Eukaryotic cells

- include all protists, fungi, animals, fungi.
- have membrane bound organelles.

↓ result

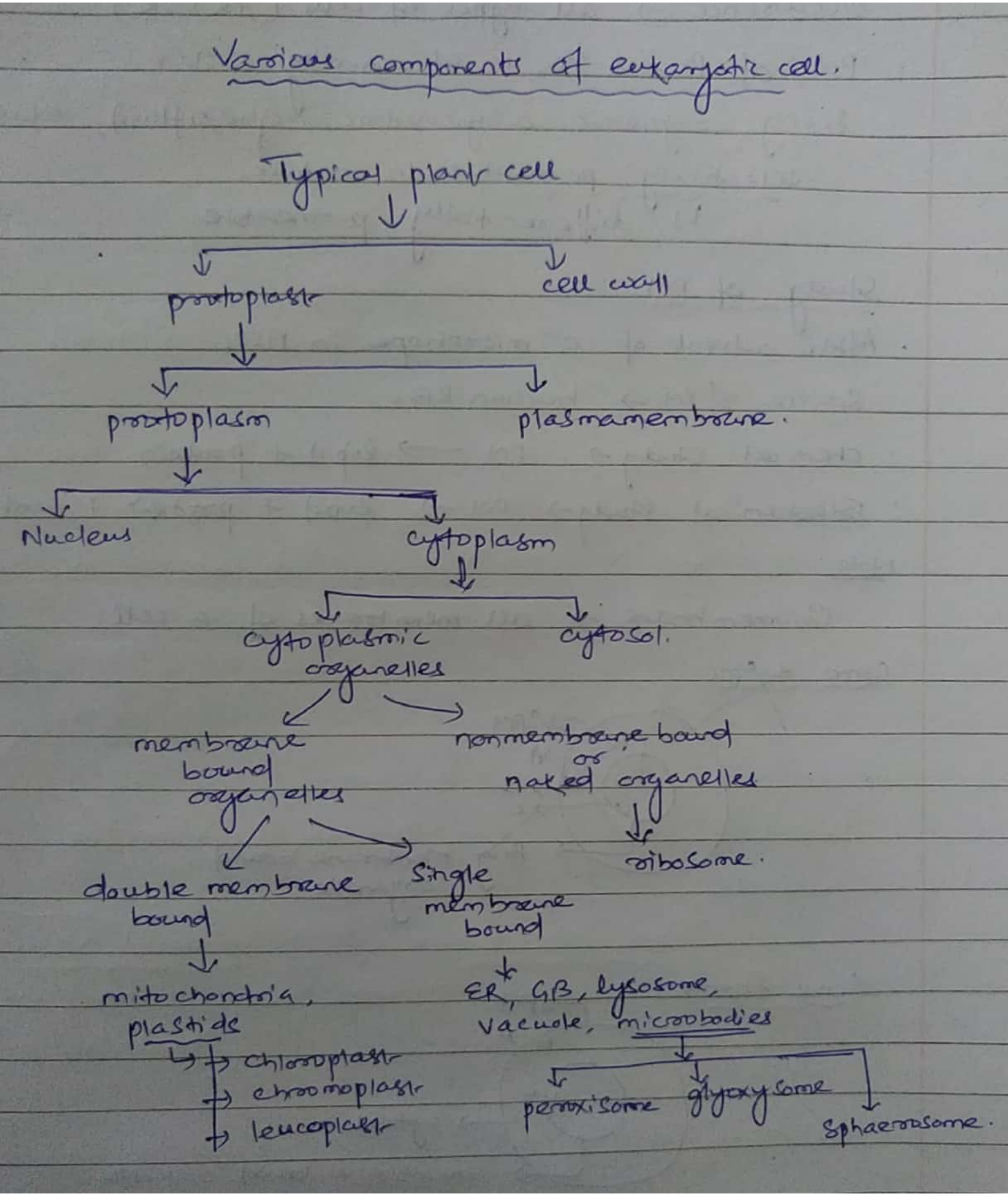
- extensive compartmentalisation of cytoplasm.
- double envelope system.

- Nucleus → with nuclear envelope.
  → organised
  → genetic material is organised into chromosomes.
- have variety of complex locomotory and cytoskeletal structures
  - locomotory
    - cilia
    - flagella
    - Pseudopodia
  - cytoskeletal
    - microtubule
    - microfilament
    - intermediate filament.

- All eukaryotic cells are not identical.

feature	plant cell	Animal cell
plastids	+ve	-ve.
centriole	-ve (mostly)	+ve.
cell wall	+ve	-ve
large central vacuole	+ve	-ve.

