

Cytoplasm

- * appears as transparent semi-fluid
- * water 85% - 95%
- * Proteins constitute the most important component
- * viscous material inside cell
- * it cytolysis = cytoplasmic streaming.

Ecto Plasm

- * next to wall
- * Control Passage of materials into and out of cell (selective permeability)

Protoplasmic Component

Chloroplast
green

leucoplast
colorless

chromoplast
coloured

Pigment

Chlorophyll

Carotenoids

Carotenoids

Function

Photosynthesis

Angiosperms
starch

elaioplast
Flowers

Fats
Fruit

Nucleus

- * Centre of activity, the site of the hereditary
- * Central
- * Peripherical
- * Consist of nucleus
- * DNA
- * Deoxyribonucleic acid
- * Ribonucleic acid
- * Phosphate
- * Nitrogen

Endoplasmic reticulum

Rough

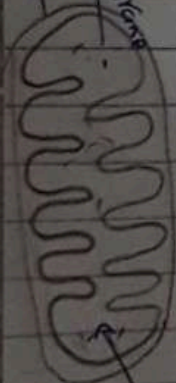
have ribosomes
connected between nuclear membrane and plasma membrane

smooth

No ribosomes

scattered at cell

lipid



I - According to origin & development

Promeristem	Primary	Secondary
early young stage small at tips cell division give Primary meristem	Present in apices stem & root Primordia of leaves Proto derm, ground meristem develop to Primary body	

II - According to Position

Apical	intercalary	lateral
- at shoot apex - at root apex * responsible for increase in length	* Part of apical meristem separated from apex * Found between regions of Permanent tissue * ex meristem at base of leaves, internodes * responsible for increase in length	* Along the sides, divide in one plane * increase in diameter * ex vascular cambium

III According to Plane division

Mass meristem	Plate meristem	Rib meristem
* cell divide in all Planes increase in volume * develop of cortex, Pith	* cell divide in two Planes increase the area of organ * ex epidermis * growth to leaf formation	* cell division in one plane * Formation of cells in Pith, cortex in young stem

③ Secondary meristem

- originated From mature living or Permanent tissue and secondary meristems

ex cork cambium develop
From ePiderms / cortex
Pericycle

- develop to Secondary body of Plant.

