

## TISSUE

### INTRODUCTION

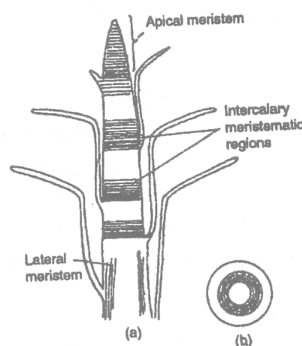
- In unicellular organisms a single cell performs all the vital activities for example, digestion, respiration, excretion etc.
- In case of Multicellular organisms specialized functions are performed by a different groups of cells. As blood flows for transportation of  $O_2$ ,  $CO_2$ , food hormones & waste material, muscle cells are involved in movement etc.
- In plants vascular tissue conduct food & water from one plant to another part to the plant. Thus Multicellular organisms possess well-developed division of labour to provide highest possible efficiency or particular function.
- A tissue is defined as a group of cells with similar structure, organized to do a common function.
- Term tissue was coined by **Bichat**.
- As plants are fixed or stationary, most of their tissues are of supportive type. Animals move around in search of food, mate & shelter so they consume more energy as compared to plants.
- Plants have some localized regions with special tissue but there are no such distinct regions in animals. Growth in animals remains uniform. Branch of biology deals with the study of tissue is called **Histology**.

### PLANT TISSUE

Mainly they are of two types : \* Meristematic, \* Permanent

#### (a) Meristematic Tissue :

These are simple living tissues having thin walled compactly arranged immature cells which are capable of division and formation of new cells.



#### (i) Main features of Meristematic tissues are :

(A)  $G_1 \rightarrow S \rightarrow G_2 \rightarrow M$  cell cycle is switched on.

Thin primary cell wall (cellulosic).

- (A). Intercellular spaces are absent (Compact tissue)
  - (B). Generally vacuoles are absent, dense cytoplasm & prominent nuclei are present.
  - (C). Large number of cell organelles are present.
  - (D). Active metabolic state, stored food is absent.
  - (E). Actively dividing cells are present in growing regions of plants e.g. root & shoot tips
- (ii) Classification on the basis of origin :

(A). primary (Promeristem):

- Derived directly from the Meristems of embryo.
- They consist of cells derived from primary meristem.
- They add to primary growth of plants.

(B). Secondary :

- Formed by permanent tissues.
- These are having cells derived from primary permanent tissue.
- They usually add to the diameter of plants.
- Permanent tissue Dedifferentiation Secondary meristem

(iii) Classification on the basis of location :

- (A) **Apical meristem:** It is present at the growing tips of stems and roots. Cell division in this tissue leads to the elongation of stem & root thus it is involved in primary growth of the plant.
- (B) **Intercalary meristem:** It is present behind the apex. It is the part of apical meristem which is left behind during growth period. These are present at the base of leaf & internode region. These lead to the increase in the length of leaf (Primary) e.g. in grass stem, bamboo stem, mint stem etc..
- (C) **Lateral meristem:** It is also called as secondary meristem. It occurs along the sides of longitudinal axis of the plant. It gives rise to the vascular tissues. Causes growth in girth of stem & root. They are responsible for secondary growth.

## EXERCISE

### OBJECTIVE DPP - 5.1

1. A group of cells having common origin and performing similar function is called  
(A) tissue (B) organ (C) organ system (D) cell aggregate
2. Meristems are cells that  
(A) store food (B) help in excretion  
(C) provide support (D) divide continuously to produce new cells
3. Plant length is increased by the activity of  
(A) apical meristem (B) lateral meristem (C) cambium (D) all of the above
4. In plants, cell division is restricted to

- (A) Meristematic cells      (B) permanent cells      (C) xylem      (D) phloem
5. In grasses the length of increases by the activity of  
(A) apical meristem      (B) intercalary meristem      (C) lateral meristem      (D) secondary meristem
6. Special feature of dividing cells is  
(A) large lacuna      (B) thick cell walls  
(C) dense cytoplasm devoid of lacuna      (D) large intercellular spaces
7. Totipotency is present in  
(A) meristem      (B) cambium      (C) phloem      (D) cork
8. Which of the following is a feature of Meristematic tissues ?  
(A) Thin cell wall  
(B) Compact tissue  
(C) Large no. of cell organelles are present in the cells of tissues.  
(D) All of the above
9. Which of the following plant tissue is formed by permanent tissue ?  
(A) primary tissue      (B) Secondary tissue      (C) Both of above      (D) None of above
10. Which of the following plant tissues causes growth in girth of stem and root ?  
(A) Apical meristem      (B) Intercalary meristem  
(C) Lateral meristem      (D) None of the above

**SUBJECTIVE DPP - 5.2****VERY SHORT ANSWER TYPE QUESTIONS**

1. The tissues derived directly from the meristem of embryo is called as .....
2. A group of cells with similar structure, organized to do a common function is called as.
3. Which plant tissue remains in active metabolic state always ?

