lysosome

membrane stabilizers → cholesterol, cortisone, chloroquine

membrane labilizers → vit A, D, E, K, UV rays, bile salts, testosterone, progesterone.

⑤ Vacuole

- membrane bound space in cytoplasm.
- contains water, sap, excretory products, other materials not useful to cells.
- Types of vacuole

① Sap vacuole

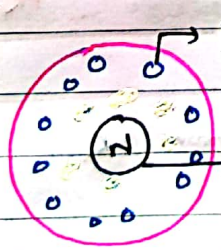
- contains sap.
  - ↳ H_2O, amino acids, proteins, sugar, soluble pigments, etc.
    - ↳ anthocyanin → Blue, red, violet
    - ↳ anthochlor → yellow (petals of Sunflower, Tagetes)
- Number of sap vacuole

PK → 0

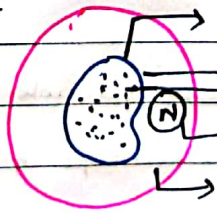
EK → animal cell → small, numerous, scattered.

EK → plant cell → immature cell → small, numerous, peripheral

EK → plant cell → mature cell → large, central, single → occupies 90% vol. of cell.



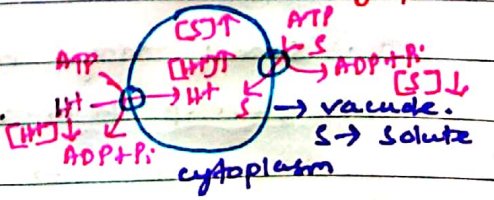
(animal cell, immature plant cell)



(mature plant cell)

peripheral cytoplasm

- Tonoplast
  - membrane of sap vacuole.
  - selectively permeable.
  - allows pumping of various ions (solutes) and protons from cytoplasm into vacuoles.

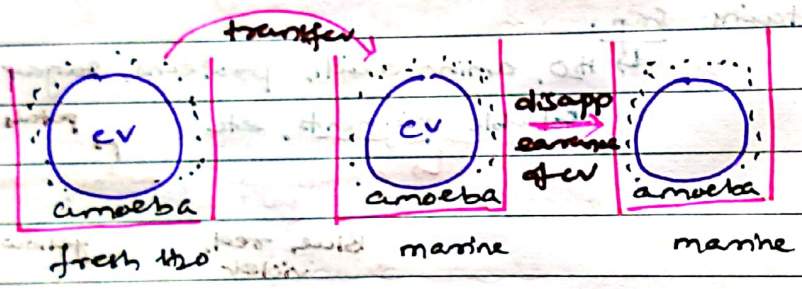


- sap is hypertonic and acidic (pH).

Significance of sap vacuole
involved in stomatal movement
↳ opening and closing of stomata.

(11) Contractile vacuole (CV)
- occurs in amoeba.
- helps in osmoregulation and excretion.
- undergoes contraction and expansion.
  - contraction → to release H_2O from cell
  - expansion → by uptaking H_2O from surrounding.

- Note - CV is found in fresh H_2O forms of amoeba.



(12) food vacuole
- found in many cells, as in protists
- formed by engulfing food particles.

Note: gas vacuole → found only in photosynthetic PK.

Note:
- Both GB and vacuole develop from ER.
- lysosome develops from GB.
- Biogenesis of lysosome → ER → GB → lysosome.

Microbodies
- Small, single membrane bound vesicles.
- develop from ER (SER)
- occurrence → animal cells, plant cells.
- perform oxidation reactions other than that of respiration.
- 3 types → Peroxisome, Spherosome, glyoxysome.

(i) Peroxisome

- named so because it is involved in H_2O_2 formation and break down
  - H_2O_2 formation → by uricate oxidase, glycolate oxidase, → marker enzyme of peroxisome.
  - break down → by catalase
- occurence → plant cells + animal cells.
  - plant cells → mesophyll cells
    - 70 – 100 per cell
    - performs photorespiration in C_3 plants only
  - animal cells → liver cell, Kidney cell
- possess special proteins called peroxin.

(ii) Sphaerosome (spherosome)

- Spherical
- occurence → endosperm cells of oil seeds.
- consists of half unit membrane.
  - lipid monolayer
  - stabilized by oleosin protein

lipid monolayer (membrane)
stored lipid.

(Spherosome)

- function → synthesis and storage of lipid (fat).
- may contain hydrolytic enzymes → They (Spherosomes) are believed to be plant lysosomes.

(iii) Glyoxysome

- Special peroxisome.
- discovery → Tolbert, Beever.
- occurence → germinating oily seeds like castor, groundnut.
- function → performs glyoxylate pathway (Gluconeogenesis)

lipid (water insoluble) → sugar (glucose) (water soluble)