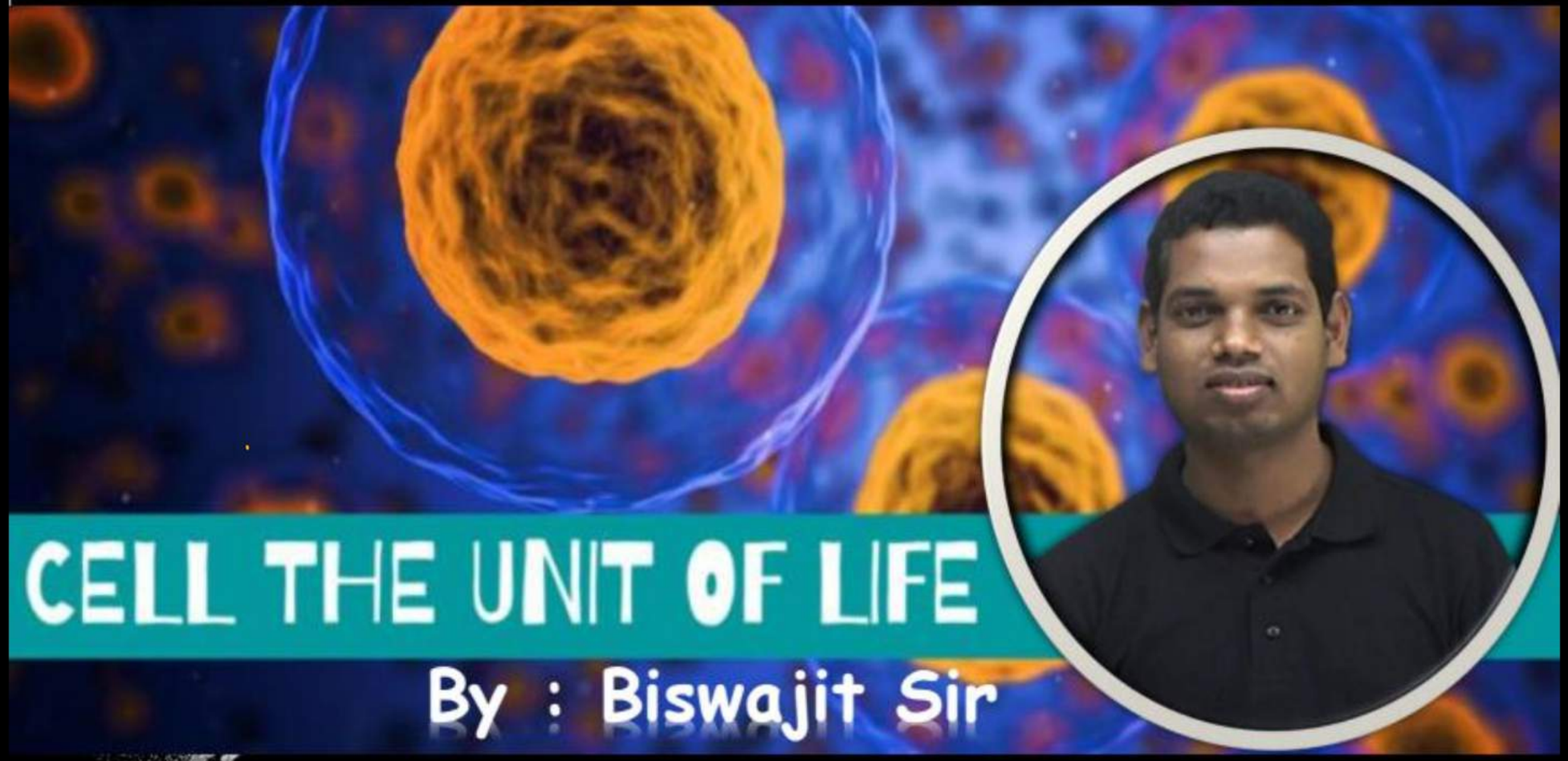
# ARJUNA NEET BATCH

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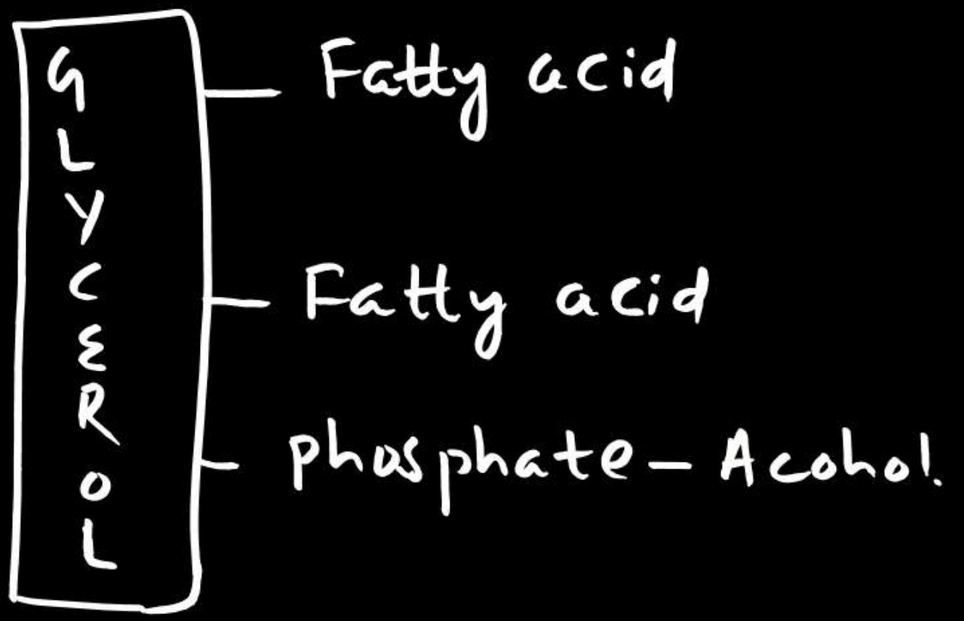