**SHORT ANSWER TYPE QUESTIONS**

4. Define tissue.
5. What do you mean by division of labour ?

**LONG ANSWER TYPE QUESTION**

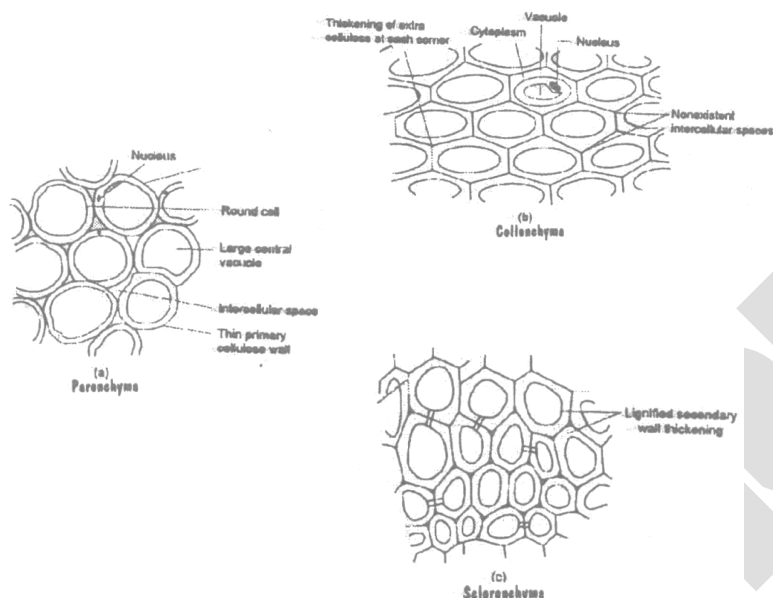
6. What is issue? Explain Meristematic plant tissue.

## TISSUE

### PERMANENT TISSUE

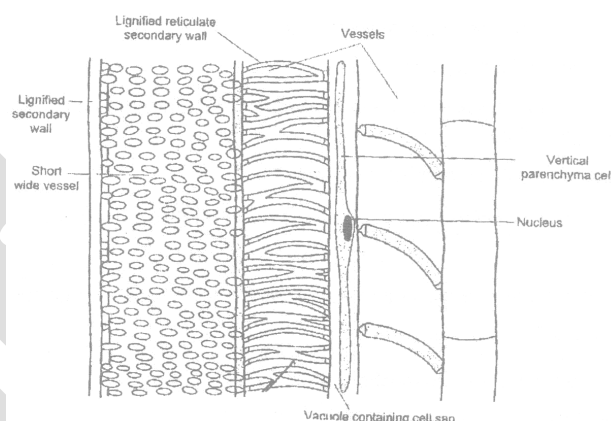
- The permanent tissues are composed of those cells which have lost their capability to divide. They have definite shape, size and thickness. The permanent tissue may be dead or living.
  - The division & differentiation of the cells of Meristematic tissues give rise to permanent tissues. In cell differentiation, developing tissue and organs change from simple to more complex forms to become specialized for specific functions. The cells of permanent tissue lose the capacity to divide and attain a permanent shape, size and function.
- (a) **Depending Upon the structure and composition, The permanent tissues are classified into two types :**
- (i) **Simple permanent tissues :** These are made up of same type of cells which are similar structurally and functionally. They include two types of tissue :
- (A) **Protective Tissues :** these tissue are primarily protective in function. They consist of :
- **Epidermis :** Epidermis forms one cell thick outermost layer of various body organs of plants such as leaves, flowers, stems and roots. Epidermis is covered outside by cuticle. Cuticle is a water proof layer of waxy substance called as cutin which is secreted by the epidermal cells. Cuticle is very thick in xerophytes. Cells of epidermis of leaves are not continuous at some places due to the presence of small pores called as stomata. Each stomata is guarded by a pair of bean shaped cells called as guard cells. These are the only epidermal cells which possess chloroplasts, the rest being colorless.
  - **Functions :**
    - (i) The main function of epidermis is to protect the plant from desiccation and infection.
    - (ii) Cuticle of epidermis cuts the rate of transpiration and evaporation of water and prevents wilting.
    - (iii) Stomata in epidermis allow gaseous exchange to occur during photosynthesis respiration.
    - (iv) Stomata also helps in transpiration.
  - **Cork or phellem :** in older roots and stems, tissues at the periphery become cork cells or phellem cells. Cork is made up of dead cells with thick walls and do not have any intercellular spaces. The cell walls in cork deposit waxy substance called as suberin. The cells of cork become impermeable to water and gasses due to the deposition of suberin. The cork cells are without any protoplasm but are filled with resins or tannins.
  - **Functions :**
    - (i) Cork is protective in function. Cork cells prevent desiccation, infection and mechanical injury.
    - (ii) Imperviousness, lightness, toughness, compressibility and elasticity make the cork commercially valuable.
    - (iii) Cork is used for insulation, as shock absorber in linoleum.
    - (iv) Cork is used in the making of a variety of sport goods such as cricket balls, table tennis, shuttle cocks, wooden paddles etc.

