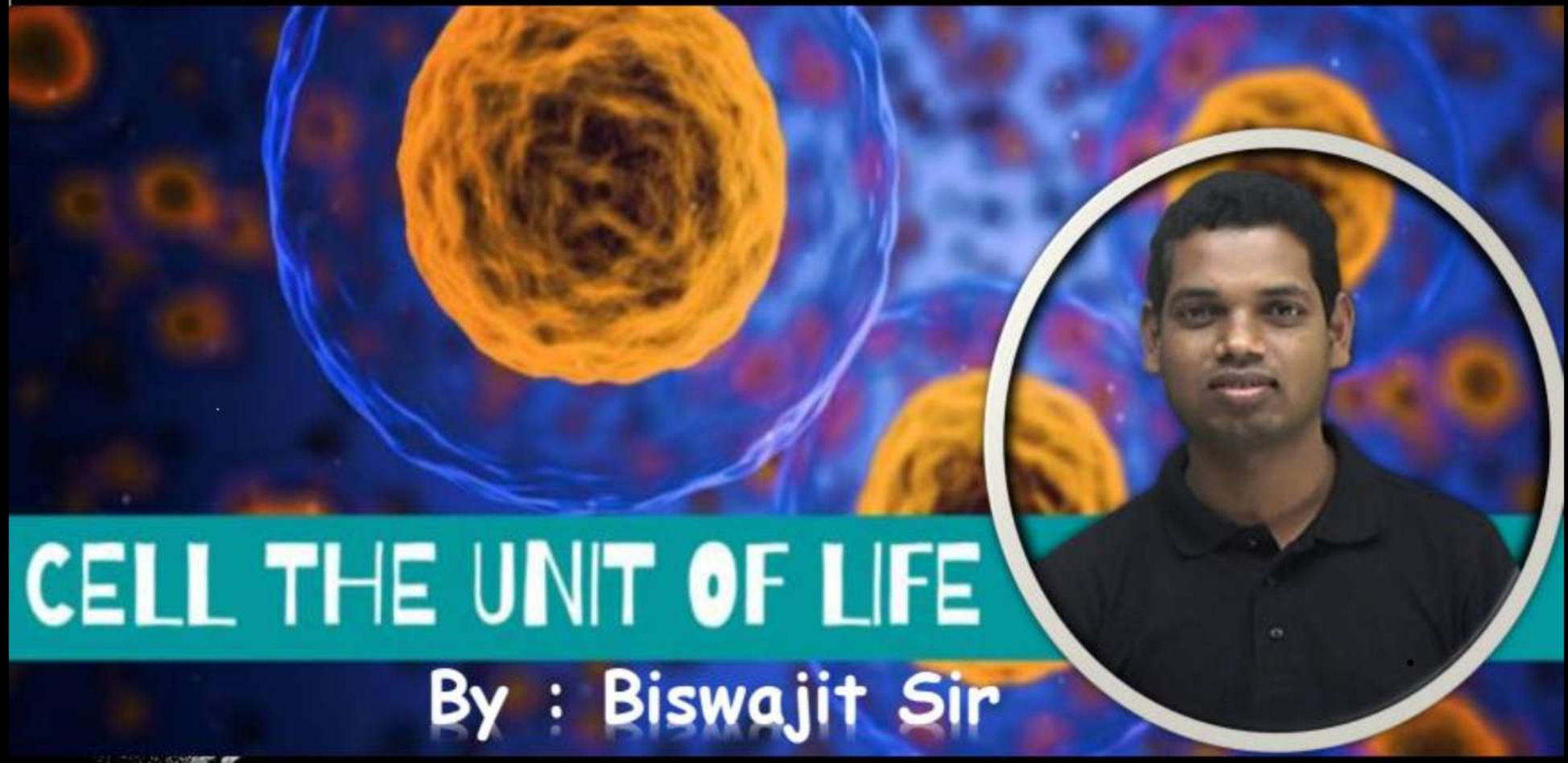
ARJUNA NEET BATCH



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Q. Which one of the following does not differ in *E.coli* and *Chlamydomonas*? (2012 Pre)