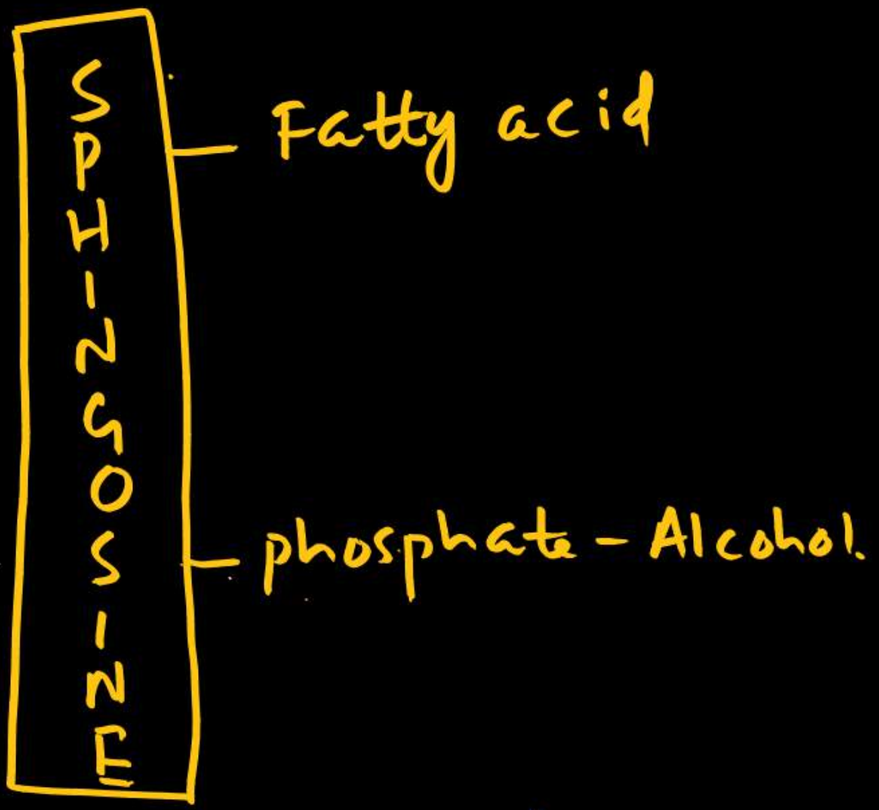
# Phospholipids

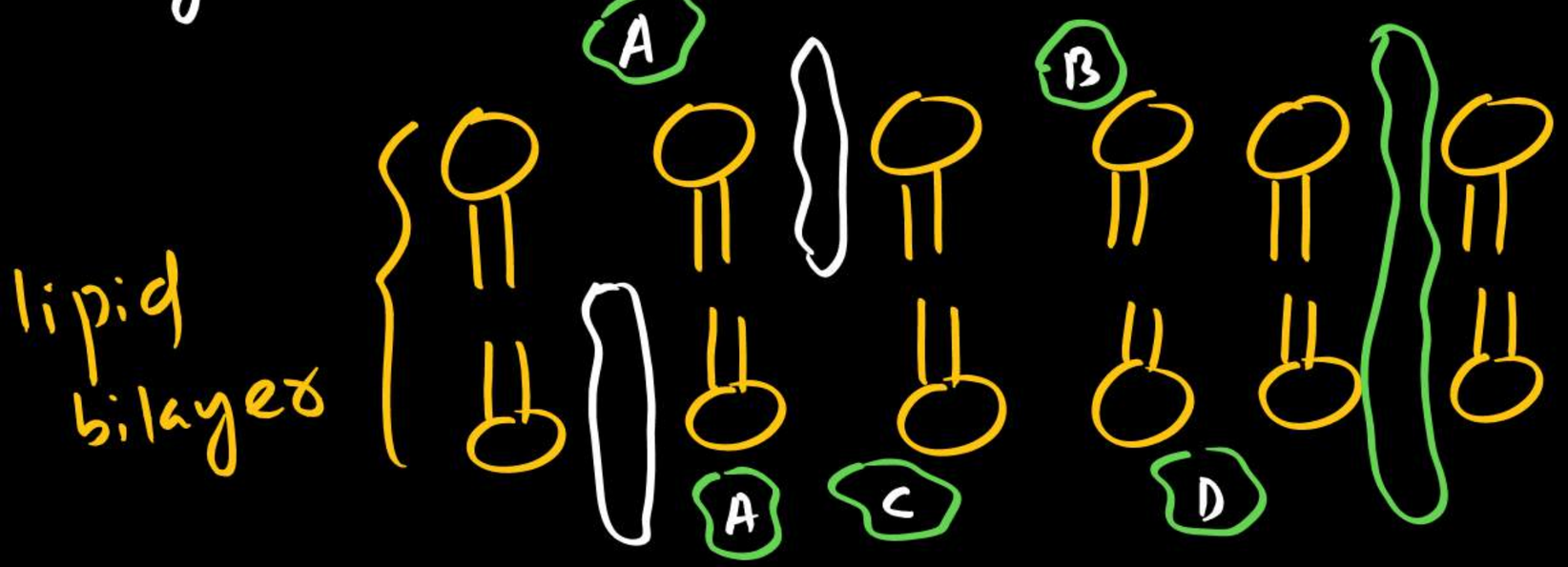



(Glycerophospholipid)