(B) Supporting tissue : These are supportive in function and of three types



- **Parenchyma:** it is the fundamental tissue.
- Tissue first time evolved in bryophyte.
- Thin walled cells, oval or spherical in structure.
- Cell wall mainly composed of cellulose & pectin.
- Large central vacuole for food & water storage.
- Primary function is food storage.
- Some parenchyma involved in excretory substance storage are so called as idioblast, storing such as resin, tannin, gums & oils. In typical parenchyma chlorophyll is absent.
- Chloroplast containing parenchyma tissue are chlorenchyma which perform photosynthesis e.g. mesophyll of leaves.
- In hydrophytic plants aerenchyma (A type of parenchyma containing air spaces) provides buoyancy.
- Parenchyma provides turgidity to cells.
- **Collenchyma :** it is the living mechanical tissue.
- Elongated cells with thick corners.
- Localized cellulose & pectin thickening.
- Provides flexibility to plant parts & easy bending of various parts of plant.
- Present only in herbaceous dicot stem.
- Present at thin margin of leaves.
- Few chloroplasts may be present.
- If gives mechanical strength & elasticity to the growing stems.
- **Sclerenchyma :** (Scleras-hard)
- Strengthening tissue.
- Composed of extremely thick walled cells with little or no protoplasm.
- Cells are dead & possess very thick lignified walls.

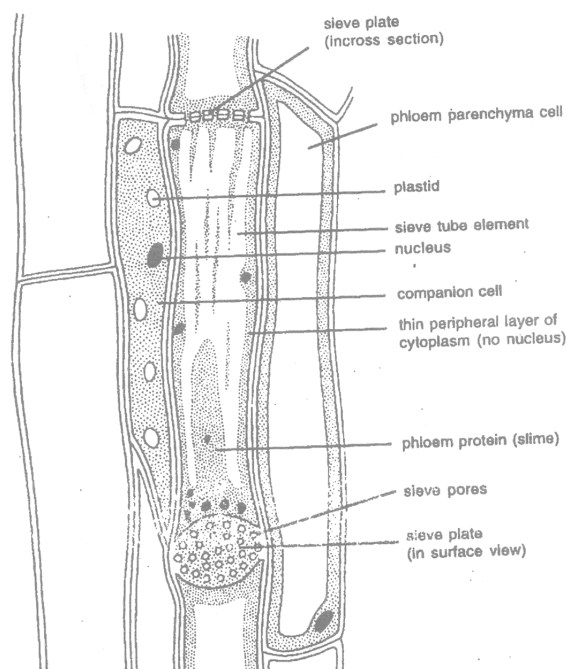
- Lignin is water proof material.
- Inter cellular spaces are absent.
- Cells of Sclerenchyma are of two types :
  - **Sclereids:** These are also called grit cells or stone cells. These are small cells, where lumen is so small due to higher thickening of cell wall, as present in drup fruit (Mango, coconut walnut) in legume seeds (Macroscleireid)
  - **Fibers :** They are very long, narrow, thick, lignified cells. Lumen is large as compared to sclereids. Generally 1-3 mm. long. In the thick walls of both the fibres and sclereids are present thin areas called as pits.
  - Sclerenchyma fibres are used in the manufacture of ropes, mats & certain textile fibres.
  - Jute & coir are obtained from the thick bundles of fibres.
- (ii) **Complex permanent tissue :** it consists of more than one type of cells which work together as a unit.
  - It helps in transportation of organic materials, water & minerals.
  - It is also known as conducting or vascular tissue.
  - Xylem & phloem together form vascular bundles.
- (A) **Xylem :** Also known as wood and is a vascular and mechanical tissue. Thick walled cells are found in the form of tubular passages.



