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

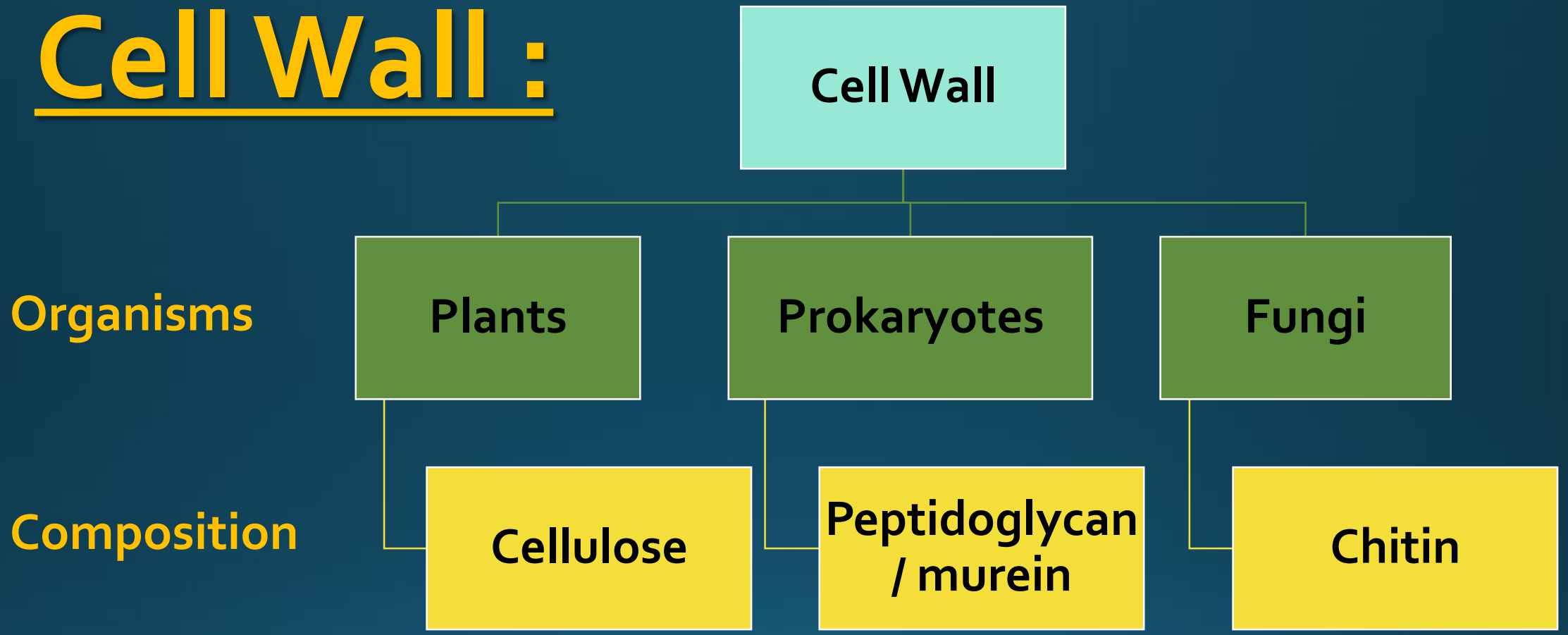
Cell Structure and Function

OBJECTIVES:

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

- Describe the structure and composition of cell wall and plasma membrane.

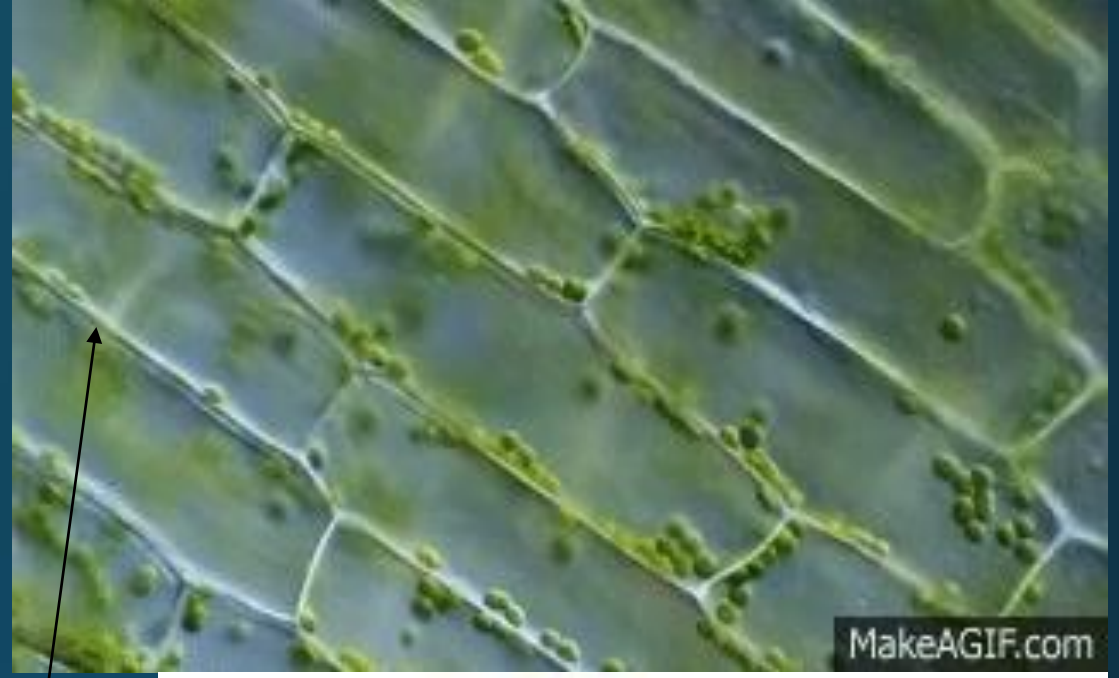
1. Cell Wall :