(Sphinophospholipid)

noncytosolic side



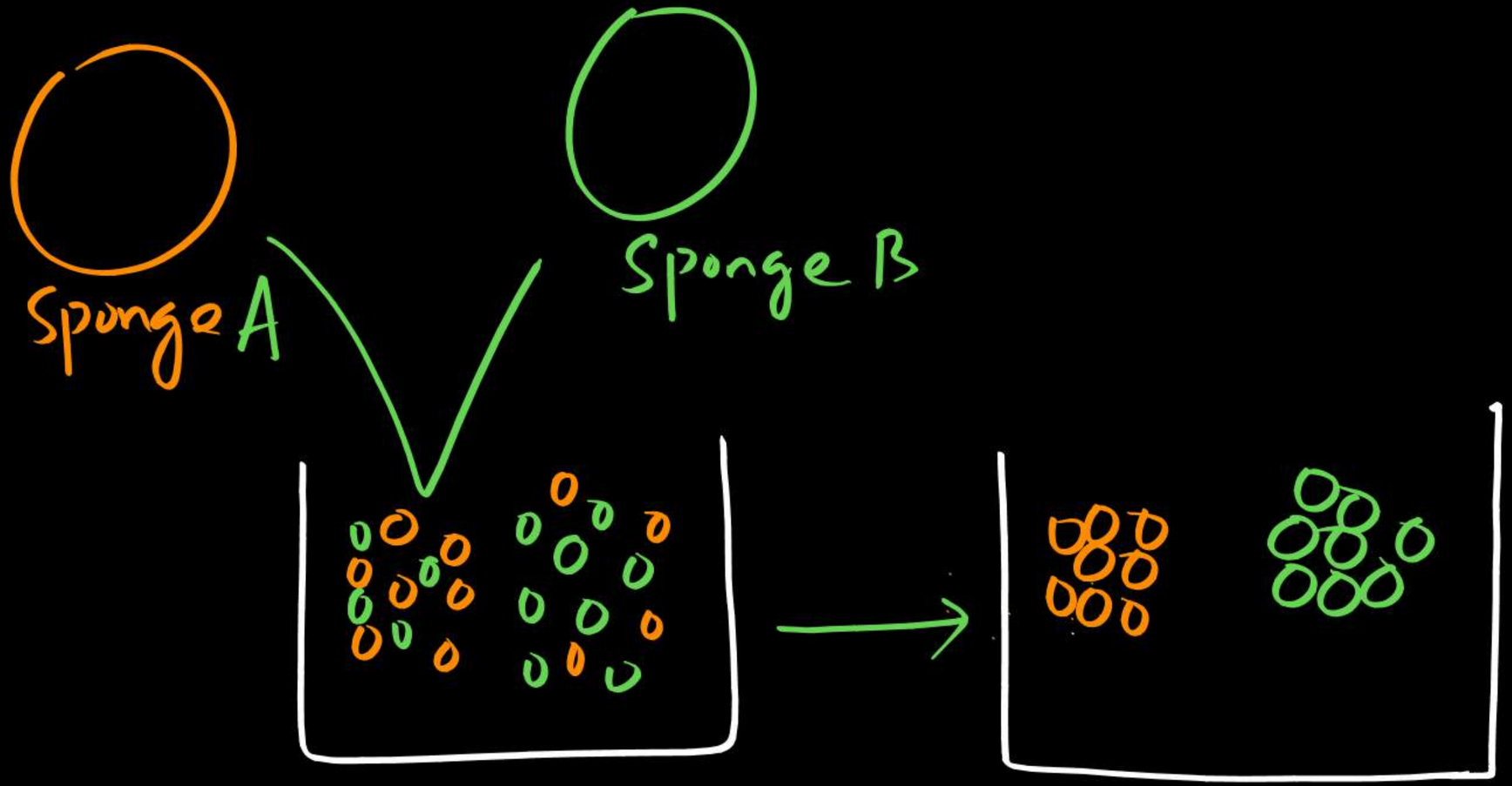

cytosolic side

**Spectrin, Ankyrin**

→ peripheral proteins.
→ found on cytosolic surface of PM.
→ maintenance of shape and fluidity of human RBC.

