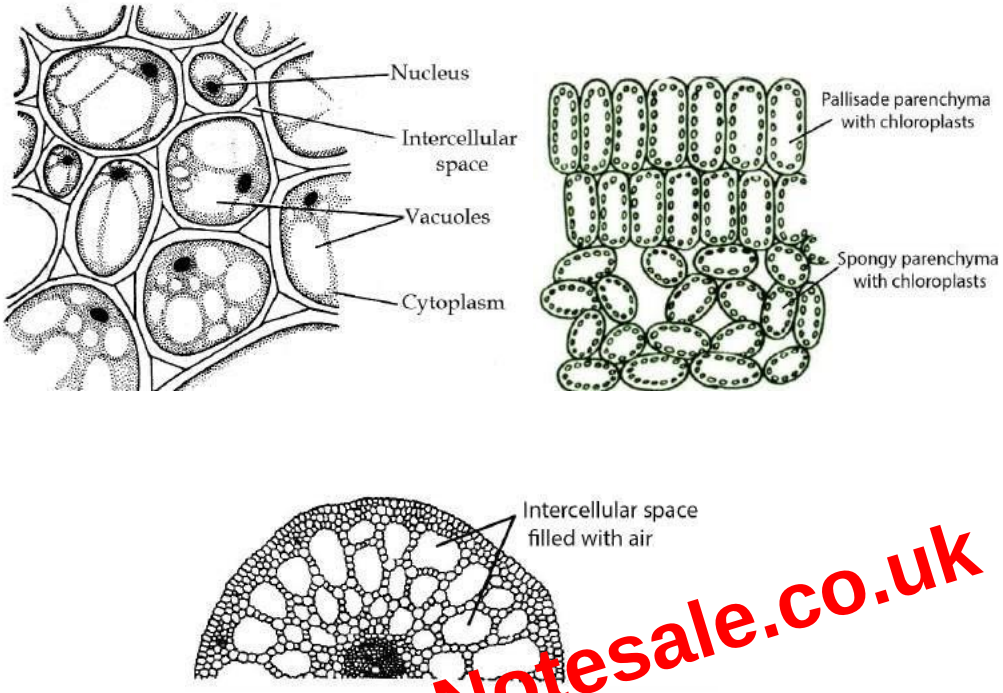

Figure: Storage Parenchyma, Chlorenchyma and Aerenchyma

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Quick Digest:

- is **commonest, simplest, unspecialized, most primitive, most abundant** that evolved first. **[IE 2005]**
- ...istributed tissue in plant is parenchyma.
- ...us feature of parenchyma is presence of **intercellular spaces.**
- ...acets in parenchymal cell is **14.**

- Parenchyma
  permanent tissue
- Most widely
-
-

- It is the fundamental tissue as all other tissues are derived from it.
- Location in plant body ❼ most **abundant tissue**; present in all organs of the plant, e.g. roots, stems, leaves, flowers, fruits and seeds.

Special type of parenchyma:

- **Prosenchyma:** Parenchyma with pointed and tapering ends, found in **pericycle of roots.**
- **Aerenchyma:** Parenchyma with **air sacs**, found in hydrophytes like *Eichhornia* for **buoyancy. [BPKIHS 1995]**
- **Chlorenchyma:** Parenchyma containing **chloroplast,** example; **palisade tissue** (highest no. of chloroplasts is present)**.**
- **Idioblastic parenchyma**: Parenchyma cells storing waste materials like oils, tannin etc.

Collenchyma (=Living mechanical tissue)

- It is **living mechanical tissue**. **[MOE 2008]**
- Cell wall ❼.....
- Cells ❼..... Intercellular spaces ❼.....
- Hydrophilic nature of **pectocellulose** makes the cells of collenchyma **flexible.**
- Sometimes collenchyma develops chloroplasts and helps in photosynthesis.
- Location in plant body ❼ .....

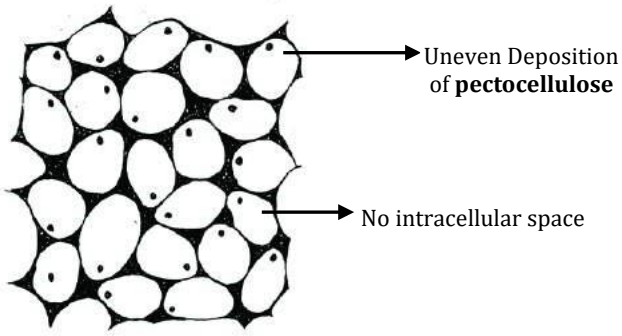

Figure: Collenchyma

- Based upon the thickening of the cell walls, collenchyma is of three types :
  1. **Angular collenchyma**: Most common type, thickening occurs only at the corners of the cells, e.g. *Vitis,Tagetes, Ficus.*
  2. **Lamellar collenchyma**: Thickening occurs at tangential walls, e.g. hypodermis of sunflower stem
  3. **Lacunar or tubular type:** Thickening occur in cell wall bordering the intercellular space, with intercellular space, e.g. hypodermis of cucurbita stem.