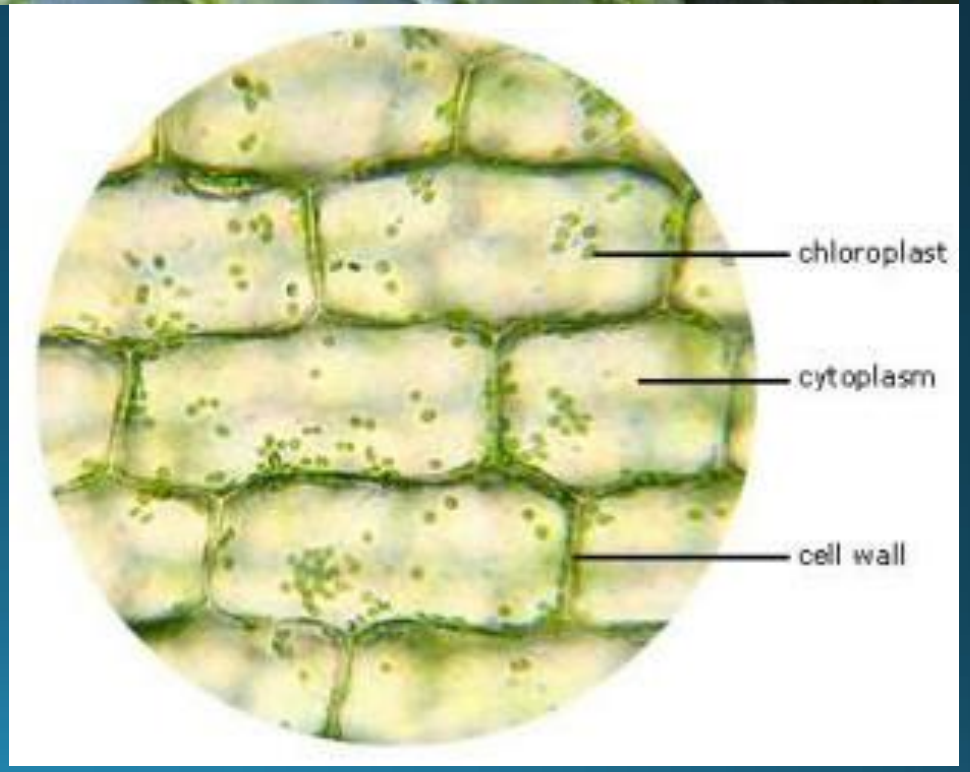


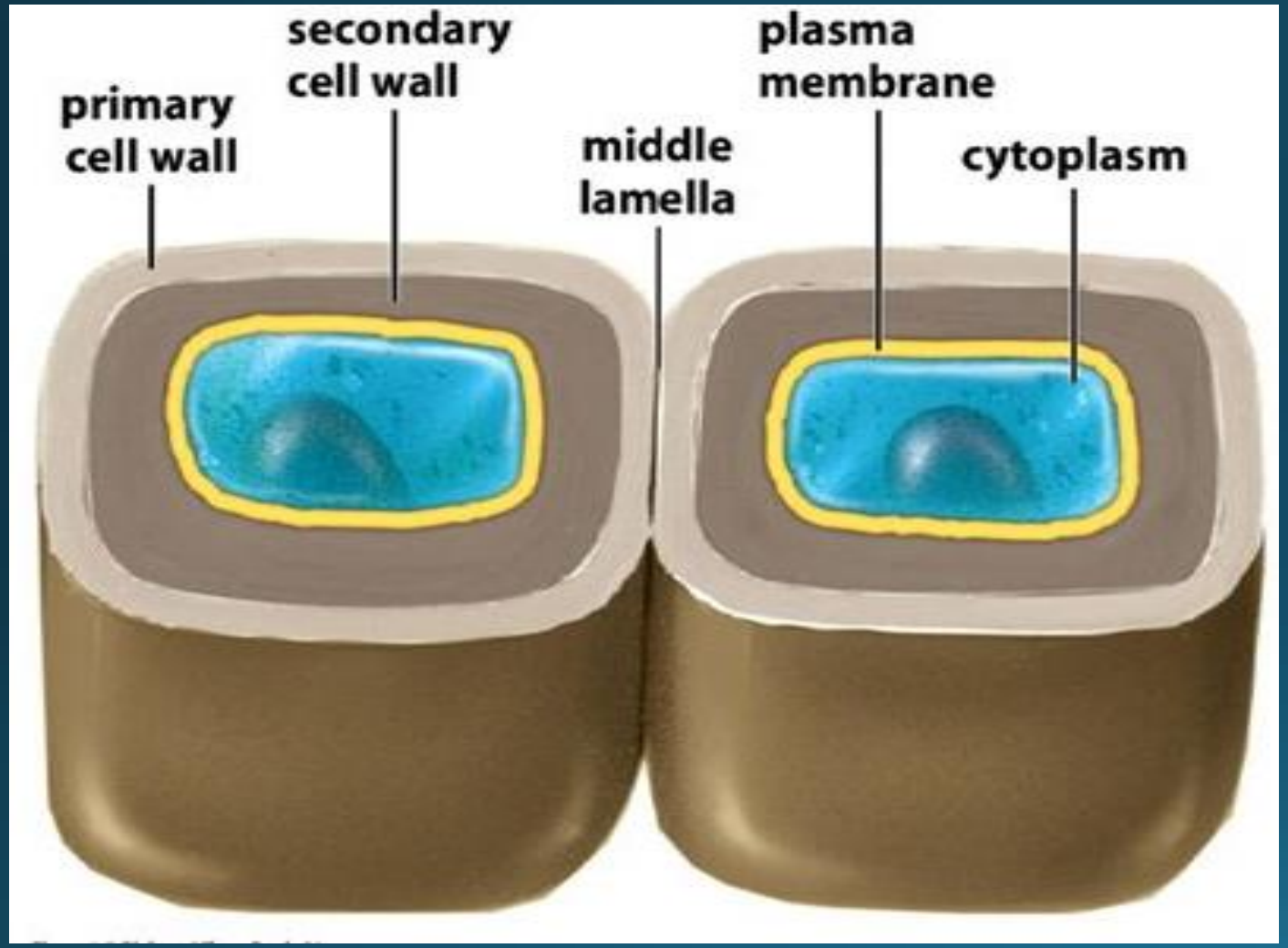
Animals = no cell wall → locomotory mode of life