## PM carbohydrates (sugars)

- Can be monosaccharides or oligosaccharides but never polysaccharide
  - oligosaccharides → branched/ unbranched
- Present on noncytosolic side of PM
- Conjugated with lipids and protein
  - lipids → glycolipid
  - protein → glycoprotein
  - glycolipid, glycoprotein → cell – cell recognition

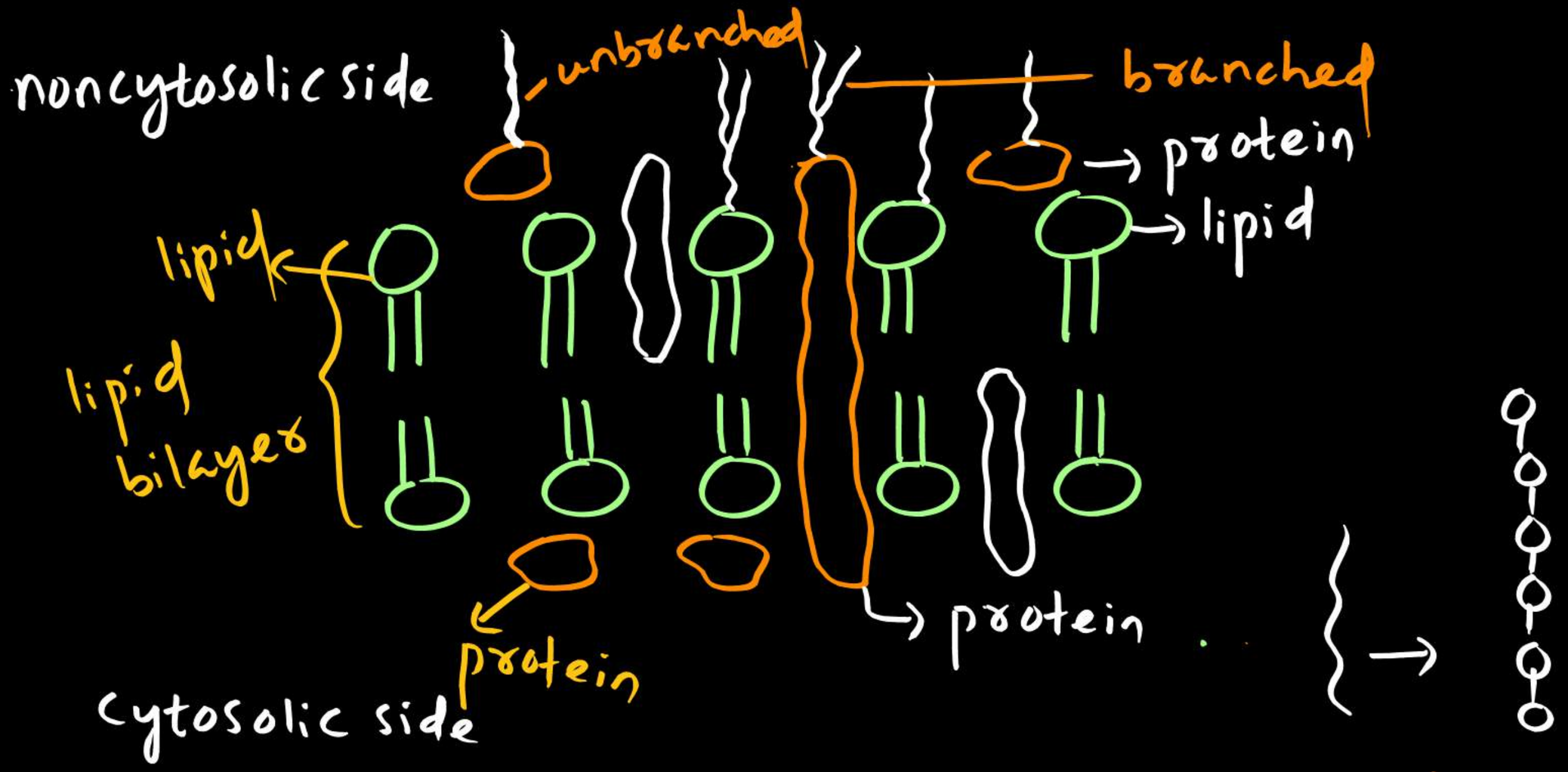

Sponge A
Sponge B

# Carbohydrate

(I) monosaccharide → smallest, simplest

(II) Oligosaccharide → made of few monosaccharide
(few)