a. Cell membrane
b. Ribosomes
c. Chromosomal Organization
d. Cell wall

Q. Which of the following is a noncytoplasmic organelle?

a. Nucleus b. lysosome c. ER d. ribosome

Q. Which of the following is not a component of cytosol?

a. Nucleus b. ribosome c. vacuole d. all

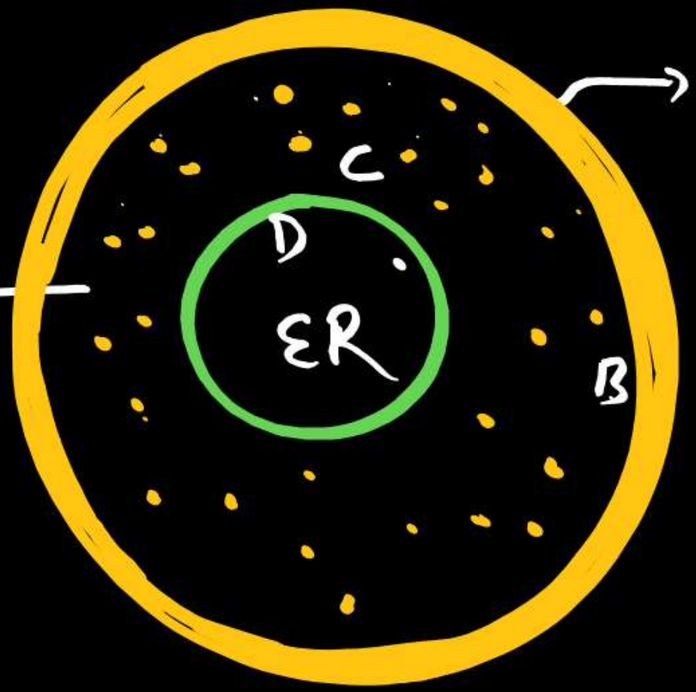
Q. What is the proportion of protein and lipid respectively in PM?

a. 40 : 50
b. 52 : 40
c. 60 : 40
d. 42 : 50

Note: biomembrane- all the membranes of cell

Some terms related membrane

- Cytosolic side/ surface
  ↳ Surface of membrane which is in contact with cytosol.
- Noncytosolic or extracytoplasmic side/ surface
  ↳ Surface of membrane which is not in contact with cytosol.



A, D → noncytosolic

B, C → cytosolic

Chemical composition of PM

Chemically PM – lipids, proteins, carbohydrates
(minor component)

- major components
- their proportion varies from cell to cell
- human RBC PM- lipids : protein
  40% 52%

Chemical composition of PM

plasmamembrane

A. Lipids
- (i) phospholipids → phosphoglyceride / Sphingophospholipid.
  - ↳ most abundant PM lipid.
  - ↳ major PM lipid.
- (ii) glycolipids
  - ↳ glycerol glycolipid / sphingo glycolipid.
- (iii) sterol