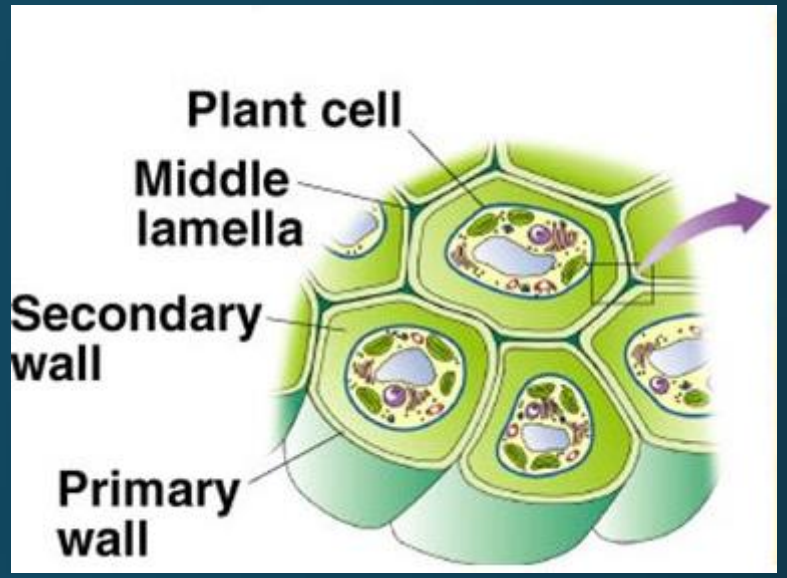
Cell Wall : (Plant)

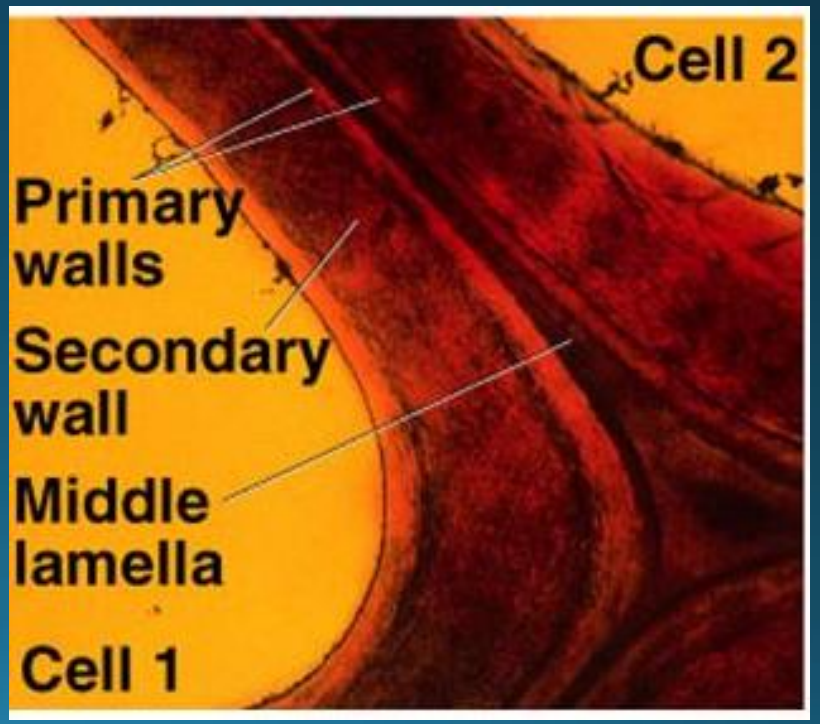
- Porous (pits)
- Secreted by cell
- Free passage of water +dissolved material
- 3 main layers
    i. Primary Cell Wall
    ii. Secondary Cell Wall
    iii. Middle lamella





