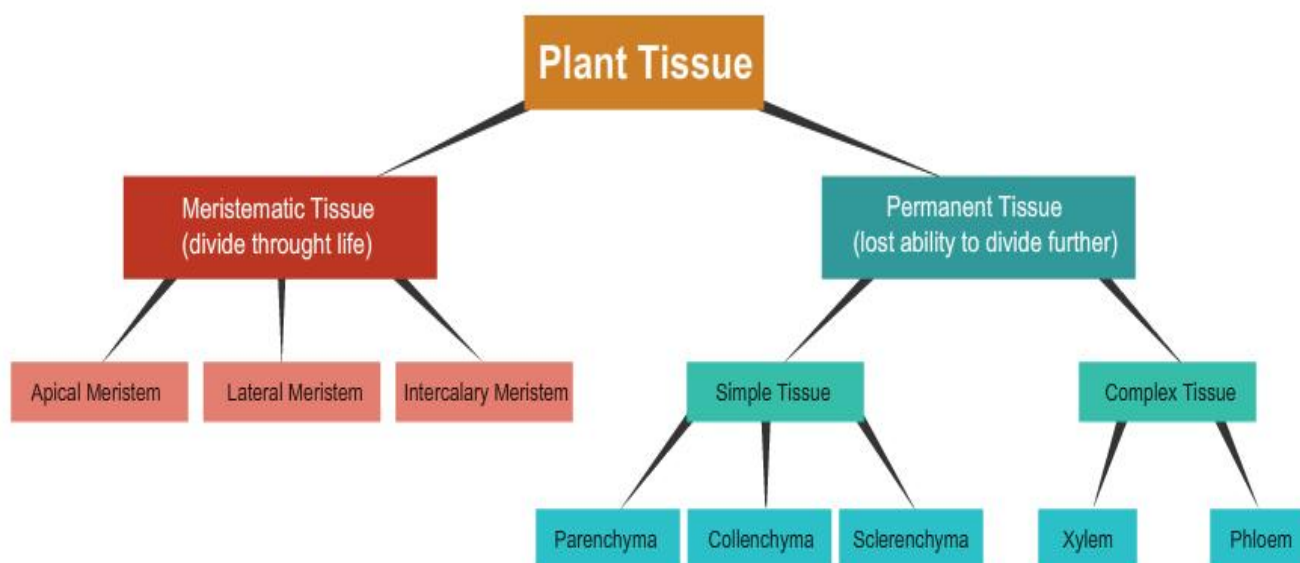


Class-IX

CHAPTER- TISSUE QUICK REVISION NOTES

SA-1

Tissues in Plants and Animals:



1. **Tissue** is a group of cells having similar origin, structure & function. Study of tissues is called **Histology**

2. In unicellular organism (Amoeba) single cell performs all basic functions, whereas in **multi-cellular organisms** (Plants and Animals) shows **division of labor as Plant tissue & Animal tissues**.

Plant tissues are of two types: Meristems & Permanent tissues.

1. **Meristems**: The Meristems are the tissues having the power of cell division. It is found on those region of the plant which grows.

Types of Meristems;

a). **The Apical meristems** – It is present at the growing tip of the stem and roots and increases the length.

b). **The lateral meristems** - present at the lateral side of stem and root (cambium) and increases

the girth.

c). **The intercalary meristems** - present at internodes or base of the leaves and increases the length between the nodes.

2. **Permanent tissues:** Two types such as Simple permanent tissues & Complex permanent tissues.

a) **Simple permanent tissues:** subdivided as

(i): **Parenchyma:** Tissues provide the support to plants. They are loosely packed and have large intracellular space.