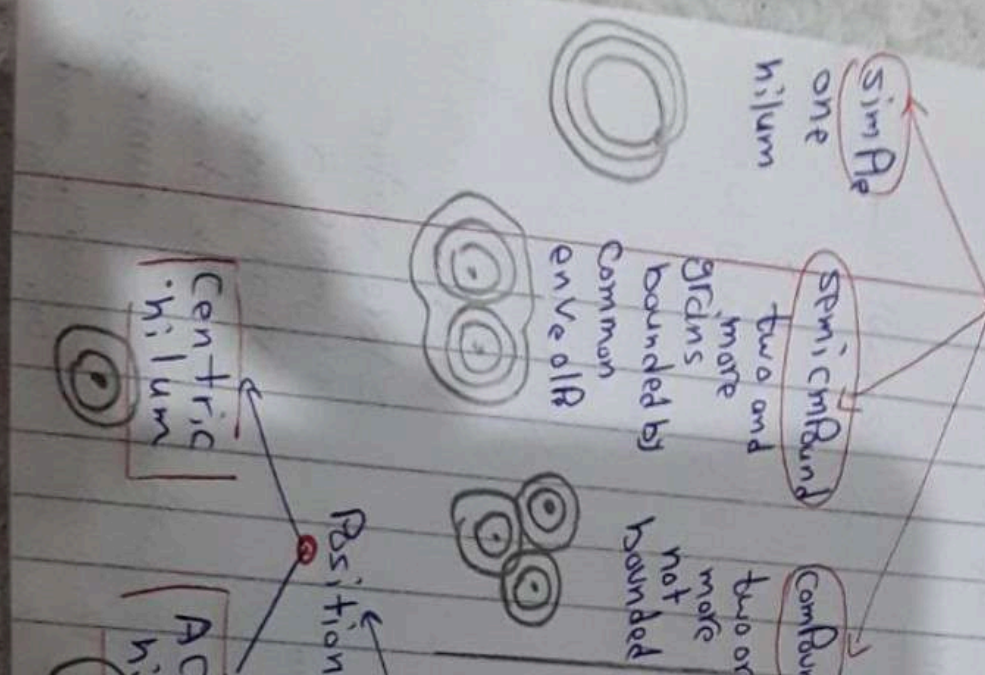
Primary meristem

→ Protoderm → ePiderms

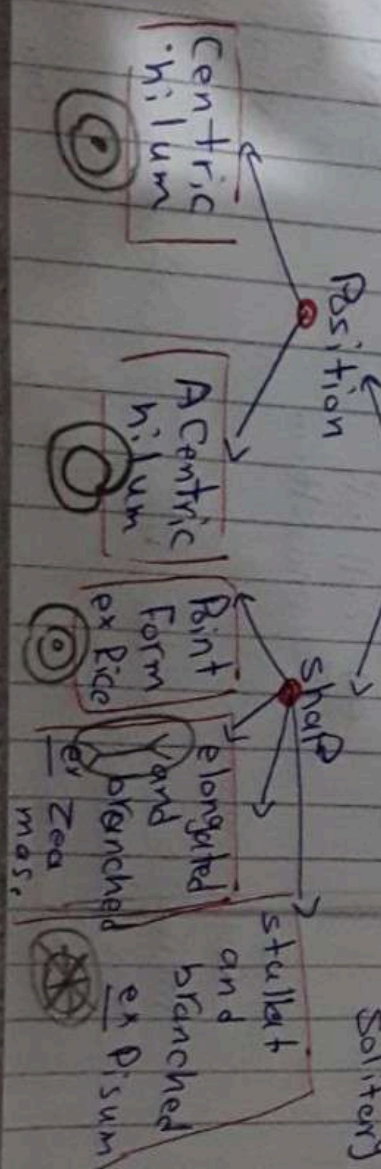
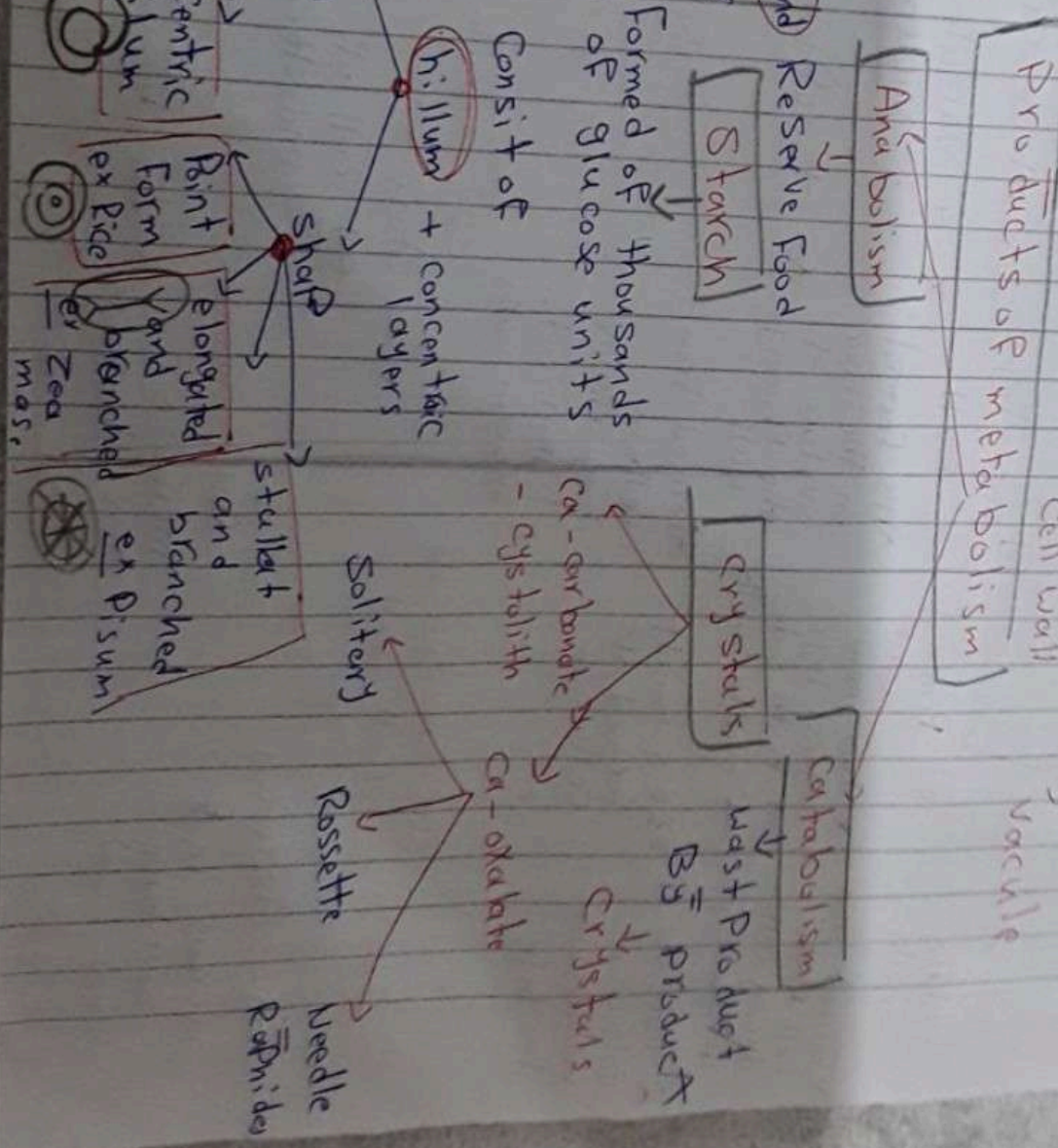
→ Procambium → Xylom & Phloem