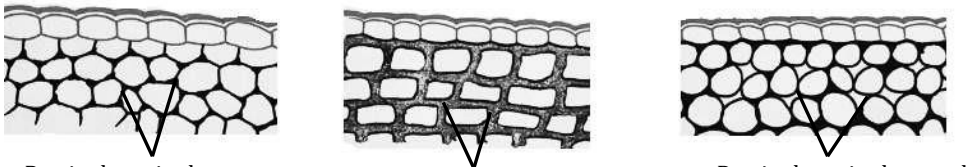

Figure: Types of wall thickening in Collenchyma

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Sclerenchyma (Gr; Scleros: Hard)

- Cell wall ❼.....
- Cells ❼.....
- Intercellular spaces ❼.....
- Main function ❼.....
- Possesses **simple** or **bordered pits.**
- Pits are non-lignified area on lignified wall.

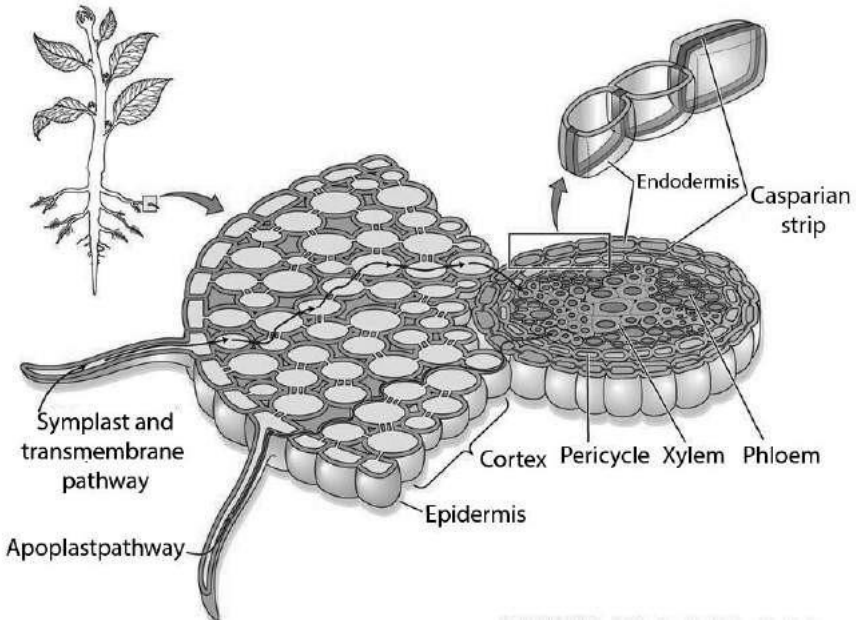

Figure: T.S. of dicot root showing endodermis

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- Endodermis is the border between cortex and stele.
- Cells:……
  ……
- Casparian strip ❼ thickened band of lignin, suberin and cetin present on radial and tangential walls of endodermal cells. **[NEET 2018]**
- A distinct endodermis is a constant feature of **roots of all plants**.
- Passage cells or **transfusion cells**……
- Passage cells help in passage of water from cortex to xylem.

Pericycle:

- It is the outermost layer of stele. **[IOM 2008]**
- **heterogenous pericycle** is present in sunflower.
- In dicot roots the pericycle cells become meristematic and forms part of the cambium ring.
- In angiosperms pericycle give rises to lateral roots so they are endogenous in origin. **[IE 2009]**

Medulla or pith:

- Large parenchymatous cells at the central part in **dicot stem** and **dicot** & **monocot roots.**
- Extensions are called **pith rays** or **medullary rays.**

Vascular (Fascicular) Tissue System

- Central cylinder of the shoot or root surrounded by cortex is called **stele.**
- The varying number of vascular bundles formed inside the stele constitute **vascular tissue system.**
- Each vascular bundle is made up of xylem and phloem with or without cambium.
- Vascular bundles in **dicotyledonous stem** and **in roots of dicots as well as monocots** are arranged in a ring while in monocotyledonous stem they are scattered in general ground tissue.

Types of vascular bundle: