Tissues

Tissues

- Group of cells that work together to perform a particular function is called tissue
- **Plant tissues**: On the basis of the dividing capacity, plant tissues are of two types:

  Meristematic and Permanent tissues
- **Meristematic tissues** – It consists of actively-dividing cells.

Properties of Meristematic Tissues-

- Made up of immature cells or undifferentiated cells.
- Cell wall is thinner with a prominent nucleus.
- Their cells are metabolically highly active with a dense cytoplasm.

Meristematic tissues are of three types:

Meristematic Tissue	Location	Function
Apical meristem	Present at the growing tips of stems and roots	To increase the length of stems and roots
Intercalary meristem	Present at the base of leaves or internodes	For the longitudinal growth of plants
Lateral meristem	Present on the lateral sides of the stems and roots	To increase the thickness of stems and roots

Permanent tissues – It is formed from meristematic tissues. The cell loses the ability to divide. Permanent tissues are divided into two categories:

- **Simple permanent -** Consist of only one type of cells performing same functions.
- **Types of simple permanent tissues:- Parenchyma , Collenchyma and Sclerenchyma**
- **Parenchyma -** Composed of unspecialised loosely packed living cells with relatively thin cell walls and large intercellular spaces.

i. **Chlorenchyma:** Parenchyma that contains chloroplast and performs photosynthesis is called chlorenchyma.

ii. **Aerenchyma:** Parenchyma that contains large air cavities is called aerenchyma. These large air cavities provide buoyancy to aquatic plants

- **Collenchyma** - Composed of living and elongated cells with cell walls irregularly thickened at the corners ; have very little intercellular spaces; provide flexibility and mechanical support to the various parts of the cells. The are present in leaf stalks just below the epidermis.

- **Sclerenchyma** - Composed of long, narrow, and lignin deposited thick-walled cells. This tissue is made up of dead cells and there are no intercellular spaces. For example, husk of coconut.

- **Complex permanent** - Made up of more than one type of cell. These tissues constitute vascular bundles. Types of complex permanent tissues are

- **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 xylem fibres. Except xylem parenchyma all other xylem elements are non- living.

- **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. Except for phloem fibres, all other phloem cells are living.

Animal tissues: Animal tissues are classified into four types based on the functions they perform: Epithelial, Connective, Muscular and Nervous tissue.

- **Epithelial tissues** –Tightly packed cells with almost no intercellular spaces. It forms the covering of the external surfaces, internal cavities, and organs of the animal body

- Various types of epithelial tissues:

- **Squamous epithelium** - Single layer of extremely thin and flat cells are called simple squamous epithelium while multi layered cells forms stratified squamous epithelium in order to prevent wear and tear

- **Location in the human body**:

- Simple squamous epithelium - Lining of the mouth, oesophagus, lung alveoli, etc.
- Stratified squamous epithelium – Skin

- **Cuboidal epithelium** - Consists of cube-like cells that provide mechanical support

- **Location in the human body:**Lining of kidney tubules and ducts of the salivary glands

- **Columnar epithelium -** Consists of elongated or column-like cells to facilitate movement across the epithelial barriers.

- **Location in the human body:** Inner lining of the intestine and gut

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

Connective tissues -Specialised to connect various body organs. Various types of connective tissues are:

Loose connective tissue- It includes areolar and adipose connective tissues

- **Areolar tissue -** It provides supports to internal organs and helps in repair of tissues

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.

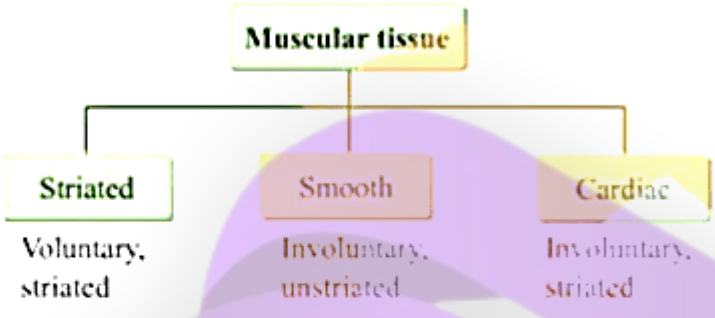
- Ligaments – Connective tissues that connect a bone to a bone. It is very elastic
- Tendons – Connective tissue that connect a bone to a muscle. It has limited flexibility

Specialized connective tissue -It includes skeletal tissues i.e cartilage and bone.

Fluid connective tissue - Blood is the special connective tissue present in animals that helps in the transport of various substances. It is composed of plasma, Red blood cells (RBC), White blood cell (WBC) and platelets.

Lymph- It is a transparent, light yellowish fluid located in the intercellular spaces of our body. It is part of the defensive mechanism of the body and also helps in transporting nutrients to tissues and cells. It also helps in carrying digested fats from the intestine.

Muscular Tissues
Muscles, made up of muscular tissues, make it possible for the different body parts to move. Muscular tissues can be classified into three categories, as is shown in the figure.



Striated Muscles

- Striated muscles show alternate light and dark bands or striations when stained appropriately.
- They are also called **skeletal muscles** because they are found attached to the bones which form the skeleton.
- They are voluntary muscles.
- The cells of striated muscular tissues are long, cylindrical, unbranched and multinucleate (i.e., having many nuclei).
- They are located in the body wall, tongue, limbs and pharynx.

Smooth Muscles

- Unstriated or smooth muscles do not show any alternate light and dark bands.
- They are involuntary muscles as they are involved in involuntary actions of the body.
- The cells of smooth muscular tissues are long with pointed ends (or spindle-shaped) and uninucleate.
- Smooth muscles are located in the alimentary canal, urinary bladder, blood vessels and ducts of glands.

Cardiac Muscles

- Cardiac muscles are the muscles of the heart.
- They are striated, but involuntary in action.
- They show rhythmic contraction and relaxation throughout life.
- The cells of cardiac muscular tissues are cylindrical, branched and uninucleate.

They are formed of a bundle of axons that are enclosed in a sheath.
They are of three types: sensory, motor and mixed.