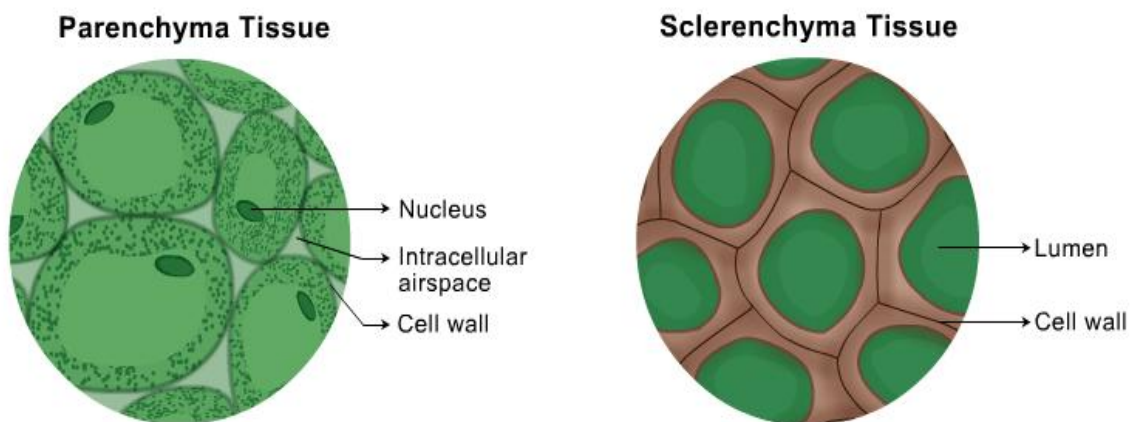
- Parenchyma with chlorophyll which performs photosynthesis is called as **chlorenchyma**.

- The **parenchyma with large air spaces** to give buoyancy is called as **aerenchyma**.

Parenchyma also stores food and water.

(ii) **Collenchyma:** Tissue provides mechanical support, **thickened at the corners**, have very little intercellular space. It allows easy bending of various parts of a plant without breaking

(iii) **Sclerenchyma:** Tissue makes the plant hard and stiff, thickened due to **lignin** and no intercellular space.



Cells of this tissue are dead and commonly seen in the husk of coconut.

(iv) **Guard cells and Epidermal tissue:** The tissue aids in protection and exchange of gases. Guard cells kidney shaped in dicots, dumb bell shaped in monocots to guard the stomata.

The epidermal tissues of roots aid in absorption of water and minerals.

The epidermal tissues in desert plants have a thick waxy coating of **Cutin** with waterproof quality.

The epidermal tissues form the several layer **thick Cork or the Bark of the tree.**

Epidermis : Epidermis forms one cell thick outermost layer of various body organs of plants such as leaves, flowers, stems and roots.

Epidermis is covered outside by cuticle. Cuticle is a water proof layer of waxy substance called as cutin which is secreted by the epidermal cells. Cuticle is very thick in xerophytes.

Cells of epidermis of leaves are not continuous at some places due to the presence of small pores called as stomata. Each stomata is guarded by a pair of bean shaped cells called as guard cells.

These are the only epidermal cells which possess chloplasts, the rest being colorless.

Functions :

- (i) The main function of epidermis is to protect the plant from desiccation and infection.
- (ii) Cuticle of epidermis cuts the rate of transpiration and evaporation of water and prevents wilting.
- (iii) Stomata in epidermis allow gaseous exchange to occur during photosynthesis respiration.
- (iv) Stomata also helps in transpiration.

Cork or phellem : in older roots and stems, tissues at the periphery become cork cells or phellem cells.

Cork is made up to dead cells with thick walls and do not have any intercellular spaces. The cell walls in cork deposit waxy substance called as suberin.

The cells of cork become impermeable to water and gasses due to the deposition of suberin. The cork cells are without any protoplasm but are filled with resins or tannins.

Functions :

- (i) Cork is protective in function. Cork cells prevent desiccation, infection and mechanical injury.
- (ii) Imperviousness, lightness, toughness, compressibility and elasticity make the cork commercially valuable.
- (iii) Cork is used for insulation, as shock absorber in linoleum.
- (iv) Cork is used in the making of a variety of sport goods such as cricket balls, table tennis, shuttle cocks, wooden paddles etc.

(Please refer to Fig. 6.3- 6.6, NCERT Book Page-70-73).

b) Complex permanent tissues: The complex tissues are made of more than one type of cells. All these cells coordinate to perform a common function.