B. Proteins
- (i) integral proteins
- (ii) peripheral proteins

C. Carbohydrates
- (i) monosaccharides
- (ii) oligosaccharides → branched / unbranched.

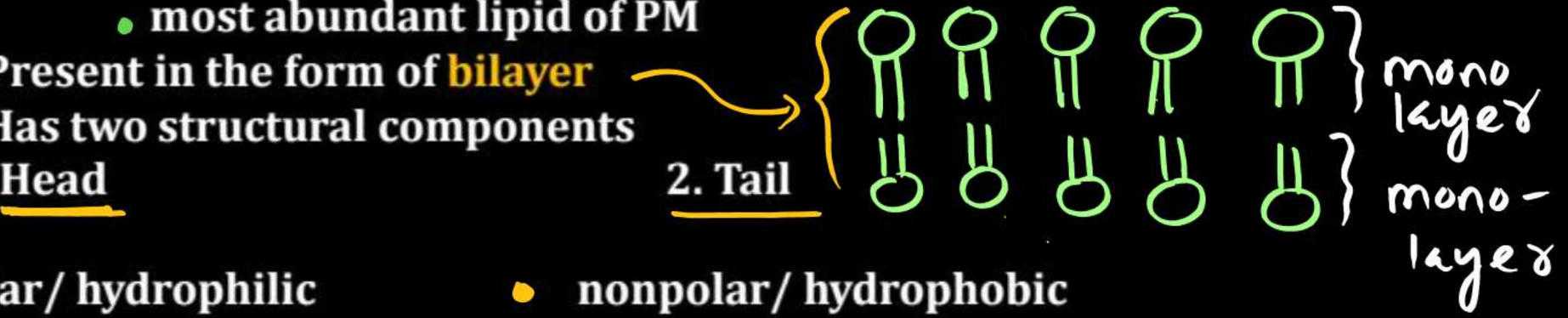
PM lipids

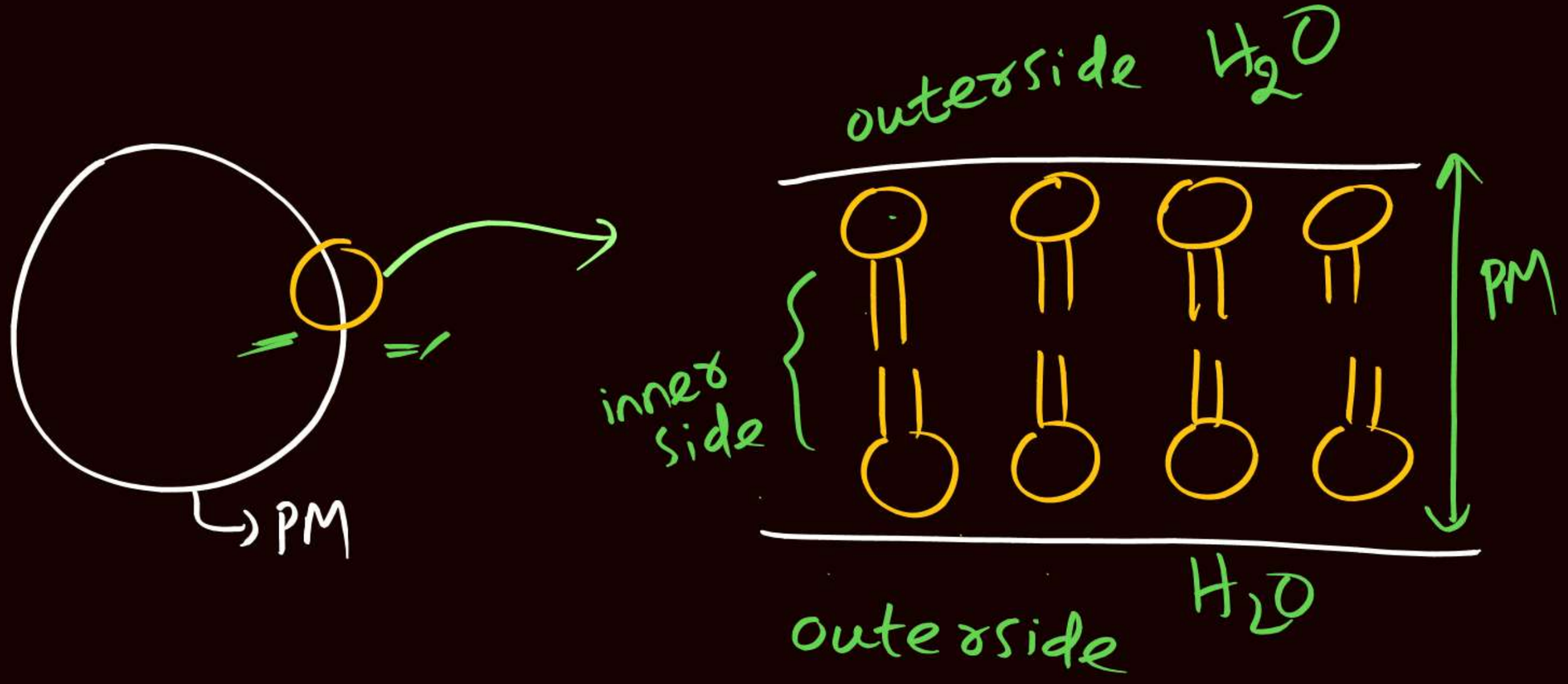
Amphiphilic