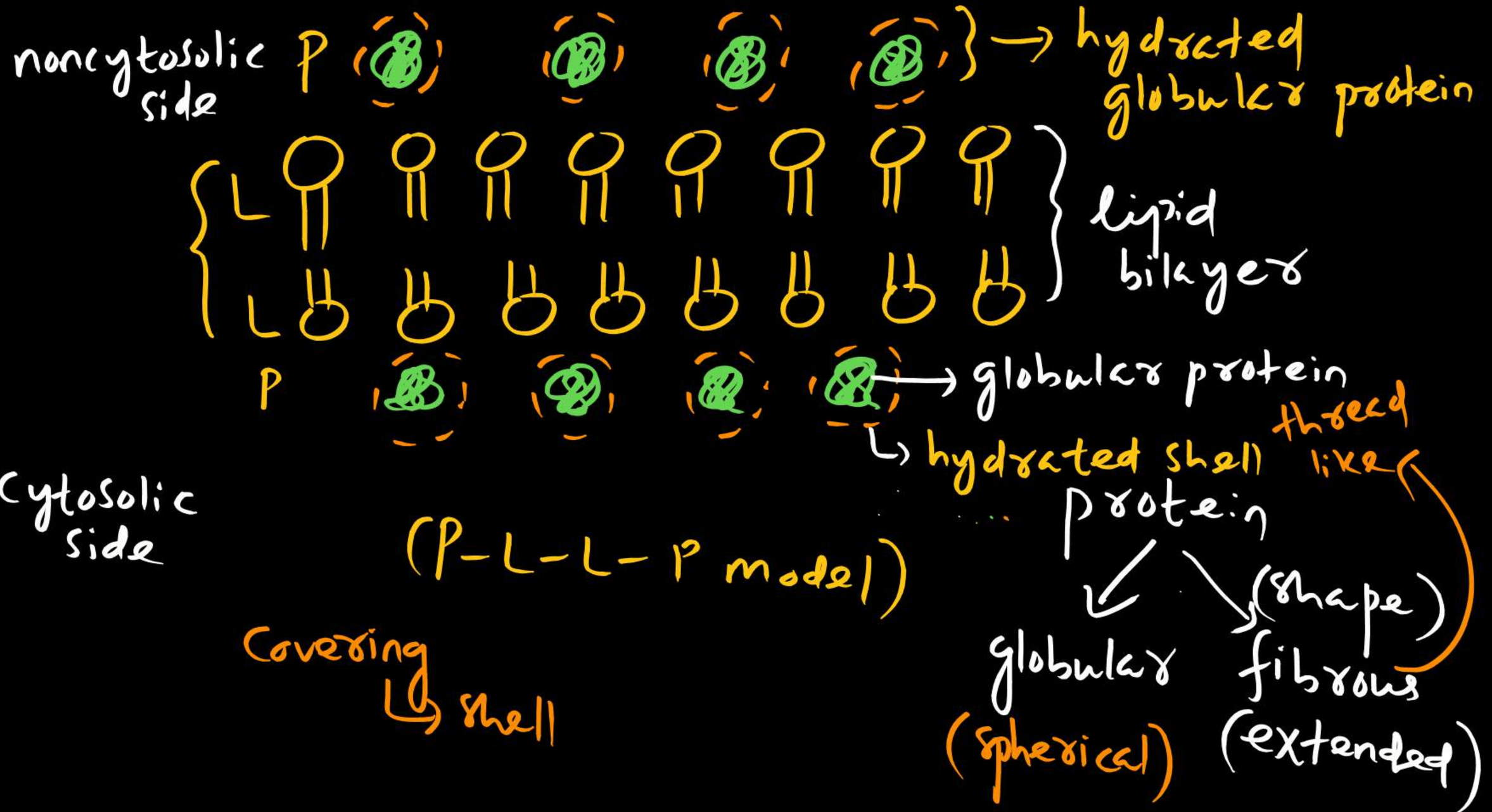
(III) Polysaccharide → made of many monosaccharide
(many)


noncytosolic side
unbranched
branched
protein
lipid
lipid
lipid bilayer
protein
protein
cytosolic side

## Models for PM organization

### a. Danieli and Davson model

- Lipid bilayer is surrounded by hydrated globular proteins on its both surfaces
- Known as P –L-L-P model/ trilamellar model/ sandwich model


noncytosolic side
P
hydrated globular protein
L
L
lipid bilayer
P
globular protein
hydrated shell
thread like protein
globular
(spherical)
(shape)
fibrous
(extended)
Cytosolic side
(P-L-L-P model)
Covering
shell

## Models for PM organization continued.....

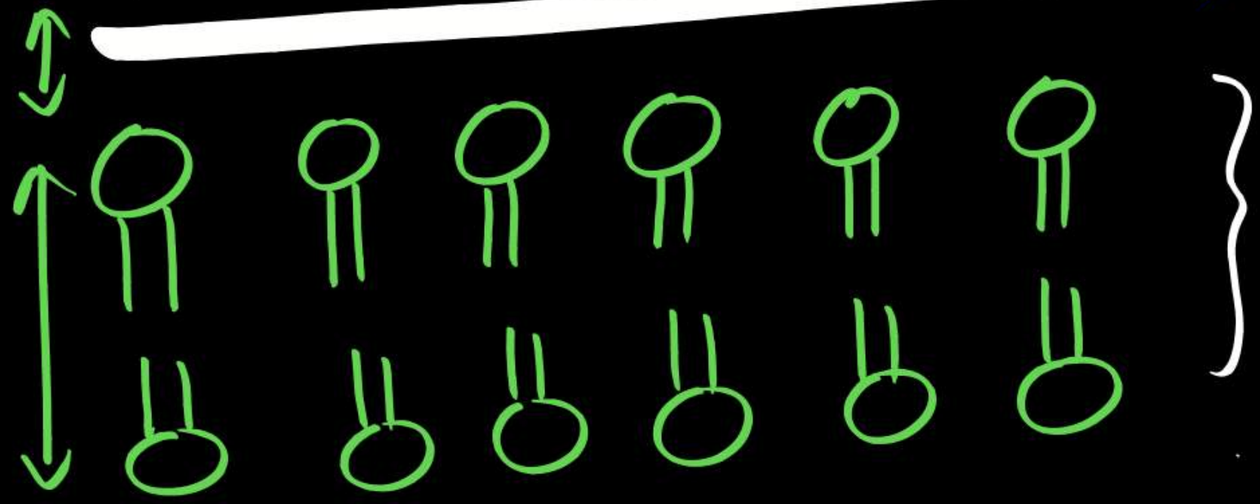
### b. Unit membrane concept model

- Given by Robertson
- States that all membranes of cell are made of unit membranes

- Lipid bilayer id surrounded by extended
  - (I) mucoprotein → noncytosolic side
  - (II) nonmucoprotein → cytosolic side