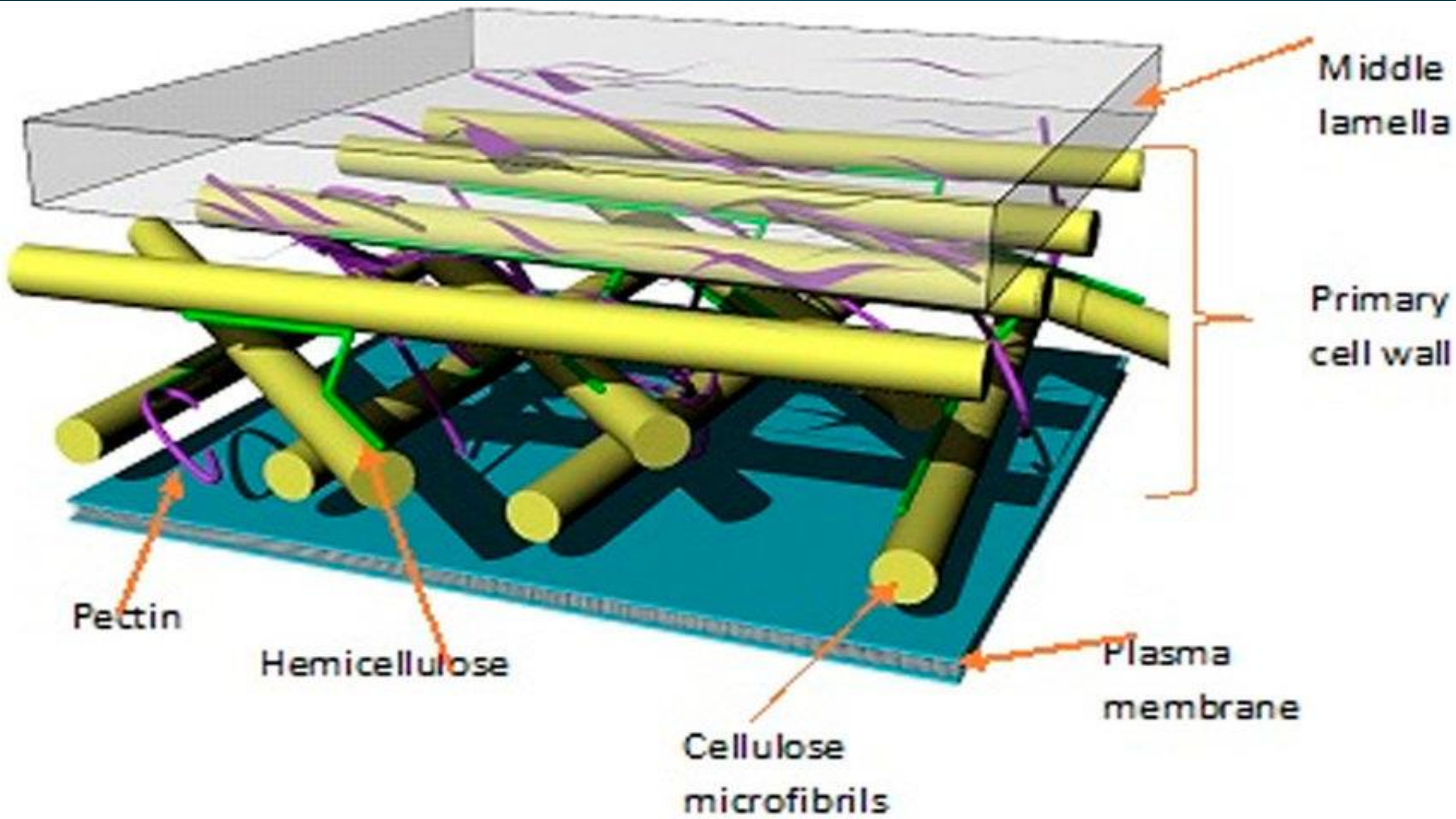

primary cell wall
secondary cell wall
middle lamella
plasma membrane
cytoplasm


Plant cell
Middle lamella
Secondary wall
Primary wall


Cell 2
Primary walls
Secondary wall
Middle lamella
Cell 1

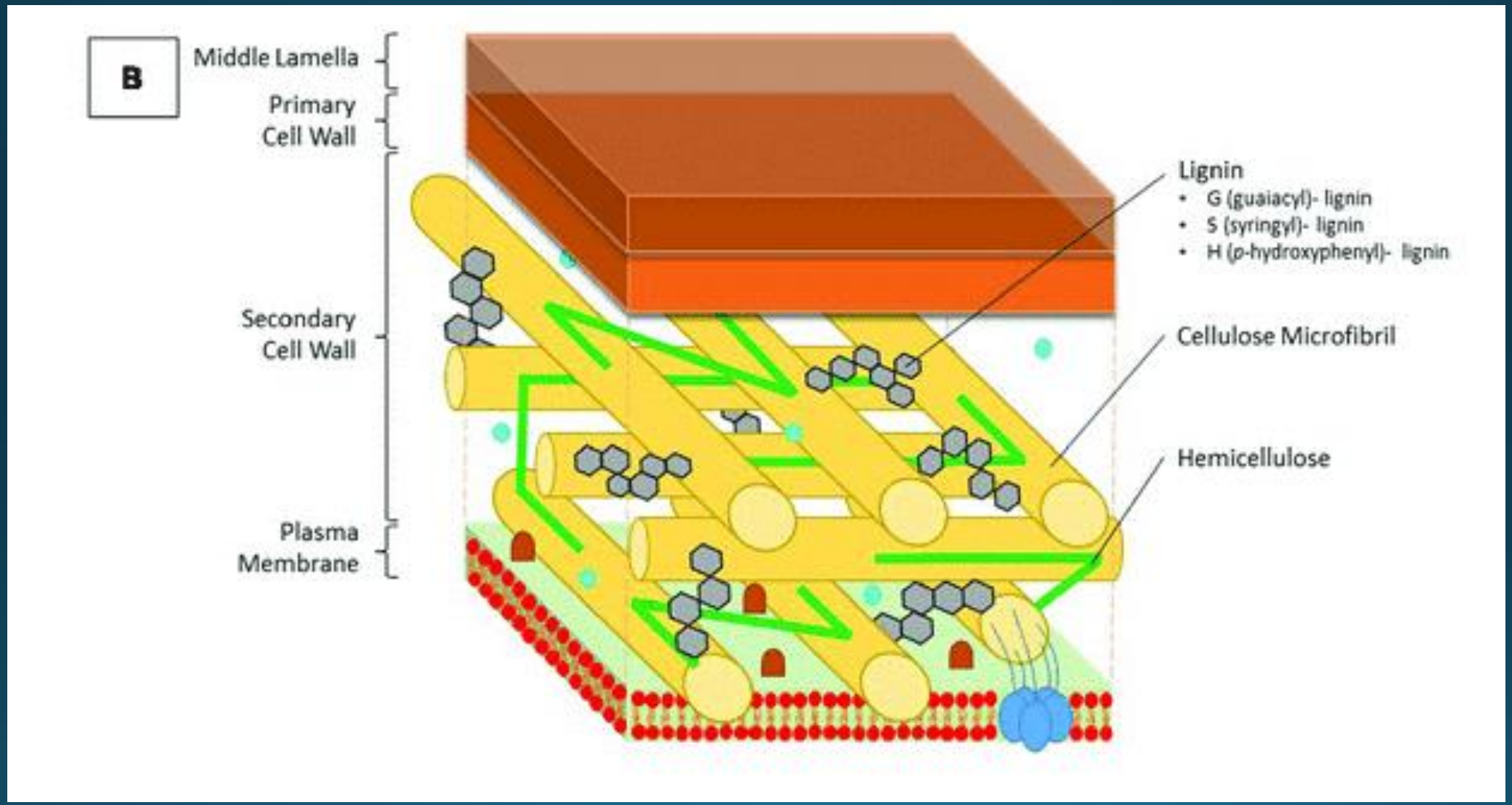
i. Primary Cell wall :