They are subdivided as;

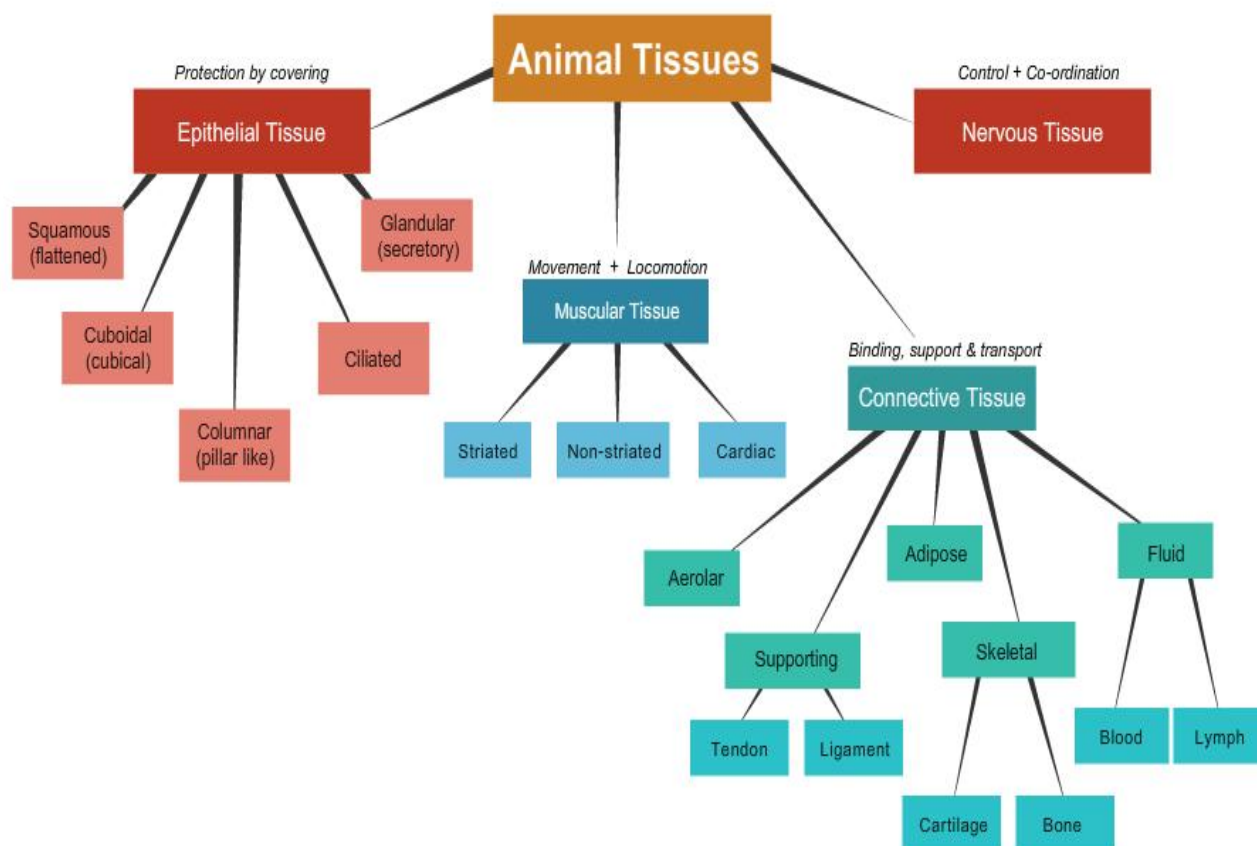
Xylem: It consists of tracheids, vessels, xylem parenchyma and xylem fibers. The cells have thick walls,

Function - aids in conduction of water and minerals.

Phloem: It consists of sieve tubes, companion cells, phloem parenchyma, and phloem fibers.

Function - Phloem transports food material to other parts of the plants.

(Please refer to Fig. 6.7, NCERT Book Page-73).



6. Animal tissues: Sub divided as epithelial tissue, connective tissue, muscular tissue and nervous

tissue.

i. Epithelial tissue: It is a protective covering forming a continuous sheet. Simple epithelium is the one which is extremely thin in one layer, whereas stratified epithelium are arranged in pattern of layers.

