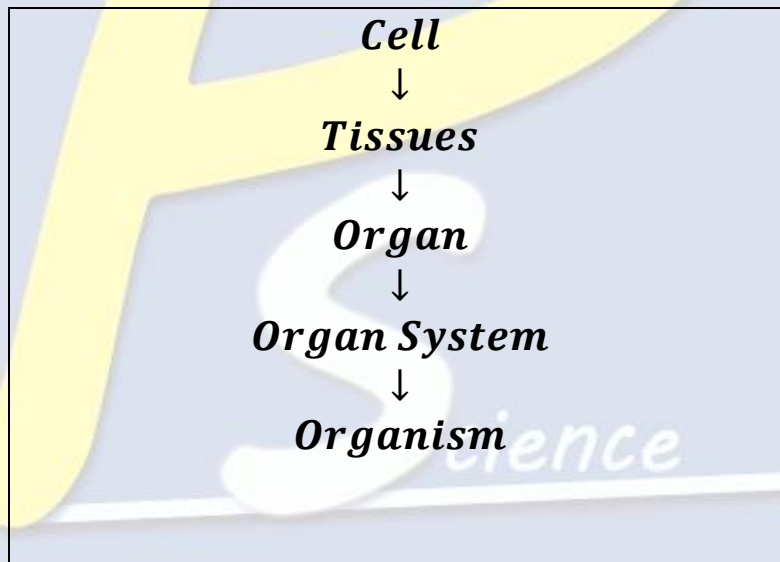


Tissues

➤ Tissues:

The multicellular organisms have specialized groups of cells in their body to perform various functions. These groups are known as tissues.

- Multiple cells with similar functioning join together to form a **tissue**.
- Various tissues comes up together to build an **organ**.
- Diverse organs sum up together in order to form an **organ system**.
- And at last when all these organ systems are interlinked they make an **organism**.



➤ Difference between Plant and Animal Tissues:

Plant Tissues	Animal Tissues
They contain cell wall.	They lack cell wall.
They require less energy as they are stationary.	They require more energy as they have to move.
They are organized simple in a	They are organized complex in

Tissues

nature.	a nature.
They restrict the growth of the cells to the stems and root tips.	They grow uniformly in all the areas.
They contain some dead cells like: Cork.	They contains only living cells .

➤ **Plant Tissues:**

1) Meristematic Tissues:

They control the growth of the plant only in those regions where they are located. They are extra active, contains dense cytoplasm with thin cellulose walls and prominent nuclei. They are further classified in 3 parts depending on the areas where they are present.

- a) Apical meristem** – they are present at the tip of the stem and the root which helps them to increase the length.
- b) Intercalary meristem** – they are located at the base of the leaves or at internodes.
- c) Lateral meristem** – they are present in a parallel way in the stem and roots helping them to increase the width.

2) Permanent Tissues:

The process in which cells take up a permanent shape, size and follows a function then it is known as the **differentiation**. Cells of meristematic tissue differentiate to for different types of permanent tissue.

a) Simple Permanent Tissues –

- The live cells have thin cell walls that are usually loosely packed so the intercellular spaces are found in this tissue.

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- They store foods and even water and minerals in the roots and provide support to the plant.
- When some of these tissues contains chlorophyll and performs photosynthesis, then it is called **chlorenchyma**.
- The aquatic plants contain large air cavities that helps them to float on water and that's why these tissues inside them are known **aerenchyma**.
- **Collenchyma** tissues make the plant flexible that allows it to bend easily in various parts of a plant (leaf, stem) without breaking and gives it a mechanical support.
- The cells of this tissue are living, elongated and irregularly thickened at the corners having very little intercellular space.

b) Complex Permanent Tissues -

- They are made up of more than 1 type of tissues that coordinate with each other to perform a common function.
- **Xylem and Phloem** are conducting tissues and constitute a vascular bundle.
- **Xylem** allows the transfer water and minerals from the roots to the plant vertically. It consists of tracheids, vessels, xylem parenchyma and xylem fibres. Its tissues have thick cell walls and some are dead cells.
- **Tracheids and vessels** are tubular structures this allows them to transport water and minerals vertically, **parenchyma** stores food

and helps in the sideways conduction of water, and **fibres** are mainly supportive in function.

- **Phloem** allows the transfer of materials in both directions. It consists of 4 components: sieve tubes, companion cells, phloem fibres and the phloem parenchyma.
- **Phloem** transports food from leaves to other parts of the plants. **Phloem fibers** are living cells and **sieve tubes** are tubular cells with perforated walls.

