

[B] Permanent Tissue  $\Rightarrow$  In the cells the division capacity is close for permanent tissues.

$\rightarrow$  Cells of permanent tissues only show G<sub>0</sub> phase of division. अर्थात् G<sub>0</sub> Phase में division की संभावना पूरी नहीं होती है जो यह संख्या कम की जाती है।

Three types :-

①

Simple Tissue :- The group of cells of same type these make tissue, These tissues are called simple tissue.

②

Parenchyma :- Thin walled living tissues

- Presence :- Int in living part of plant.

- Characteristics :- Thin walled, In the walls no any type of elements are deposit.

- Intracellular space are int.

- Cells become semicircular.

- In the Polygonum cells maximum No. of <sup>कोण</sup>gonium is 14.

$\rightarrow$  Mainly water & food storage.

## Types of Parenchyma:

① Simple Parenchyma: - These are +nt almost all plants.  
(+nt in pith & cortex)

② Chlorenchyma: - Chloroplast +nt in chlorenchyma.

- These are mainly +nt in green parts & leaves of plants.

- Function - Photosynthesis.

③ Aerenchyma: - Large air chambers are +nt in these parenchyma. So these tissue become spongy.

- Presence: - These are +nt in leaves as a spongy tissue.

- In aquatic plants.

- Function: - Gas exchanges in the leaves  
जलीय पौधों में उच्चतम मात्रा में गैसों का आदान-प्रदान करती है,  
Provides buoyancy in aquatic plants.

④ Sclerenchyma: - In this the parenchymal cells become long & rod shaped.

- Presence: - Petiole (पौधे का तना)

- Function: - Mechanical Support.

5. Idioblast:-

When in the parenchymatous cells many type of excretory elements are deposits then the shape of cells are dendrite. These are called idioblast.

Ficus, Waterlily  
(खरगोश) (जलकुम्भी)

Function of Parenchyma:-

Main function :- Water and food Storage.

Special / other function:- Photosynthesis, gas exchange, उल्लेखित

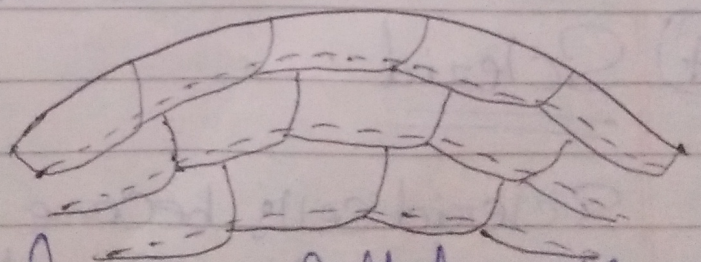
6. Collenchyma:- (Pactinated tissue)

On the cell wall pectin elements are deposits. Pectins become permeable for water also the tissues are not dead for deposition of pectin. These are also called thick walled living tissue or living mechanical tissue.

Mainly these are not in Dicot herb as a hypodermis

Types:-

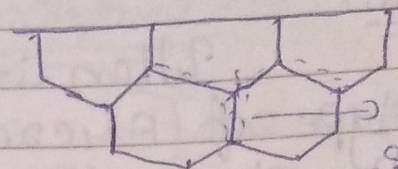
1. Lamellar collenchyma:-



समोपरी रेखीय दिशि  
पर

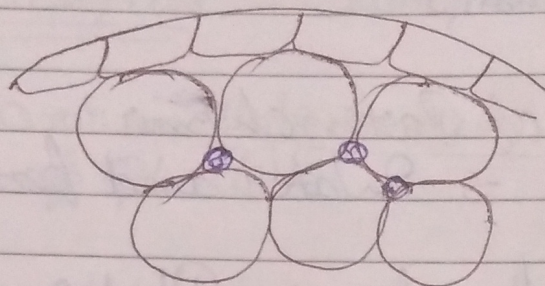
← wall deposition

⑧ Angular (कोणीय)



Deposition  
कोणीय भागों पर

⑨ Lacunar :- (नलीय)



Deposition intercellular  
Space पर होता है

Functions of Chlorenchyma :-

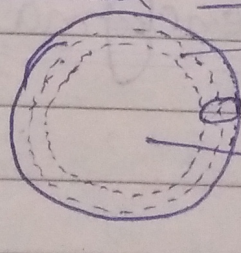
लवणमय दृढ़ता प्रदान करना ।

⑩ Sclerenchyma :- Lignified tissue. Because on the walls lignine elements are deposit. Lignine <sup>become</sup> impermeable for water ~~etc~~. So this deposition dead tissue.

In these tissue Cavity ~~or~~ become closed due to deposition.

Two types of Sclerenchyma :-

① Sclerid :-



Thickwalled :-

Cavity

Sclerid cells become semicircular, Round shape, egg shaped & hard.

These are not in many form:-

- (i) Stone cell / Graft cell :- immature grafted.  
Fruit wall of watermelon
- (ii) Macroscleroid :- These become hard & large shaped  
eg: Seed Coat of pulses.
- (iii) Trichoscleroid :- These become as a long fiber -  
eg: cotton
- (iv) Osteoscleroids :- As a shape of bones.  
eg: Pistia (water hyacinth)

B] Fiber :- Also known as sclerenchymatous fiber.  
Thick walled, lignified, closed cavity and  
खीख पर नुकीले

Also known as mechanical fiber (मजबूती का)

Also known as Phloem fiber

Fibers are two types

- ① Cortical fiber → eg: Banana → not in Cortex
- ② Pith fiber → not in Pith

Xylem fiber  
These are not connected  
Separate

Phloem fiber / Bast fiber  
Also can separate.  
- Also use as a mechanical fiber  
eg: Jute, Cotton.