
Chapter 6

Tissues

Tissues

- Group of cells that work together to perform a particular function

A. Plant tissues

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

- Meristematic
- Permanent

Meristematic tissues - Consist of actively-dividing cells

Meristematic tissues are of three types:

1. **Apical meristem** - Present at the growing tips of stems and roots

Important function:

- To increase the length of stems and roots

2. **Intercalary meristem** - Present at the base of leaves or internodes

Important function:

- For the longitudinal growth of plants

3. **Lateral meristem** - Present on the lateral sides of the stems and roots

Important function:

- To increase the thickness of stems and roots

Permanent tissues - Formed from meristematic tissues; lose the ability to divide

Permanent tissues are divided into two categories:

1. **Simple permanent** - Consist of only one type of cells

Types of simple permanent tissues:

- (i) **Parenchyma** - Composed of unspecialised living cells with relatively thin cell walls
- (ii) **Collenchyma** - Composed of living and elongated cells with cell walls irregularly thickened at the corners
- (iii) **Sclerenchyma** - Composed of long, narrow, and thick-walled cells. This tissue is made up of dead cells and there are no intercellular spaces.
- (iv) **Protective tissues** - Epidermis and cork

2. **Complex permanent** - Made up of more than one type of cells

Types of complex permanent tissues:

- (i) Xylem
 - Conducts water and minerals from the roots to the different parts of the plant
 - Composed of four different types of cells – Tracheids, vessels, xylem parenchyma, and fibres
- (ii) Phloem
 - Conducts food material from the leaves to the different parts of the plant
 - Composed of four different types of cells – Sieve tubes, companion cells, phloem parenchyma, and phloem fibres

B. Animal tissues

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

- Epithelial
- Connective
- Muscular
- Nervous

Epithelial tissues - Form the covering of the external surfaces, internal cavities, and organs of the animal body

Various types of epithelial tissues:

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

3. **Columnar epithelium** - Consists of elongated or column-like cells

Location in the human body:

- Inner lining of the intestine and gut

4. **Glandular epithelium** - Consists of multicellular glands

Connective tissues - Specialised to connect various body organs

Various types of connective tissues:

1. **Areolar tissue** - Found in the skin and muscles, around the blood vessels, nerves, etc.
2. **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
3. **Dense regular connective tissue** - Main components are tendons and ligaments; tendons connect muscles to bones, while ligaments connect two bones together
4. **Skeletal tissue** - Main components of skeletal tissues are cartilage and bone
5. **Fluid tissue** - Blood is the vascular tissue present in animals

Muscular tissues - Main function of muscular tissues is to provide movement to the body

Muscular tissues are of three types:

1. **Striated muscles or skeletal muscles or voluntary muscles** - Cells are cylindrical, un-branched, and multinucleate
2. **Smooth muscles or involuntary muscles** - Cells are long, spindle-shaped, and possess a single nucleus
3. **Cardiac muscles or involuntary muscles** - Cells are cylindrical, branched, and uninucleate

Nervous tissues - Present in the brain, spinal cord, nerves

1. Neuron - Cells of the nervous tissue
2. A neuron consists of a cell body, an axon, and a dendrite