Various components of eukaryotic cell.



Note:-

Centrosome : * nonmembrane bound organelle.

* found in animal cells. and absent in almost of the plants

* present in some plant cells (flagellated)

↓

algae, Bryophytes, pteridophytes.

Plasmamembrane (PM)

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- called plasmalemma, cell membrane.
- occurence → all types of cells (PK + EK)
- PM of PK and EK is structurally similar.
- living, dynamic, asymmetric, quasifluid, elastic, selectively permeable in nature.
  - ↳ differentially permeable.

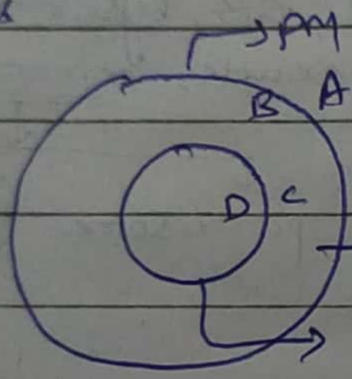
Study of PM

- After advent of e^- microscope in 1950.
- Source of PM → human RBC.
- Chemical study → PM → lipid + protein
- Biochemical study → PM → lipid + protein + carbohydrates.

Note:

Biomembrane → all membranes of a cell.

Some terms



Sides

A, D → non cytosolic side / extracytoplasmic side

B, C → cytosolic side.

Chemical composition of PM

Chemically PM → lipids + proteins + carbohydrate

- lipids + proteins → major components
  - their proportion is variable
  - in human RBC PM → 52% : 40% (protein) (lipid)
- carbohydrate → minor component

(protein) (lipid).

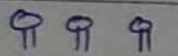
PM lipids

3 types: phospholipid, glycolipids, sterols.
↳ most abundant

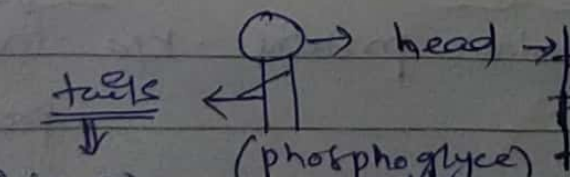
(A) Phospholipid of PM

2 types (I) phosphoglyceride (II) Sphingophospholipid

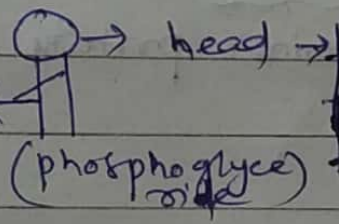
- most abundant PM lipid
- present in the form of bilayer


(lipid bilayer)

- Nature – amphiphilic (amphipathic)
  ↓
  due to presence of both polar and nonpolar properties.



- 2 in no.
- made of saturated hydrocarbon
- nonpolar, hydrophobic



- 2 in no.
- made of saturated hydrocarbon
- nonpolar, hydrophobic
- present on inner side of PM.
- protected from aqueous environment.

(B) Glycolipid

- lipid conjugated with carbohydrate.
- 2 types: glycerolglycolipid, sphingoglycolipid (relatively more common)

© Sterol

PK PM → Sterol → -ve Exception → mycoplasma
↓
cholesterol +ve

EK PM → Sterol → +ve.

↳ Animal cell → Cholesterol.
fungal cell → ergosterol.
plant cell → Stigmasterol, Sitosterol, campesterol.

Note:

- Cholesterol plays an important role in maintaining the fluidity of PM.
- As per NCERT diagram cholesterol is situated on cytosolic side of PM.

PM proteins

- Associated with lipid bilayer.
- Basis of classification → Ease of extraction
- 2 types

Peripheral proteins	integral proteins
· K/a external / extrinsic proteins	· K/a internal / intrinsic proteins
· relatively less (30%)	· relatively more (70%)
· present on surface of lipid bilayer / PM.	· buried completely or partially in lipid bilayer.
· loosely bound to lipid bilayer	· tightly bound to lipid bilayers.
· their extraction easy and does not disrupt lipid bilayers.	· their extraction is difficult and causes disruption of lipid bilayer

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peripheral protein
ex: Spectrin, ankyrin

integral protein
ex: glycophorin.

PM carbohydrates

- can be branched or unbranched oligosaccharides.
- never polysaccharides.
- present only on noncytosolic / ~~extra~~cytoplasmic side.
- conjugated with lipid → glycolipid or protein → glycoprotein

→ help in cell-cell recognition.