- True wall
- Location → Inner to middle lamella
- Development → during cell division
- Thin + slightly flexible
- Composition → cellulose microfibrils (bundles of cellulose chains) through matrix of pectin and hemicelluloses
- Arrangement → Criscross in layers – strength
- Function → Adapted to growth + Stretches plastically / Irreversibly


Middle lamella
Primary cell wall
Pectin
Hemicellulose
Cellulose microfibrils
Plasma membrane

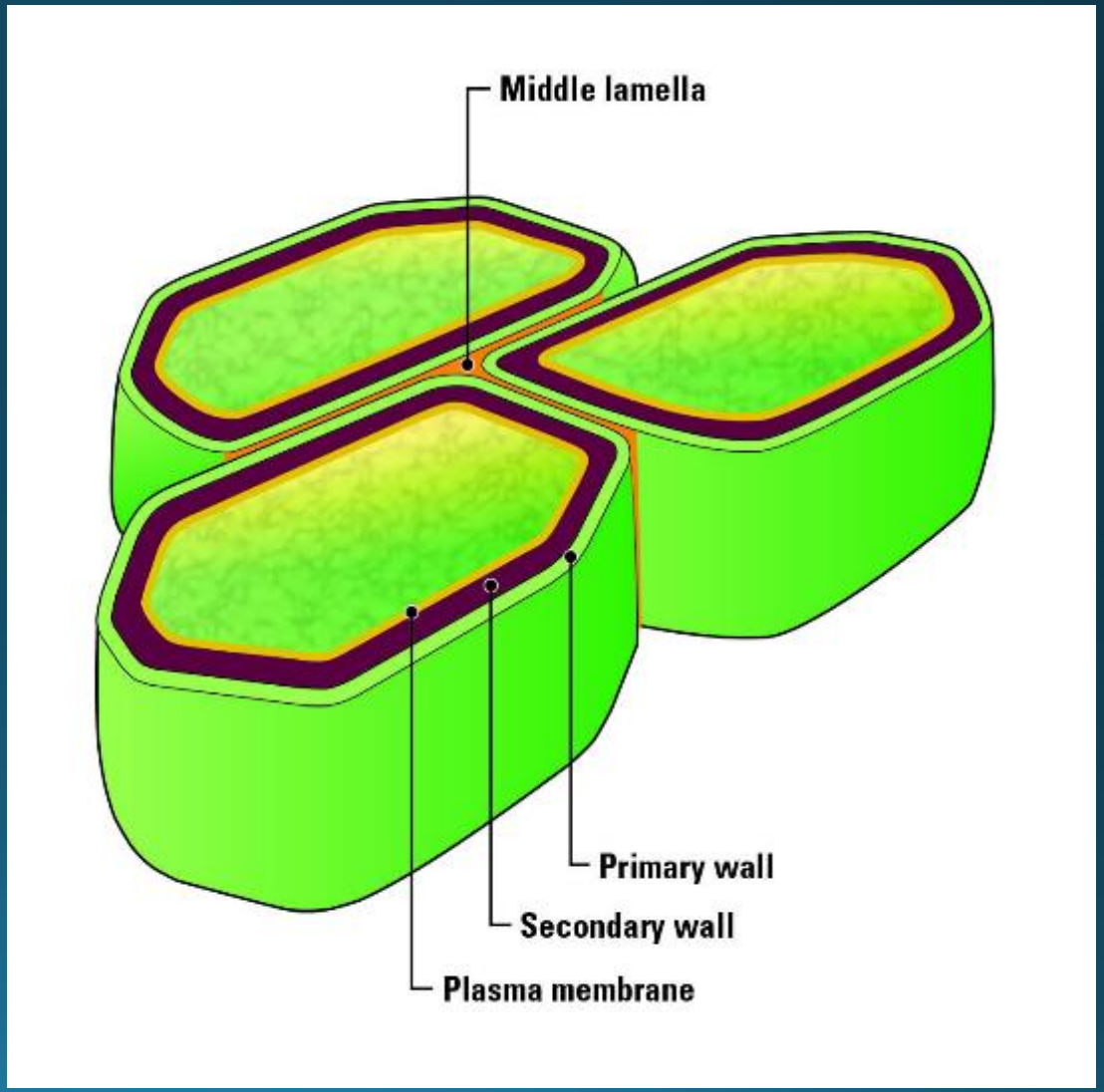
ii. Secondary Cell wall :

