

# Chapter 2: Tissues

## 1. Introduction to Tissues:

- A tissue is a group of similar cells that work together to perform a specific function.
  - In multicellular organisms, tissues form organs, which in turn form organ systems.
  - Tissues are classified into **plant tissues** and **animal tissues** based on their origin and functions.
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## 2. Plant Tissues:

Plant tissues are broadly classified into **Meristematic** and **Permanent** tissues.

### a) Meristematic Tissues:

- **Location:** Root and shoot tips, cambium.
- **Structure:** Composed of actively dividing cells.
- **Function:** Growth and formation of new cells.
- **Types:**
  - *Apical Meristem:* Growth in length (tips of roots and shoots).
  - *Lateral Meristem:* Growth in thickness (vascular and cork cambium).
  - *Intercalary Meristem:* Located at the base of leaves or internodes, helps in lengthening.

### b) Permanent Tissues:

- Formed from meristematic tissues that have lost the ability to divide.
  - **Types:**
    - *Simple Permanent Tissue:*
      - *Parenchyma:* Soft, thin-walled, stores food. (e.g., pulp of fruits)
      - *Collenchyma:* Provides flexibility and mechanical support. (e.g., petiole)
      - *Sclerenchyma:* Thick-walled, dead cells that provide strength. (e.g., nutshells)
    - *Complex Permanent Tissue:*
      - *Xylem:* Transports water and minerals from roots to leaves.
      - *Phloem:* Transports food from leaves to other plant parts.
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### 3. Animal Tissues:

Animal tissues are classified into **Epithelial, Connective, Muscular, and Nervous** tissues.

#### a) Epithelial Tissue:

- **Location:** Covers the body surfaces and lines cavities.
- **Function:** Protection, secretion, absorption.
- **Types:**
  - *Squamous Epithelium:* Thin, flat cells (e.g., lining of blood vessels).
  - *Cuboidal Epithelium:* Cube-shaped cells (e.g., ducts of glands).
  - *Columnar Epithelium:* Tall, pillar-like cells (e.g., intestine lining).
  - *Ciliated Epithelium:* Has cilia for movement (e.g., respiratory tract).
  - *Glandular Epithelium:* Secretes substances (e.g., sweat glands).

#### b) Connective Tissue:

- **Location:** Connects and supports other tissues.
- **Function:** Binding, support, protection.
- **Types:**
  - *Bone:* Hard and rigid, supports and protects.
  - *Cartilage:* Flexible, reduces friction (e.g., ear, nose).
  - *Tendons:* Connect muscle to bone.
  - *Ligaments:* Connect bone to bone.
  - *Adipose Tissue:* Stores fat.
  - *Blood:* Fluid tissue that transports nutrients and gases.

#### c) Muscular Tissue:

- **Function:** Movement and locomotion.
- **Types:**
  - *Skeletal Muscle:* Voluntary, striated (attached to bones).
  - *Smooth Muscle:* Involuntary, non-striated (e.g., digestive tract).
  - *Cardiac Muscle:* Involuntary, striated (heart muscle).

#### d) Nervous Tissue:

- **Function:** Transmits impulses.
  - **Structure:** Neurons (nerve cells) and supporting glial cells.
  - **Location:** Brain, spinal cord, nerves.
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**Key Points to Remember:**

- Tissues form the basic building blocks of organs and organ systems.
- Plant tissues are categorized based on growth (meristematic) and function (permanent).
- Animal tissues include epithelial, connective, muscular, and nervous tissues, each serving distinct functions.