a. Phospholipids

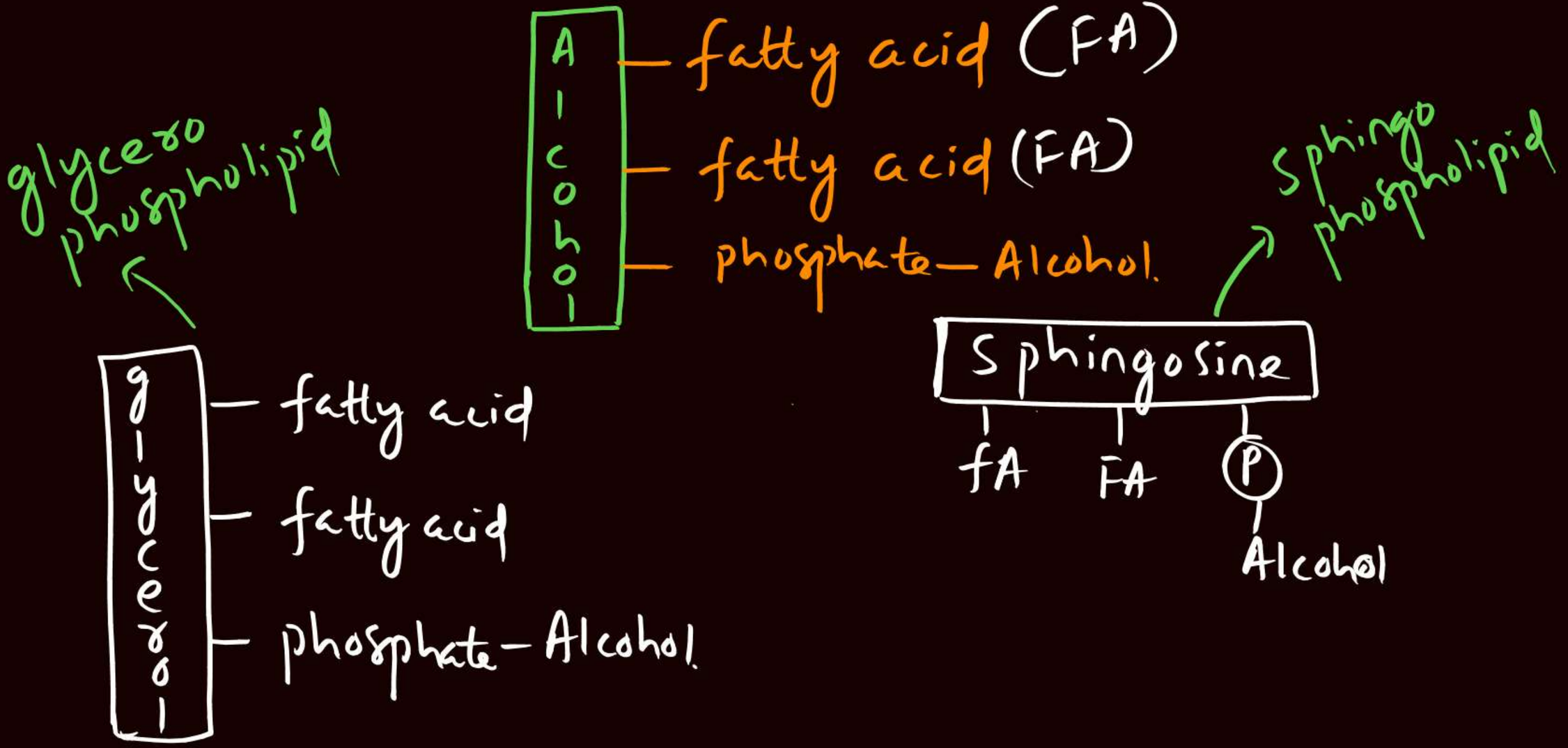
- Major lipid of PM
- Can be phosphoglyceride or sphingophospholipid
  - called glycerophospholipid
  - most abundant lipid of PM
- Present in the form of bilayer
- Has two structural components