➤ Animal Tissues:

Animals' complex body designs require the use of specialized tissues to carry out various bodily functions. Cells in the muscular tissues contract and relax to result in movement. Animal tissues are of several kinds, including epithelial, connective, muscular, and nerve tissue. Muscle creates muscular tissue, and blood is a sort of connective tissue.

1. Epithelial Tissues:

- It serves as the body's covering or protective tissues.
- The majority of the body's cavities and organs are covered in epithelium and it functions as a partition to keep various bodily systems apart.
- An extracellular fibrous basement membrane separates all epithelium from the underlying tissue.

Tissues

- Various epithelia have distinctive structural differences that correspond to their distinct roles.
 - a) Squamous Epithelium** forms a delicate line and is incredibly flat and thin, the lining of the mouth, the oesophagus and skin are also covered with it.
 - b) Stratified Squamous Epithelium** are set up in a layering pattern to reduce the damage, skin epithelial cells are organised into various layers.
 - c) Ciliated Columnar Epithelium** found in areas where absorption and secretion take place, such as the lining of the intestine. This "pillar-like" columnar epithelium makes it easier to pass through the epithelial barrier.
 - d) Cuboidal Epithelium** forms the lining of salivary gland ducts and kidney tubules, where it offers mechanical support. The ability to secrete chemicals at the epithelial surface is a common extra specialisation of epithelial cells.

2. Connective Tissues: The connective tissue cells are embedded and loosely spaced within the intercellular matrix, which can be jelly-like, fluid, thick, or solid, depending on the function of the particular connective tissue.

- a) Blood:** In blood the red blood cells (RBCs), white blood cells (WBCs), and platelets are contained in a fluid matrix called plasma. Salts, hormones, and proteins are all found in plasma.

Tissues

b) **Bones:** they create the structure that holds the body erect. Additionally, it supports the body's major organs and binds the muscles. It is a tissue that is rigid and robust (strong). It has a very high matrix.

c) **Ligament:** they are extremely flexible tissues that can join two bones together as it has a lot of strength. Very little matrix is present in ligatures.

d) **Tendons:** they link bones and muscles. Also, are fibrous tissues with little flexibility and tremendous strength.

e) **Cartilage:** cells in cartilage are widely spaced and they also smoothens the surfaces of bones at joints. Sugars and proteins make up the solid matrix. The cartilage in our ears can be folded, but the bones in our arms cannot be bent.

f) **Areolar:** they can be found in the bone marrow, between the skin and muscles, and around blood vessels and nerves. It aids with tissue repair, supports internal organs, and fills the space inside the organs.

3. Muscular Tissues: The elongated cells that make up muscular tissue are also known as muscle fibers. Our body's movement is caused by this tissue.

a) **Contractile Proteins:** Special proteins termed contractile proteins are found in muscles, which contract and relax to produce movement.

b) Striated Muscles: Using our conscious will, we can move some muscles. Our limbs contain muscles that move when we command them to and stop when we tell them to. The term "voluntary/ striated/ skeletal muscles" refers to such muscles. The cells of this tissue are long, cylindrical, unbranched and multinucleate.

c) Unstriated Muscles: Involuntary movements include the flow of food through the digestive tract and the contraction and dilation of blood vessels. We can't actually begin or end them just by wishing to do so! They are also found in the iris of the eye, in ureters and in the bronchi of the lungs. The cells are long with pointed ends (spindle-shaped) and uninucleate (having a single nucleus).

d) Cardiac Muscles: Throughout life, the heart's muscles express regular contraction and relaxation. The term "cardiac muscles" refers to these involuntary muscles. Heart muscle cells are cylindrical, branched and uninucleate.

4. Nervous Tissues: Every cell has the capacity to react to stimuli. However, nervous tissue cells are extremely specialised for receiving stimulation and then rapidly passing that signal from one location in the body to another. These tissue's cells are known as neurons or nerve cells.

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- A neuron has a cell body that includes a nucleus and cytoplasm, from which long, thin hair-like structures emerge.
- Each neuron typically consists of one long segment, the axon, and numerous short, branched pieces, known as dendrites.
- The length of a single nerve cell can reach one metre. A nerve is made up of several nerve fibres that are connected by connective tissue.
- When we wish to, we can move our muscles due to nerve impulses. For most animals, the combination of nerve and muscle tissue is essential. In reaction to stimuli, animals may move quickly mainly to this combination.