- Membrane with
  - lipid bilayer → unit membrane
  - lipid monolayer → half unit membrane
  - no lipid → nonunit membrane

noncytosolic side




→ extended mucoprotein
↳ carbohydrate

lipid bilayer

→ extended nonmucoprotein

cytosolic side

(fig: unit membrane)

L + P + C

avg. thickness: 75 A°

$A^{\circ} \rightarrow 10^{-10}\ m$

## Models for PM organization continued.....

### c. Fluid mosaic model

- Given by Singer and Nicolson in 1972
- Most valid/ widely accepted model for PM organization
- fluid → quasifluid nature of lipid

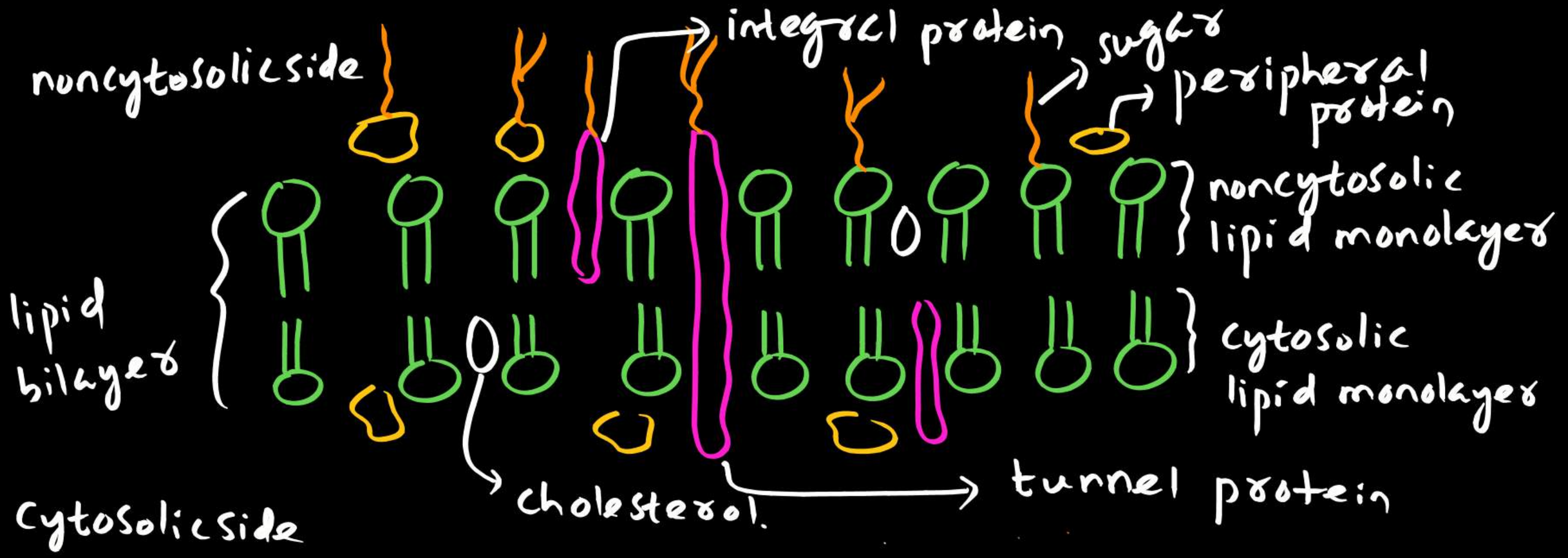
Mosaic → arrangement of proteins

comparision

- Lipid → sea

proteins → icebergs

- PM is protein icebergs in lipid sea




( PM as per fluid mosaic model)

Q. Select the correct statement from the following regarding cell membrane **(2012 Pre)**

a. Fluid mosaic model of cell membrane was proposed by Singer and Nicolson
b. Na+ and K+ ions move across cell membrane by passive transport
c. Proteins make up 60 to 70% of the cell membrane
d. Lipids are arranged in a bilayer with polar heads towards the inner part