→ ground m. → root cap

Types of starch grains according to structure



Non-living components of ergastic materials



Cell wall

1 Middle lamella

- * Formed from cell plate during cell division
- * Consists of Calcium, magnesium, pectate

2 Primary wall

- * two new layers lay on both sides of middle lamella
- * It's mainly formed of cellulose

3 Secondary wall

- * It's formed on the inner surface of the primary wall
- * Formed from cellulose, hemicellulose, lignin, cutin, suberin, waxes

Germination of Cell wall

Intussusception
increase in surface

Addition

increase in thickness
as

Vacuole

- * They are cavities within the cytoplasm filled with a liquid called cell sap

- * a vacuoles of cell called vacuome

tonoplast → double line

Types of Vacuoles

Oil Vacuole

store oil
eg cell of endosperm

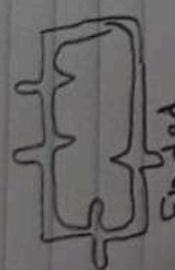
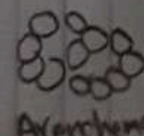
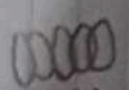
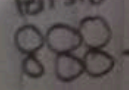
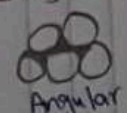
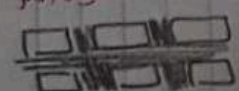
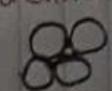
water vacuole

store water organic & inorganic substance
→ numerous
→ large and one only

- * vacuole in meristematic → permanent → large and one only

Permanent simple tissues

	Parenchyma	Collenchyma	Sclerenchyma
Comp	* Thin cellulosic wall * living cell	* Thick walled without lignification * Their wall made up cellulose, hemicellulose and Pectin * living cell	* Thick wall * lignified cell * Dead cell at maturity
Origin	* ground meristem Pro Cambium	* ground meristem Pro Cambium	
Function	* mainly storage - Respiration - conduction of water - Photosynthesis	- storage - Photosynthesis - mechanical support	- mechanical support

Types	Parenchyma	Collenchyma	Sclerenchyma
	- chlorenchyma with chloroplast for Photosynthesis - aerenchyma with wide intercellular spaces for gas exchange  Polyhedral  Parenchyma  Armed  Aerenchyma  Palisade →  Spongy →	① Angular التشبيك في الزوايا بين الخلايا ex corners  Angular ② Lamellar التشبيك في السطوح  ③ Lacunar التشبيك بين الزوايا بساقي لتفتوتها بمرور  ④ Annular التشبيك حول الخلايا 	