Depending on shape and function they are classified as:

- a) **Squamous epithelium** in the lining of mouth and esophagus.
- b) **Cuboidal epithelium** in the lining of kidney tubules and salivary glands.
- c) **Columnar epithelium in the intestine** & Columnar epithelium with cilia in the lining of respiratory tract.
- d) **Glandular epithelium** in the Glands aids in a special function as gland cells, which can secrete at the epithelial surface.

In detail:

Epithelial tissue lines the surface of a body and forms a protective covering. Epithelium cells are packed tightly together with little intercellular matrix. Epithelial tissue in the body is of two types.

(a) **Simple epithelium:** It consists of a single layer of cells where cells are in direct contact with the basement membrane. It is further sub-divided into the following types:

(i) **Simple squamous epithelium:** It consists of a single layer of flat cells with irregular boundaries. It is found in the walls of the blood vessels and in the lining of alveoli.

(ii) **Simple cuboidal epithelium:** It consists of a single layer of cube-like cells. It is present in regions where secretion and absorption of substances takes place such as the proximal convoluted tubule region of the nephron.

(iii) **Simple columnar epithelium:** It consists of a single layer of tall, slender cells with their nuclei present at the base of the cells. They may bear micro-villi on the free surfaces. Columnar epithelium forms the lining of the stomach and intestines, and is involved in the function of secretion and absorption.

(iv) **Ciliated epithelium:** It consists of columnar or cuboidal cells with cilia on their free surfaces. They are present in bronchioles and oviducts from where they direct mucus and eggs in specific directions.

(v) **Glandular epithelium:** It consists of columnar or cuboidal cells involved in the secretion of substances. Glands are of two types, unicellular glands (goblet cells of the alimentary canal) and multicellular glands (salivary glands). They can be classified as exocrine (ductless glands) and

endocrine glands (duct glands) by the method through which they release enzymes.

(b) **Compound epithelium:** It consists of many layers of cells. It is involved mainly in the function of providing protection and has a limited role in secretion and absorption.

Examples of compound epithelium include the dry surface of the skin or moist inner lining of the buccal cavity, pharynx, pancreatic ducts, and the inner lining of ducts of salivary glands. (Please refer to Fig. 6.9, NCERT Book Page-75).

ii) Connective Tissue: Five Types, such as;

a) Blood: The Blood is a fluid connective tissue. Blood plasma has RBCs (Red Blood Cells) WBCs (White Blood Cells) and platelets. Blood plasma contains proteins, salts and hormones. Blood flows and transports gases, digested food, hormones and waste materials.

b) Bone: The bone is a connective tissue with hard matrix, composed of calcium and phosphorus. A bone is connected by another bone with another connective tissue called ligaments. A bone is connected by muscle with another connective tissue called tendon.

c) Cartilage: The cartilage is a connective tissue with solid matrix composed of proteins and sugars. It is commonly seen in nose, ear, trachea, and larynx.

d) Areolar Connective Tissue: It is found between the skin and muscles, around the blood vessels. It supports internal organs and aids in repair of tissues.

e) Adipose Connective Tissue: It is filled with fat globules for the storage of fat. It acts as insulator. (Please refer to Fig. 6.10, NCERT Book Page-76).

Muscular tissues: They have special contractile proteins responsible for movements. Three types, such as; Striated muscles/skeletal muscles/voluntary muscles :

They are cylindrical, un-branched and multinucleated. They have dark bands and light bands.

Unstriated muscles/smooth muscles/involuntary muscles:

They are commonly called as Smooth muscles, having no striations (dark bands/ light bands are absent). Commonly found alimentary canal, uterus, Iris of an Eye. They are spindle shaped.

Involuntary in nature

Cardiac Muscles: They are commonly called as Heart muscles, cylindrical, branched and uni-

nucleate. Involuntary in nature.(Please refer to Fig. 6.11, NCERT Book Page-77).

Nervous Tissue: The tissue responds to stimuli. The brain, spinal cord and nerves are composed of nervous tissue or neurons.

A neuron consists of Cell Body, cytoplasm, Nucleus, Dendrite, Axon, nerve ending. The neuron impulse allow us to move our muscles when we want to respond to stimuli.