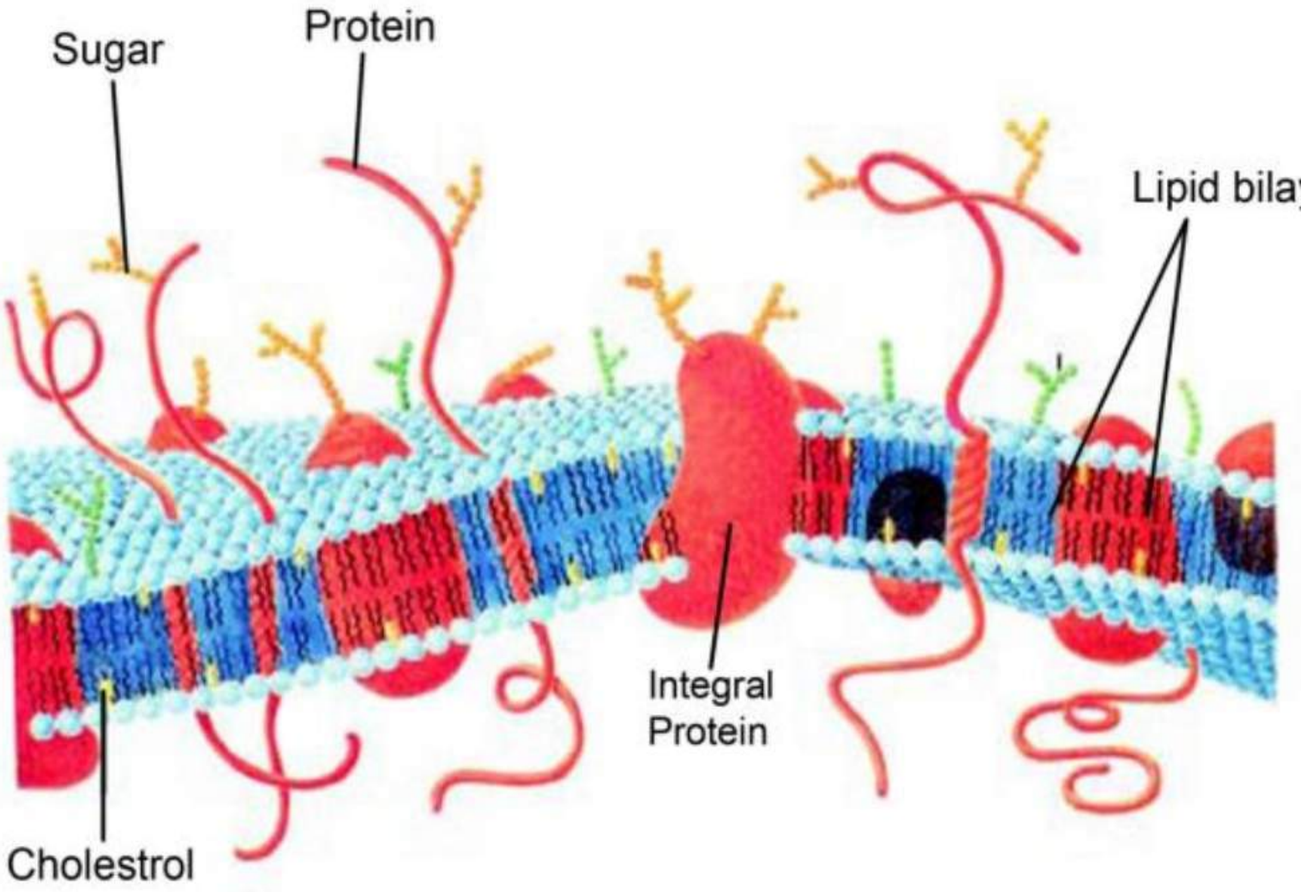



Fig. 8.4 Fluid mosaic model of plasma membrane

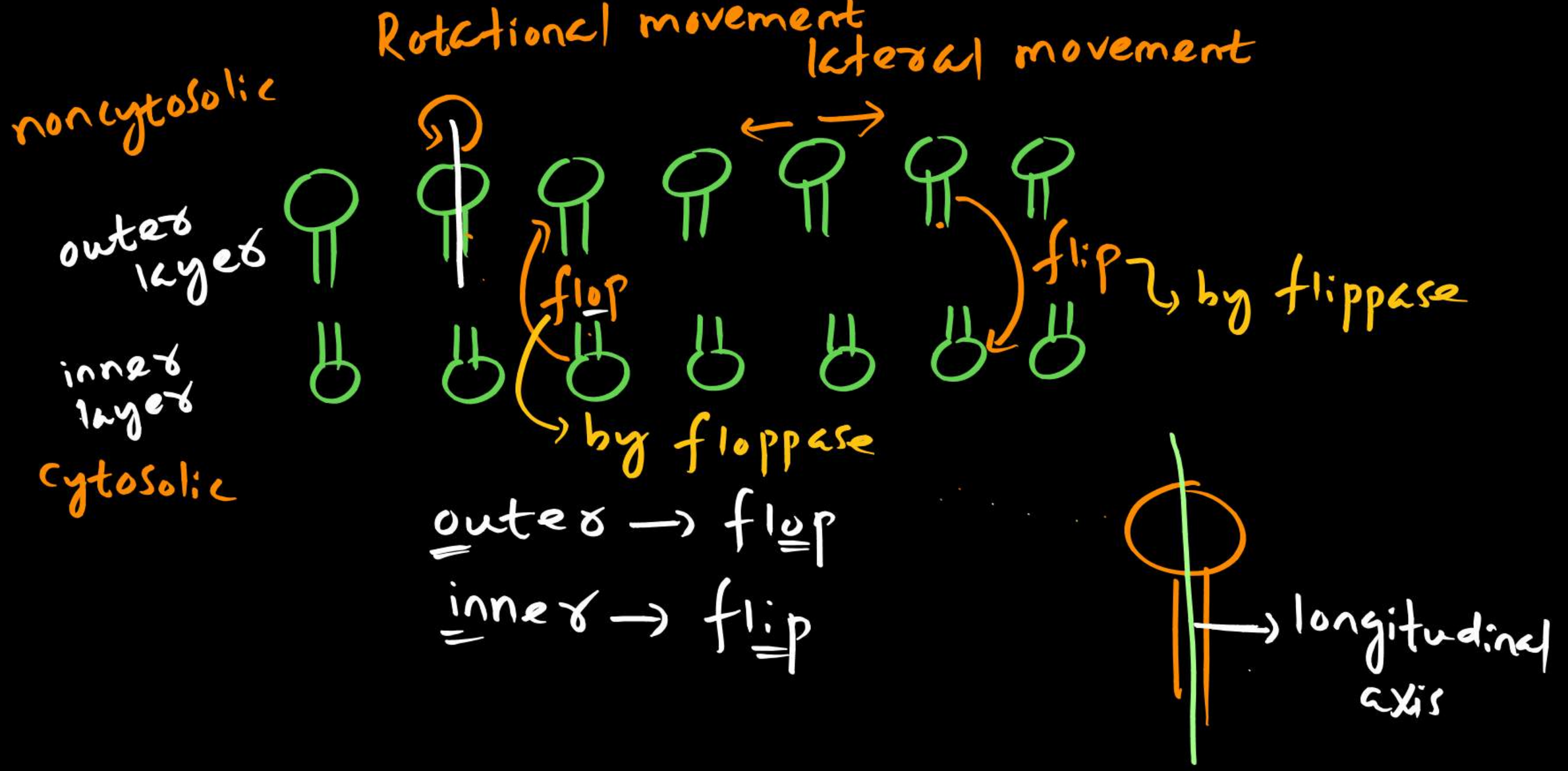
# Movements of PM lipids and proteins

## (A) Movements of PM lipids

| rotational | lateral | flip flop |
|---|---|---|
| passive | passive | active |
| within same monolayer about bout its longitudinal axis | within same monolayer | between two monolayers |
| – | more common | rare |

passive → Energy (ATP) is not used.

Active → Energy is used (ATP)


Rotational movement
lateral movement
noncytosolic
outer layer
inner layer
cytosolic
flop
by floppase
flip
by flippase
outer → flop
inner → flip
longitudinal axis

## Movement of PM proteins

| | rotational | lateral | flip flop |
|---|---|---|---|
| • | | | |
| • | passive | passive | –ve due to their large size. |
| • | around its own longitudinal axis | on lateral side | |

## Fluidity of PM

- Due to lipids and proteins
- As per fluid mosaic model quasifluid nature of lipid enables lateral movement of proteins within overall bilayer.
- Imp.
- Important for functions like
  cell division, cell growth, formation of intercellular junction, secretion, endocytosis, repair, dynamic nature of PM, etc

## Some important terms

- **Gradient**

- **Types of conc gradient**

- **Direction of gradient**

## Some important terms

- **Active process**
- **Passive process**
- nonpolar
- polar

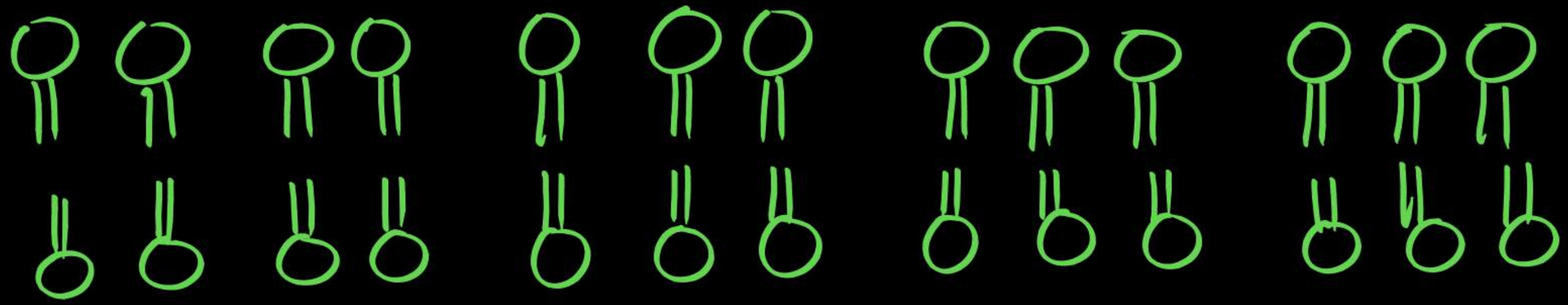
polar particles can't cross lipid bilayer.

↓ ∴ they require

carrier protein to facilitate their transport.

+

channel protein



## Transport across PM

One of most important function of PM

