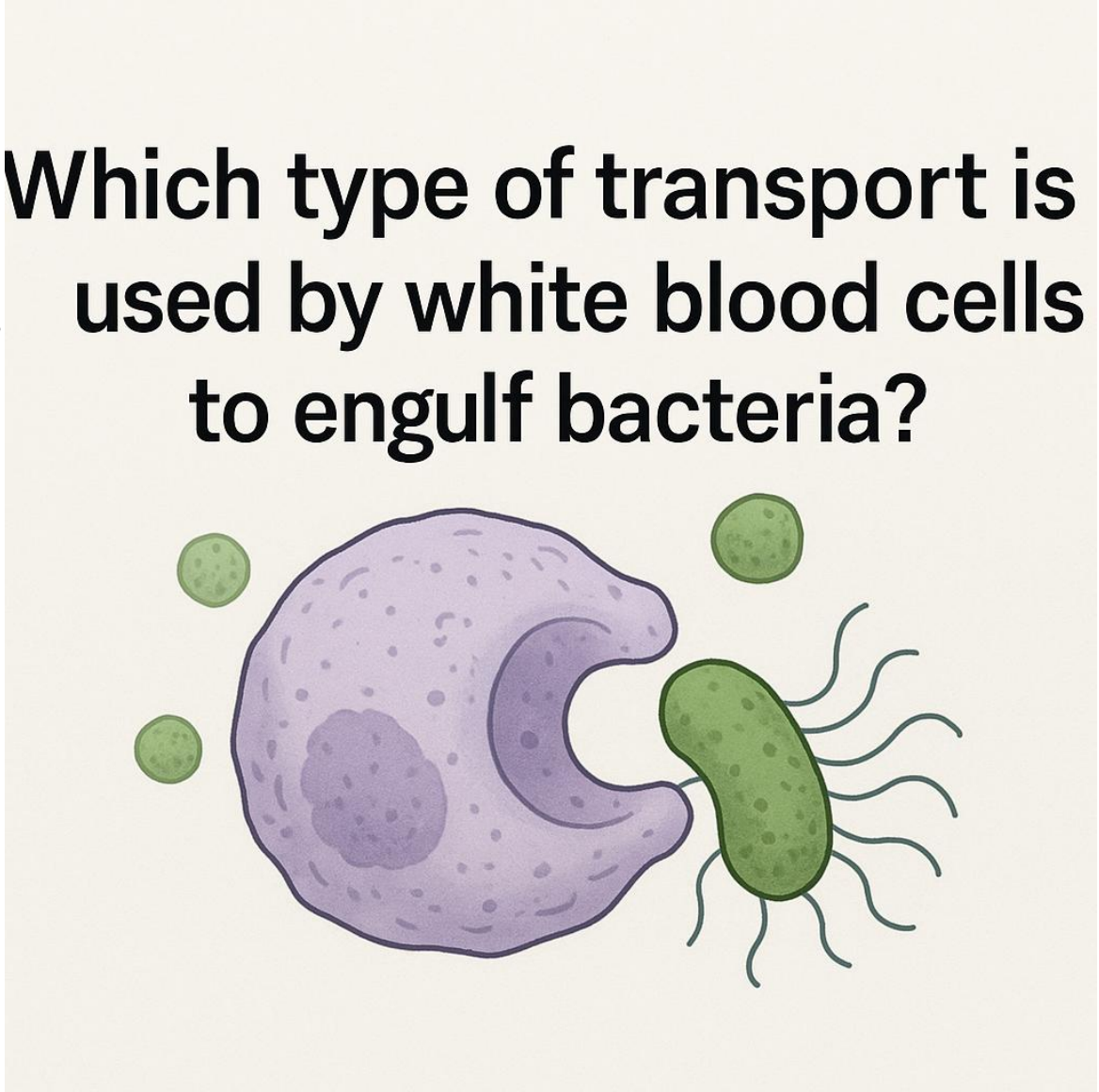
Proteins spanning the membrane



ASSESMENTS

1. Why is the plasma membrane described as “selectively permeable”?

Which type of transport is used by white blood cells to engulf bacteria?



What is the Fluid Mosaic Model, and who proposed it

How do peripheral proteins assist in cell signaling or communication

REFERENCES

- ✓ Ross And Wilson Anatomy And Physiology In Health And Illness, Anne Waugh &Allison Grant
- ✓ Essentials of Medical Physiology, K. Sembulingam & P. Sembulingam (Jaypee Brothers Medical Publishers)
- ✓ Human Anatomy & PhysiologyGerard J. Tortora & Bryan H. Derrickson (Wiley)
- ✓ A Textbook of Human Anatomy and Physiology-I, SIA Publishers


Thank You