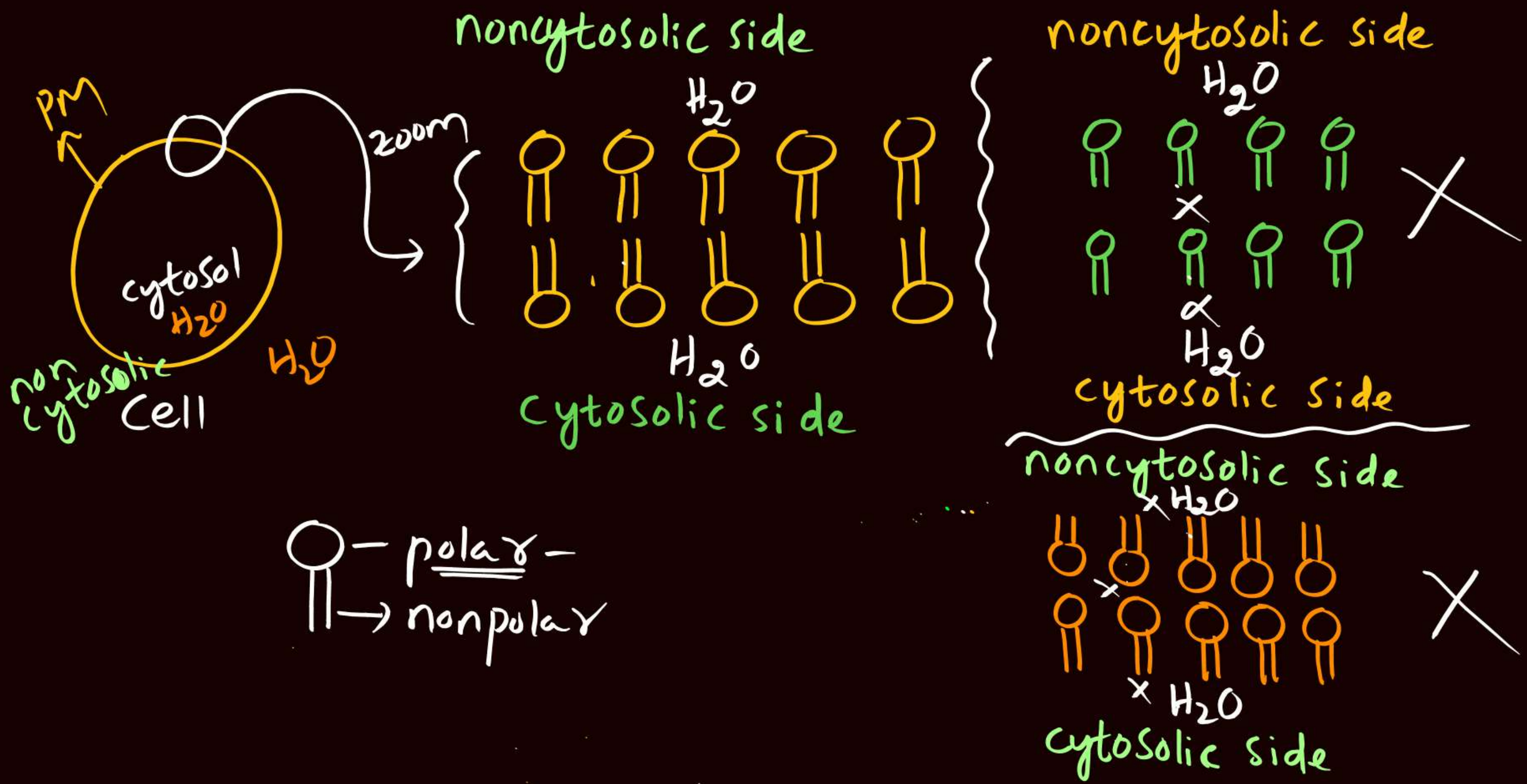
1. Head
   - Polar/ hydrophilic
   - Outer side of PM
   - Interacts with water
2. Tail
   - nonpolar/ hydrophobic
   - inner side/ surface of PM
   - proteced from aqeuous environment (H_2O)
   - made of saturated hydrocarbon (fatty acid)