1. **Simple diffusion**

- neutral, lipid soluble ( lipophilic), hydrophobic particles are transported
- Lipid mediated transport

2. **Facilitated diffusion**

- Polar (nonionic like glucose) molecules, ions, hydrophilic (lipophobic) are transported
- Protein mediated transport

Special proteins

Transport proteins (transmembrane proteins)

carrier, channel

## Simple diffusion + facilitated diffusion

- Passive transport (energy is not used)
- Along the conc gradient/ downhill transport
- Many molecules are transported
- Relatively slower than active transport

## 3. Active transport

- Energy is used
- Few polar (nonionic) molecules, ions are transported
- Against the conc gradient/ uphill transport
- Protein mediated transport

  carrier protein (  pump)

**Note:**

- Carrier protein – both facilitated diffusion , active transport
- Channel protein- facilitated diffusion
- Carrier proteins associated with active transport are called pumps
- Decreasing order of rate of transport

Active transport > Facilitated diffusion > simple diffusion

## Osmosis:

- Diffusion of water from its higher conc to lower conc through semipermeable ( or selectively permeable) membrane.
- Passive process
- Special diffusion

## Bulk transport

- Transport of particles in bulk (large)amount

### A. Endocytosis

- Uptake of particles in bulk by a cell

- Solid phase liquid phase

Phagocytosis pinocytosis
By phagosome by pinosome
Cell eating cell drinking

**B. Exocytosis**

- release of particles in bulk by a cell
- Also called ephagy/ cell vomiting

# Thank You बच्चों

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