

## 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