outer side
H_2O
inner side
PM
PM
H_2O
outer side

Phospholipid

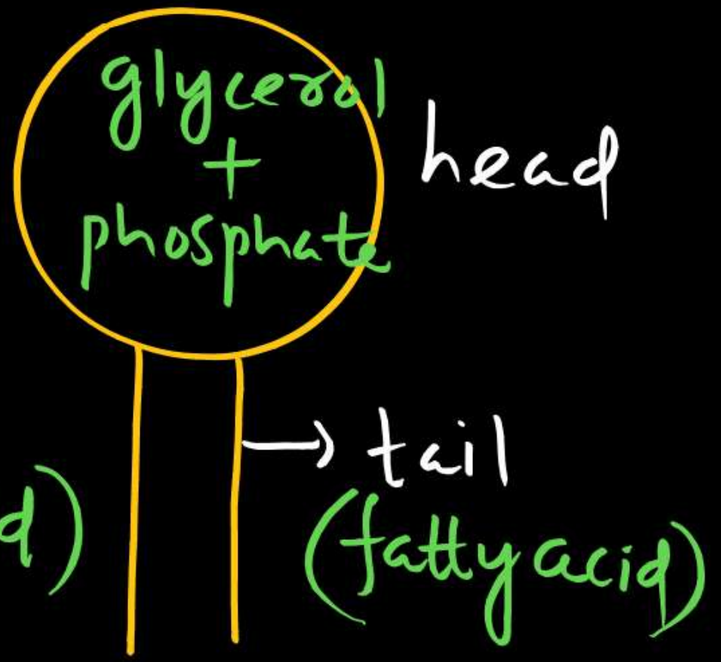



noncytosolic side
PM
zoom
cytosol
H_2O
H_2O
non cytosolic
Cell
H_2O
H_2O
cytosolic side
polar
nonpolar
noncytosolic side
H_2O
cytosolic side
noncytosolic side
H_2O
H_2O
cytosolic side

PM lipids continued.....

Phospholipid

- **Head** → glycerol+ phosphate
- **tail** → saturated hydrocarbon fatty acid



b. Glycolipids

- Lipid conjugated with carbohydrate
- Can be glyceroglycolipid/ sphingoglycolipid

glyco → carbohydrate

↳ more common (phospholipid)

PM lipids continued.....

c. Sterol

- PK PM- sterol -ve (hopanoids +ve)
  - ↳ sterol like molecule
- Exception: *Mycoplasma* (cholesterol +ve)
- EK PM - sterol +ve
  - animal cell PM → cholesterol
  - plant cell PM → stigmasterol, sitosterol, campesterol
  - Fungal cell PM → ergosterol.

NOTES:

- **Cholesterol** helps in **maintainance** of **fluidity** of PM
- Cholesterol is present in **both** lipid monolayers of PM