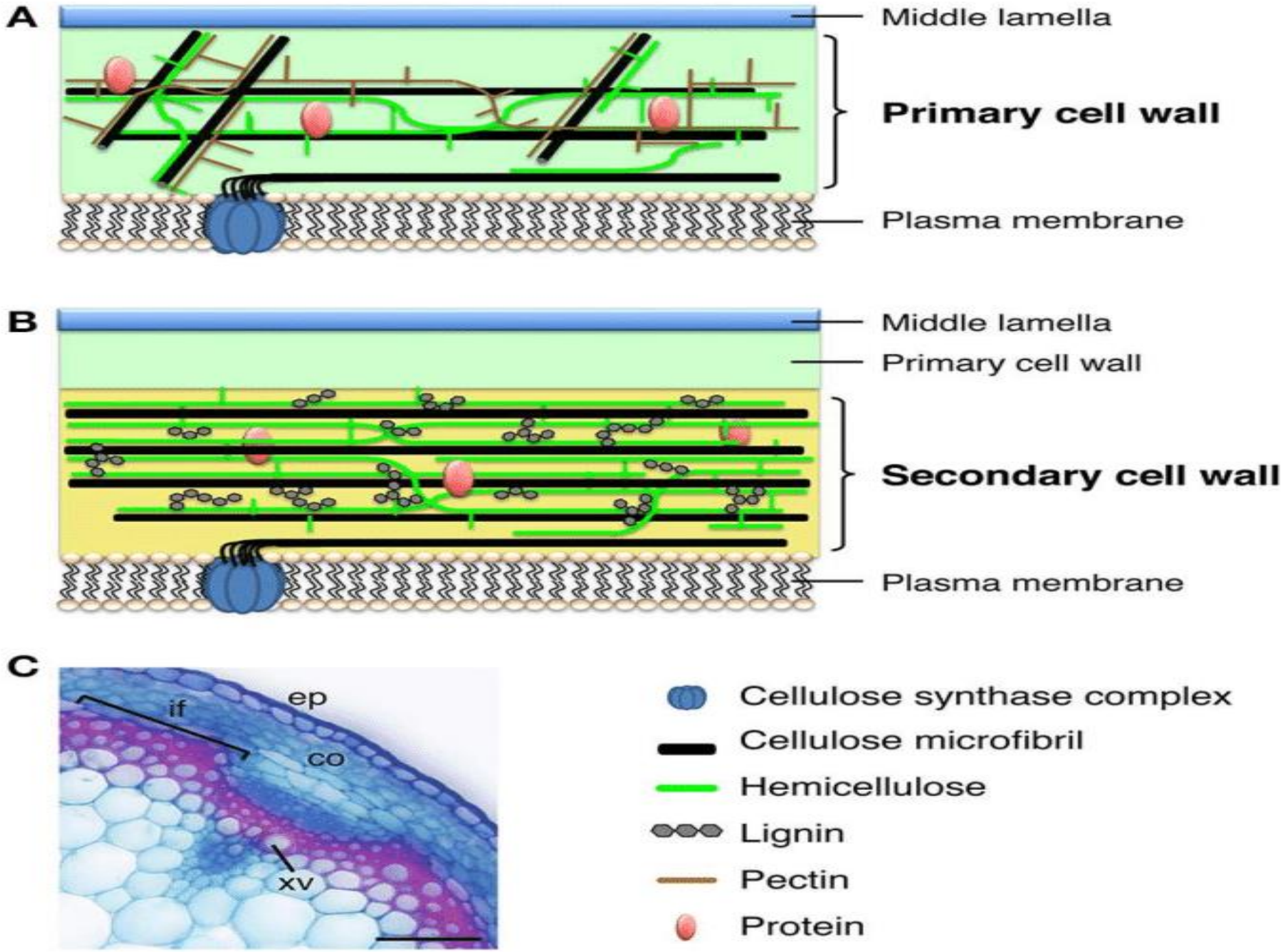
- Location → Between primary cell wall and plasm membrane
- Only in sclerenchyma cells (?)
- Generally present in dead plant cells → support
- Development → after cell has completed growth
- Thick + rigid → limits further growth
- Composition → cellulose, hemicelluloses, lignin, inorganic salts, waxes
- Arrangement → lignin anchors the cellulose microfibrils + provides rigidness
- Function → definite shape + mechanical support


B
Middle Lamella
Primary Cell Wall
Secondary Cell Wall
Plasma Membrane
Lignin
• G (guaiacyl)- lignin
• S (syringyl)- lignin
• H (p-hydroxyphenyl)- lignin
Cellulose Microfibril
Hemicellulose

iii. Middle Lamella :

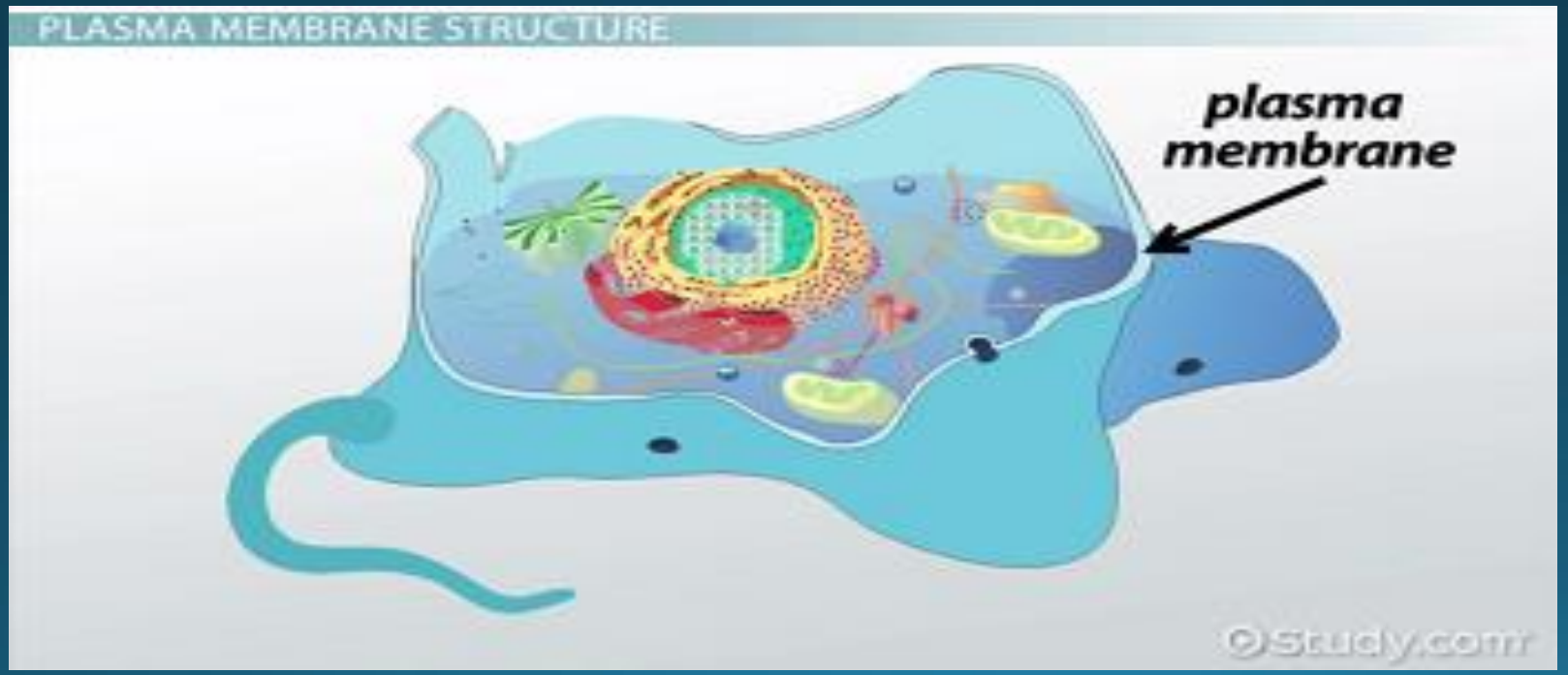
- Location → Between primary cell walls of adjacent cells
- Composition → Sticky gel-like Mg + Ca salts (pectic acids) + pectin
- Function → holds neighboring cell walls together



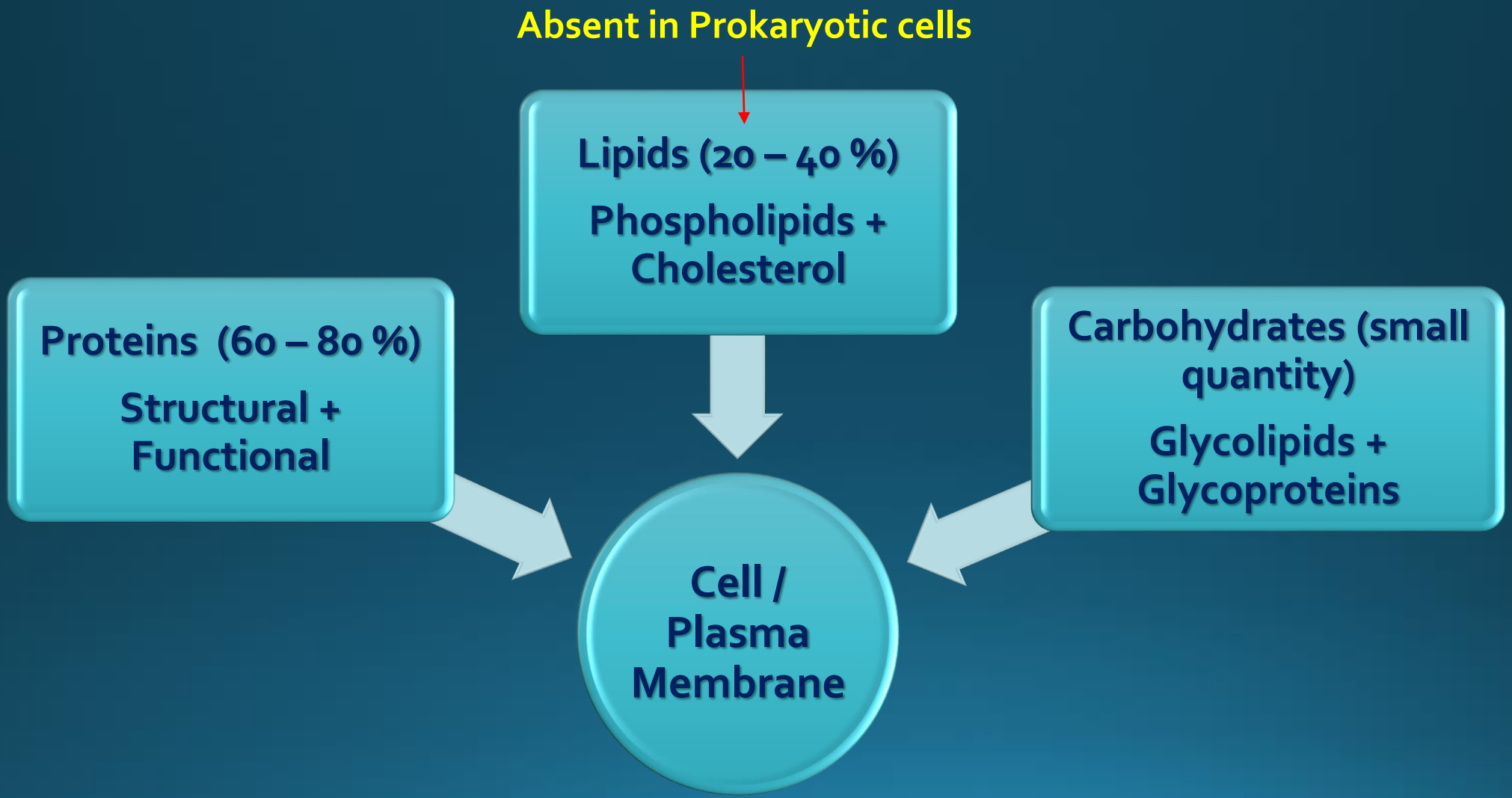

A
Middle lamella
Primary cell wall
Plasma membrane
B
Middle lamella
Primary cell wall
Secondary cell wall
Plasma membrane
C
if
ep
co
xv
Cellulose synthase complex
Cellulose microfibril
Hemicellulose
Lignin
Pectin
Protein

