Class-9

SHORT NOTE

TISSUES

- A group of cells that are similar in structure and/or work together to achieve a particular function forms a tissue.
- Study of tissues: Histology
- Types of tissues: 1. Plant tissues 2. Animal tissues

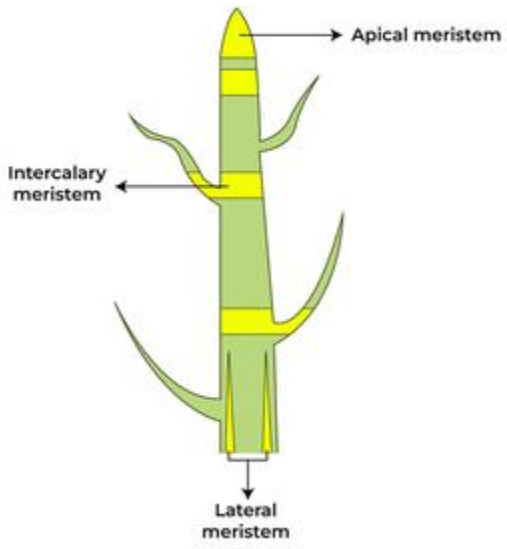
PLANT TISSUES	ANIMAL TISSUES
Dead and supportive	living
Based on the dividing capacity of tissues, various plants can be classified as growing or meristematic tissue and permanent tissue.	Cell growth in animals is more uniform. So, there is no such demarcation of dividing and nondividing regions in animals.

PLANT TISSUES:

On the basis of the dividing capacity, plant tissues are of two types:

1. Meristematic tissues
2. Permanent tissues

- **Meristematic tissues:** Consist of actively-dividing cells present on certain specific regions.
  Depending on the region where they are present, meristematic tissues are classified as:



1. **Apical meristem:** Present at the growing tips of stems and roots.
   Function: To increase the length of stems and roots.
2. **Lateral meristem:** Present at the base of leaves or internodes.
   Function: For the longitudinal growth of plants.
3. **Intercalary meristem:** Present on the lateral sides of the stems and roots.
   Function: To increase the thickness of stems and roots.

- **Permanent tissues:** Meristematic tissues take up a specific role and lose the ability to divide and form permanent tissues.
- This process of taking up a permanent shape, size, and a function is called differentiation

Permanent tissues are of two types:

1. **SIMPLE PERMANENT TISSUES:** Consist of only one type of cell.
   - Simple permanent tissues are of three types:

PARENCHYMA	COLLENCHYMA	SCLERENCHYMA
Most common and living cells.	Composed of living and elongated cells,present in leaf stalks below the epidermis.	Composed of dead cells
Unspecialised cells with thin cell walls.	cell walls irregularly thickened at the comers.	long, narrow, and thick-walled cell due to presence of lignin.
Large intercellular spaces.	No intercellular space.	no intercellular spaces.
generally stores food.	mechanical support and flexibility in plants	• present in stems, around vascular bundles, in the veins of leaves and in the hard covering of seeds and nuts. • It provides strength to the plant parts.

2. **COMPLEX PERMANENT TISSUES:** Made up of more than one type of cells (Conducting tissues).
   - Types of complex permanent tissues:

1. **Xylem:** Conducts water and minerals from the roots to the different parts of the plant.

- consists of tracheids, vessels, xylem parenchyma and xylem fibres.
- Tracheids and vessels have thick walls, and many are dead cells when mature.
- Tracheids and vessels are tubular structures. This allows them to transport water and minerals vertically.
- The parenchyma stores food.
- Xylem fibres are mainly supportive in function.

2. **Phloem:** Conducts food material from the leaves to the different parts of the plant.

- Phloem is made up of five types of cells: sieve cells, sieve tubes, companion cells, phloem fibres and the phloem parenchyma.
- Sieve tubes are tubular cells with perforated walls
- Except phloem fibres, other phloem cells are living cells.

ANIMAL TISSUES:

Animal tissues are classified into four types based on the functions they perform:

1. Epithelial tissue 2. Connective tissue 3. Muscular tissue 4. Nervous tissue

1. EPITHELIAL TISSUE: Form the covering of the external surfaces, internal cavities and organs of the animal body.

- Epithelial tissue cells are tightly packed and form a continuous sheet.
- Various types of epithelial tissues are:

1. **Simple squamous epithelium:** Single layer of flat cells.
   Location in the human body: Lining of the mouth, oesophagus, lung, alveoli, etc.
2. **Cuboidal epithelium:** Consists of cube like cells.
   Location in the human body: Lining of the kidney tubules and ducts of the salivary glands.
   Function: secretion and absorption.
3. **Columnar epithelium:** Consists of elongated or column-like cells.
   Location in the human body: Inner lining of the intestine and gut. Function: secretion and absorption.

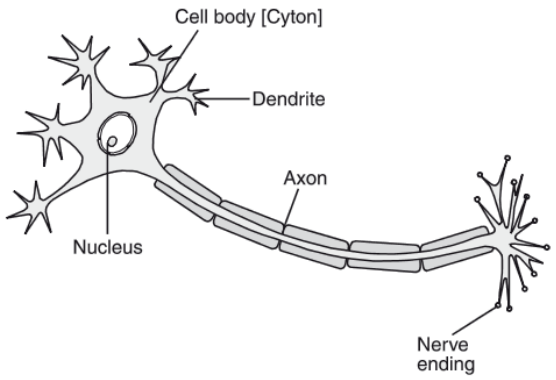
2. **CONNECTIVE TISSUE:** Specialised to connect various body organs.
   - **Areolar tissue:** Found in the skin and muscles, around the blood vessels, nerves, etc.
   - **Adipose tissue:** Acts as the storage site of fats; found between the internal organs and below the skin; acts as an insulator for the body.
   - **Dense regular connective tissue:** Main components are tendons and ligaments; tendons connect muscles to bones, while ligaments connect two bones together.
   - **Skeletal tissue:** Main components of skeletal tissues are cartilage and bone.
   - **Fluid tissue:** Blood is the vascular tissue present in animals.

3. **MUSCULAR TISSUE:** consists of elongated cells, also called muscle fibres.
   - responsible for movement in our body.
   - Muscles contain special proteins called contractile proteins, which contract and relax to cause movement.

- Three types of muscles fibres are there namely:

SKELETAL/STRIATED MUSCLE	SMOOTH/UNSTRIATED MUSCLE	CARDIAC MUSCLE
mostly attached to bones and help in body movement.	Cells are long, spindle-shaped and possess a single nucleus.	The muscles of the heart show rhythmic contraction and relaxation throughout life.
Striations present	Striations absent.	Striations present.
long, cylindrical, unbranched and multinucleate (having many nuclei)	found in the iris of the eye, in ureters and in the bronchi of the lungs	cylindrical, branched and uninucleate.
Voluntary	Involuntary	Involuntary

4. **NERVOUS TISSUE:**



   - Neuron is the structural and functional unit of the nervous system.
   - cells of the nervous tissue are highly specialised for being stimulated and then transmitting the stimulus very rapidly from one place to another within the body.
   - A neuron consists of a cell body with a nucleus and cytoplasm, from which long thin hair-like parts arise.
   - Usually each neuron has a single long part (process), called the axon, and many short, branched parts called dendrites.
   - The signal that passes along the nerve fibre is called a nerve impulse.
   - The functional combination of nerve and muscle tissue is fundamental to most animals.
   - This combination enables animals to move rapidly in response to stimuli.