

Chapter 6: Tissues.

Tissues

- A group of cells that are similar in structure and perform a specific function.
- It helps in dividing the work (division of labour).
- Each tissue is specialised in doing specific function and hence the task can be done efficiently.

Plant Tissues

□ Meristematic Tissue

- The tissue which has undifferentiated cells and responsible for the growth of plants.

• Types

- Depending on the region where they are present, meristematic tissue are of three types.

<u>Apical</u>	<u>Intercalary</u>	<u>Lateral</u>
• Present at the tips of stem, roots. • Helps to increase the length of plants.	• Located near the internode region. • It helps to increase the length of internode region.	• It is located near the wall of stem and roots. • It helps to increase the breadth of plants.

Fig: Location of meristematic tissue in plant body.

characteristics of meristematic tissue.

- cells of meristematic tissue are very active.
- Have dense cytoplasm.
- Have thin cellulose walls.
- Have prominent (easily visible, large) nucleus, and may lack vacuoles.

□ Permanent Tissue.

- A tissue that loses its ability to divide and takes up a permanent shape and specific function.

Differentiation: A process of taking up a permanent shape and size, function.

Meristematic Tissue Differentiation → Permanent Tissue.

i) Simple Permanent Tissue.

A tissue that is made up of a single type of cell.

Types of Simple Permanent Tissue.

i(a). Parenchyma.

- They are living cells.
- consist of unspecialised cells with thin cell wall.
- Usually loosely arranged, have large intercellular space (space between cells).
- The tissue stores food.

Types of Parenchyma.

- Chlorenchyma
 - A type of parenchyma that contains chlorophyll.
 - It performs photosynthesis.
- Aerenchyma
 - A type of parenchyma which contains air cavities
 - It helps the aquatic plants to float.

i(b). Collenchyma.

- It helps in providing flexibility to the plants.
- Provides mechanical support.
- cells are living, elongated and irregularly thickened at the corners.
- Have very little intercellular space.

i(c). Sclerenchyma

- It consist of dead cells.
- The cells are long and narrow and thick due to the presence of lignin.
- Intercellular space is absent, cells are compactly packed.

- It makes the plant hard and stiff and provides strength.
- Present in outer covering of seeds and nuts.

□ Epidermis.

- Outermost layer of cells is called epidermis.
- Consist of single layer of cells, very thin and flat.
- In dry habitat, it may be thick to prevent water loss.

Functions

- Some epidermal cells secrete wax that make them water resistant.
- Helps to prevent water loss, mechanical injury and invasion by pathogens (Fungi).

□ Stomata.

- Stomata are enclosed by kidney shaped cells called guard cells.
- It helps in exchange of gases and transpiration (Loss of water in the form of water vapour).

□ Cutin

- A waxy coating present in desert plants
- It prevents water loss.

□ Suberin

- Present in cork cells which are dead and compactly arranged.
- It makes the plants impervious/impermeable to gases and water.

ii) Complex Permanent Tissue.

- A tissue which is made up of more than one type of cell

□ Xylem

- It consist of tracheids, vessels, xylem parenchyma and xylem fibres.

Tracheids and vessels.

- Have thick walls, tube-like structure.
- Help in transportation of water and minerals.

Xylem Parenchyma.

- Helps in storage of food.
- cells are living

~~Xylem Parenchyma~~

Xylem fibres

- Mainly have supportive function.
- Cells are dead.

▣ Phloem.

- It consists of sieve tubes, sieve cells, companion cells, phloem parenchyma and phloem fibres.

Sieve tubes and sieve cells,

- Have perforated walls and transport food.
- Cells are living.

companion cells,

- Help to coordinate the functions of other cells.

Phloem parenchyma.

- Helps to store food.

Phloem fibres,

- Supportive function.
- Cells are living dead.

Animal Tissues

□ Epithelial Tissue.

- They form the covering or protective tissues in the animal body.
- They cover most organs and cavities within the body.
- Eg: skin, lining of the mouth and blood vessels are made of epithelial tissue.

characteristics of epithelial Tissue

- Tightly packed.
- Form a continuous sheet
- No intercellular space.
- Permeable to allow exchange of materials;

Types of epithelial tissue.

i] Simple Squamous epithelial tissue.

- They are extremely thin and flat.
- Present in the inner lining of blood vessels, oesophagus.
- Many layer of epithelial tissue line together to form stratified epithelial tissue.
 - Present in skin to provide protection.

2] Columnar epithelial tissue

- They are tall, pillar like cells.
- Present where absorption and secretion is important.
- Present in respiratory tract, intestine etc.
- If it has hair like structure i.e cilia then it is known as ciliated columnar epithelial tissue.
- Helps to clear dust and mucus from the respiratory tract.

3] Cuboidal epithelial tissue.

- cells are cube-shaped.
- Present in lining of kidney tubules, duct of salivary gland.
- Provides mechanical support.
- If it acts as a gland then it is known as glandular epithelial tissue which helps to secrete substances.

□ Connective tissue.

- They help in connecting various body parts and organs to each other.
- cells of connective tissue can be loosely packed, can be Jelly like, fluid or rigid.

Types of connective tissue

1] Blood

- A red coloured fluid that flows throughout the body.
- It has a fluid part called plasma.
- Plasma contains - RBC, WBC, and Platelets.
- Also contain proteins, hormones and salts.

Functions

It helps in transportation of food, hormones and remove waste materials.

2] Bone

- It forms the framework for the body
- It also anchors muscles and supports the main organs of the body.

- It is strong and non-flexible.
- It is made up of calcium and phosphorous compounds.

3] Ligament.

- It helps in connecting two bones with each other.
- It is very elastic and provides considerable strength.

4] Tendons

- It connects bones to muscles.
- Made up of fibrous tissue with great strength but limited flexibility.

5] Cartilage

- It has widely spaced cells.
- Composed of proteins and sugars.
- It smoothes the surface of joints to reduce friction.
- Present in nose, ear, trachea, and larynx.

6] Areolar Connective tissue.

- Found between skin and muscles, around blood vessels

and nerves and in the bone marrow.

- Fills the space inside organs, supports internal organs and helps in repairing tissues.

7] Adipose tissue.

- Found below skin and between internal organs.
- It helps in storing fat and acts as an insulator.

8] Muscular Tissue.

- Made up of elongated cells.
- The cells of this tissue are called muscle fibres.
- It helps in movement of various body parts.
- Contains special proteins known as contractile proteins.

Types of muscles.

1] Voluntary muscles.

- These muscles can be moved by our will as they are attached to the skeleton.
- The cells have alternate light and dark band appearance and hence are known as striated muscles.

- The cells are long, cylindrical, unbranched and multinucleated.

2] Involuntary muscles.

- The muscles which are not under our control.
- They are also known as smooth muscles or unstriated muscles as they do not show any striations.
- They are found in iris of eye, ureters, and bronchi of lungs.
- Cells are long with pointed end, uninucleated, unbranched.

3] Cardiac muscles.

- Only found in heart.
- They can contract and expand throughout the life.
- They are cylindrical, branched and uninucleated.

4] Nervous Tissue.

- It is responsible for controlling the whole body.
- Cells of nervous tissue are called neurons or nerve cell.

Fig: Structure of a neuron.

- Responsible for transmitting signals throughout the body.
- Parts of neuron.
 - cell body - consist of cytoplasm, various organelles, and nucleus.
 - Dendrites - long hair like branches arising from cell body. Responsible for receiving signals.
 - Axon - long, single part that transmits the signals.
 - Nerve ending - Passes message from one neuron to another.