2. Plasma Membrane :

- Boundary of Protoplasm
- In Prokaryotic + Eukaryotic Cells
- Other names = Cell membrane / Plasmalemma / Cell Surface Membrane
- Function → Controls passage of materials in and out of the cell



Composition of Plasma Membrane:



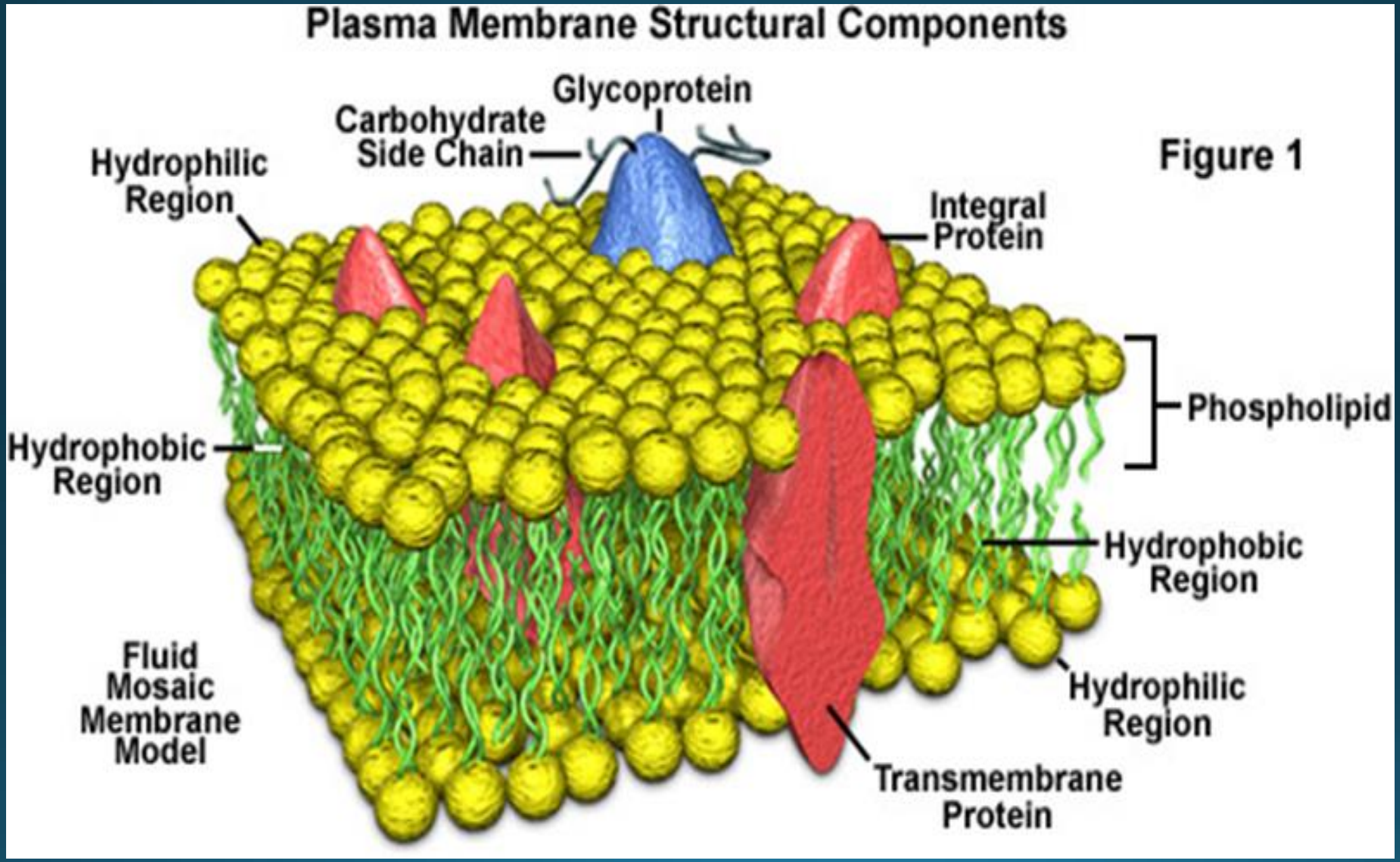
Structure of Plasma Membrane:

Fluid Mosaic Model :

"The membrane is a phospholipid bilayer in which protein molecules are either partially or wholly embedded"

Proteins:

- Scattered irregularly throughout membrane
- Pattern of distribution varies
- Determine most of the functions of that membrane
- Drift sideways in fluid bilayer
- Glycoproteins with attached carbohydrate chain


Plasma Membrane Structural Components
Glycoprotein
Carbohydrate Side Chain
Hydrophilic Region
Figure 1
Integral Protein
Phospholipid
Hydrophobic Region
Hydrophobic Region
Fluid Mosaic Membrane Model
Hydrophilic Region
Transmembrane Protein

Lipids:

- Lipid part forms 2 phospholipid layers (bilayer)
- Arrangement → Hydrophobic ends face each other while hydrophilic ends appeared on the surface
- Has steroids + cholesterols in it

Carbohydrate:

- Branched or unbranched Oligosaccharides
- As Glycolipids or Glycoproteins
- Outer side of membrane

7nm thick

Asymmetrical

Cytoskeleton filaments on the inner surface → support the membrane

Plenary:

1. Cell wall of plant cells is different from that of prokaryotes in _____ and _____ .
2. What is the difference between primary and secondary cell wall ?
3. Describe 2 differences between cell wall and cell membrane.


STAY
HOME
STAY SAFE

Allah Hafiz