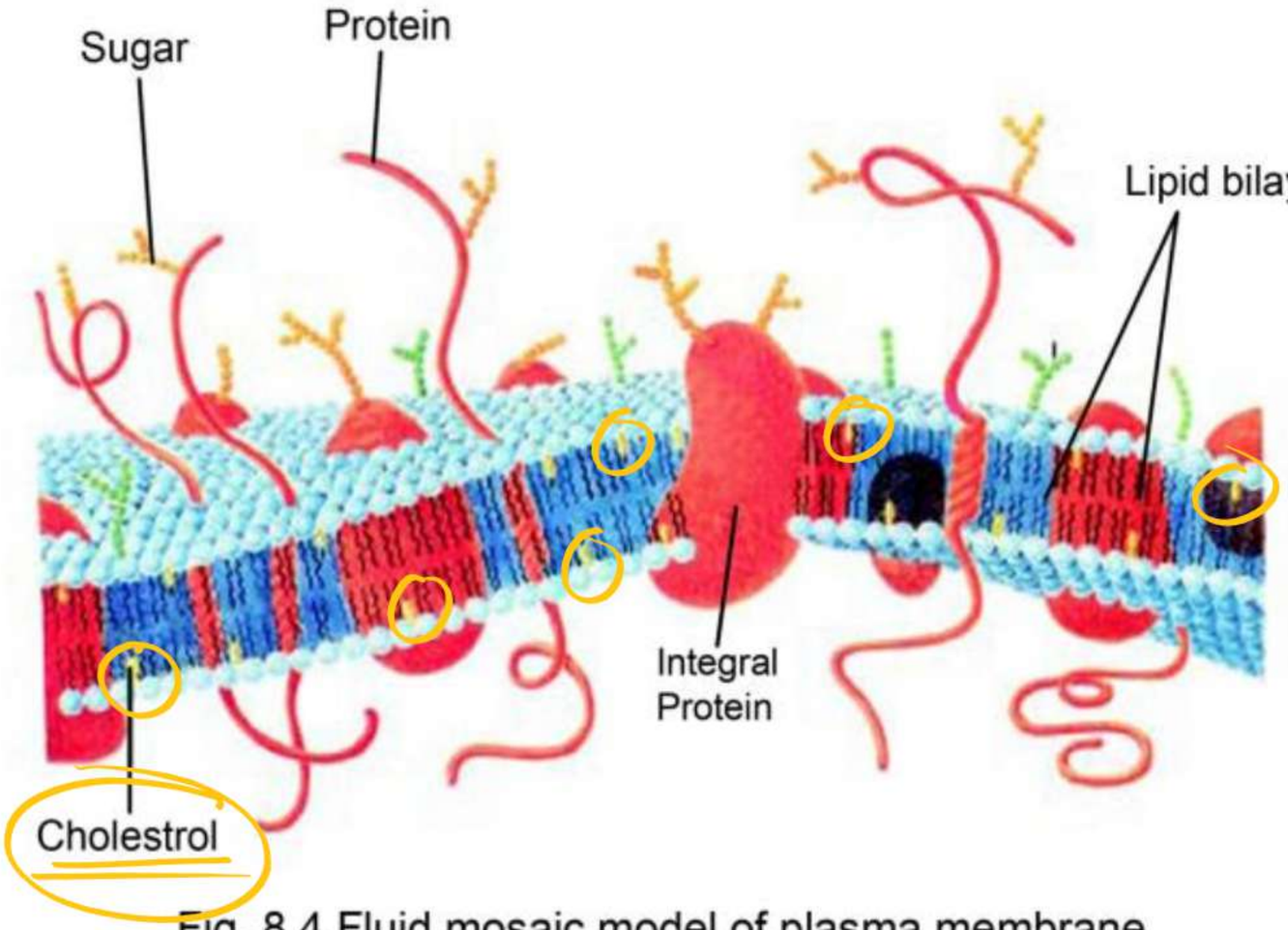
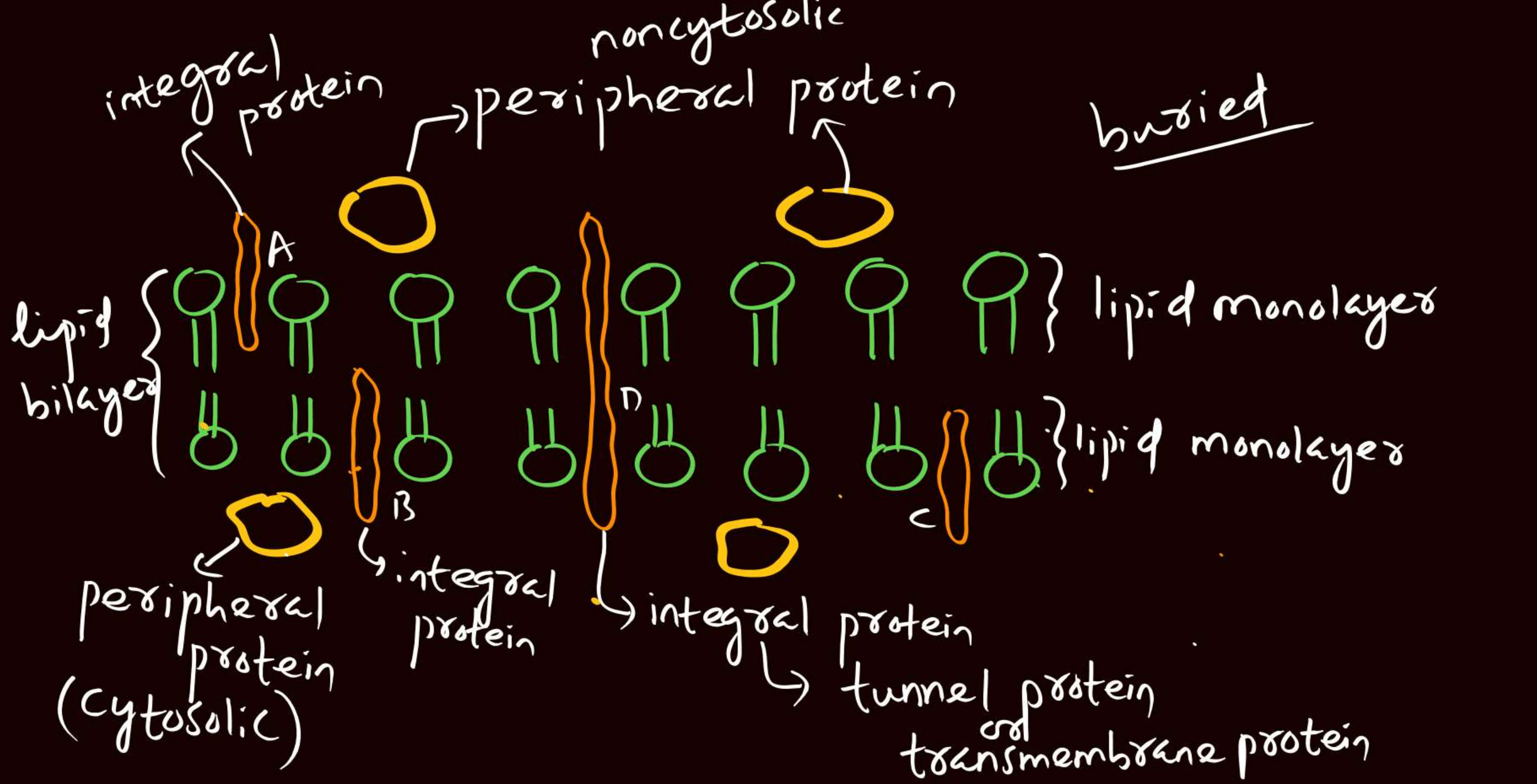


Fig. 8.4 Fluid mosaic model of plasma membrane

PM proteins

- Associated with lipid bilayer
- Classified on the basis of ease of extraction / removal

integral protein	peripheral protein
• buried partially or completely buried in lipid bilayer.	• Surface of lipid bilayer.
• 70 %.	• 30 %.
• tightly bound	• loosely bound
• difficult to remove	• easy to remove


integral protein
noncytosolic peripheral protein
buried
A
lipid bilayer
lipid monolayer
lipid monolayer
D
B
C
peripheral protein (cytosolic)
integral protein
integral protein
tunnel protein
or
transmembrane protein

integral prot.

- its removal/extraction disrupts lipid bilayer.
- Ex- Glycoprotein
- called internal/intrinsic protein

peripheral prot.

- Its removal does not disrupt lipid bilayer.
- Ex-Ankyrin, Spectrin
- called external or extrinsic protein

PM proteins continued.....

Trnsmebrane protein/ tunnel protein

- Integral proteins that pass through the entire lipid bilayer
- All tunnel proteins are integral proteins but all integral proteins are not tunnel proteins

Spectrin , Ankyrin

- peripheral proteins
- Present on cytosolic surface of PM
- Helps in maintenance of fluidity and shape of human RBC.

Thank You बच्चों