

# 1.3 – MEMBRANE STRUCTURE

## PHOSPHOLIPIDS

→ **Phospholipids** are the building blocks of membranes

→ Phospholipids are **amphipathic**

→ They have polar and non-polar parts

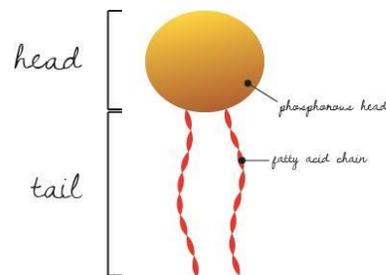
→ Phospholipids have two main parts:

1) Polar **phosphate head**

- Hydrophilic = attracted to water
- On the outside of a bilayer
  - Touching the water of the cytoplasm and the outside

2) Two non-polar **fatty acid tails**

- Hydrophobic = repels water
- On the inside of a bilayer

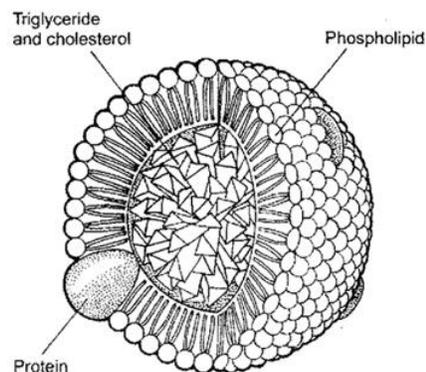


→ Phospholipids in a ball make **lipoprotein complexes**

→ Phosphate heads on the out of the ball

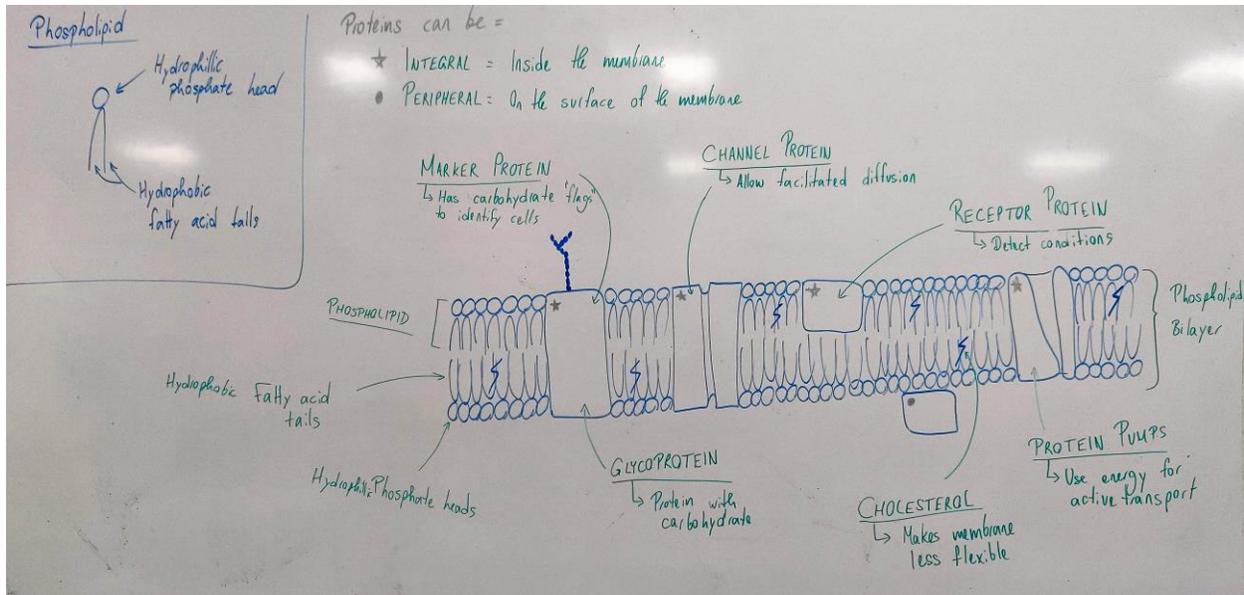
→ Fatty acid tails are on the inside of the ball

→ Because inside is nonpolar, body can put fats and cholesterol inside for transport



## PHOSPHOLIPID BILAYER

- Phospholipids membranes form a **bilayer**
  - In a bilayer, phospholipids can move around but not flip sides
- The phospholipid bilayer is a **fluid mosaic**
  - **Fluid** = Proteins can move around the membrane by sliding between phospholipids
  - **Mosaic** = The membrane is a mix of phospholipids, proteins, and cholesterol



- Proteins in the membrane can be:
  - **Integral** – Inside the membrane
  - **Peripheral** – On the surface of the membrane (inside or outside the cell)
- Proteins have many functions in the membrane:
  - 1) **Transport**
    - Channel proteins for facilitated diffusion
    - Protein pumps for active transport
  - 2) **Receptors**
    - Receptor proteins to detect internal or external conditions
  - 3) **Anchorage**
  - 4) **Carriers**
    - Electron carriers for photosynthesis and cell respiration
  - 5) **Identification**
    - Marker proteins (glycoprotein) that identify the cell
  - 6) **Enzymes**
- **Cholesterol** maintains the stiffness of the membrane
  - Cholesterol is amphoteric, but mainly stays in among the fatty acid tails

## MODELS OF THE MEMBRANE

- **Davson-Danielli model** (D = Dumb )
  - This is an old model of the membrane which was disproven
    - No integral proteins in the membrane
    - A full layer of proteins above and below the membrane
  - Evidence for this model (was misinterpreted)
    - Under the microscope they saw two black lines and thought they were proteins (actually phosphate heads in the bilayer)
  
- **Singer- Nicolson model** = (Smart)
  - This is the current accepted model of the cell membrane
    - Phospholipid bilayer where the phospholipid can move in their layer
    - Has integral and peripheral proteins
  - Evidence for this model:
    - We can now see integral proteins through microscopes
    - Experiment where two cells were merged, and their proteins mixed
      - Showed that phospholipids move