- **Xylem consists of four types of cells called as elements :**
- **Tracheids :** They are elongated angular dead cells (Primitive elements) mainly involved in conduction of water & minerals in gymnosperms.
- **Vessels:** they are advance element (Generally found in angiosperms). Vessels are cylindrical tube like structures placed one above the other end to end which form a continuous channel for efficient conduction of water.
- **Xylem parenchyma :** they are small & thick walled parenchymatous cells
- Subjected for storage of starch (food).

- **Xylem Sclerenchyma** : They are non living fibres with thick walls & narrow cavities provide mechanical support.
- **Except xylem parenchyma all other xylem elements are dead.**
- **Hadrome** : Tracheids & vessels are collectively called hadrome, as main
- Conducting elements in xylem.
- The annual rings present in the trunk of a tree are xylem rings. By Counting the number of annual rings we can determine the age of a tree.

**(B) Phloem** : They also consist of both parenchymatous & sclerenchymatous cells.



- **Phloem consists of four types of element :**
- **Sieve tubes** : Sieve tubes are slender tube like structures made up of elongated, thin walled cells placed end to end. The end walls of sieve tube cells are perforated by numerous pores are called as sieve plates. Nucleus of sieve cell degenerates at maturity, however. Cytoplasm persists, because of protoplasmic continuation of sieve tube with companion cell through plasmodesmata. Sieve cells possess slime protein or protein which is concerned with growth and repair of sieve cells.
- **Companion cells** : Companion cells have dense cytoplasm and prominent nuclei.
- Sieve cells & companion cells are so called sister cells because they originate from single mother cell.
- **Phloem fibre** : They give mechanical support to sieve tubes
- **Phloem parenchyma** : They store food & help in radial conduction of food.
- **Leptome** : main part of phloem involved in conduction of food, which is sieve tube.



- In xylem only unidirectional movement is possible while in phloem bidirectional movement can occur.
- In phloem except phloem Sclerenchyma all elements are living.

**EXERCISE****OBJECTIVE DPP - 6.1**

1. A permanent plant tissue consisting of thin walled living cells is  
(A) parenchyma (B) collenchyma (C) Sclerenchyma (D) xylem
2. A permanent plant tissue made up of living having thickening at the corners is  
(A) Sclerenchyma (B) collenchyma (C) parenchyma (D) phloem
3. The main function of Sclerenchyma is to help in the  
(A) conduction of food (B) synthesis of food (C) exchange of gases (D) mechanical support
4. The wall of cork cells are thickened by the deposition of  
(A) cutin (B) suberin (C) lignin (D) pectin
5. The wax like substance present in the cell wall of onion skin is  
(A) pectin (B) lignin (C) cellulose (D) suberin
6. The outer wall of epidermis in stems and leaves has a waxy covering made up of  
(A) lignin (B) suberin (C) pectin (D) cutin
7. Collenchyma differs from Sclerenchyma in  
(A) retaining cytoplasm at maturity (B) having thick walls  
(C) having a wide lumen (D) being Meristematic
8. Lignified elongated bead cells are  
(A) parenchyma (B) collenchyma (C) sclerenchyma (D) Epidermis
9. Which of the following plant tissue lacks protoplasm at maturity ?  
(A) Sclerenchyma (B) Collenchyma (C) parenchyma (D) Epidermis
10. In plants phloem tissues perform the function of  
(A) conduction of water (B) conduction of food (C) photosynthesis (D) mechanical support

**SUBJECTIVE DPP - 6.2****VERY SHORT ANSWER TYPE QUESTIONS**

1. sieve tubes and companion cells are found in..... tissue (xylem/phloem/collenchyma)
2. Long, narrow, dead cells having a thick deposition of lignin in the cell wall are called ..... Cells.  
(parenchyma/ cambium / sclerenchyma)
3. Which tissue is responsible for transport of water in plants ?

**SHORT ANSWER TYPE QUESTIONS**



4. Name the different elements of xylem and phloem.
5. In hydrophytes xylem is less developed, why ?

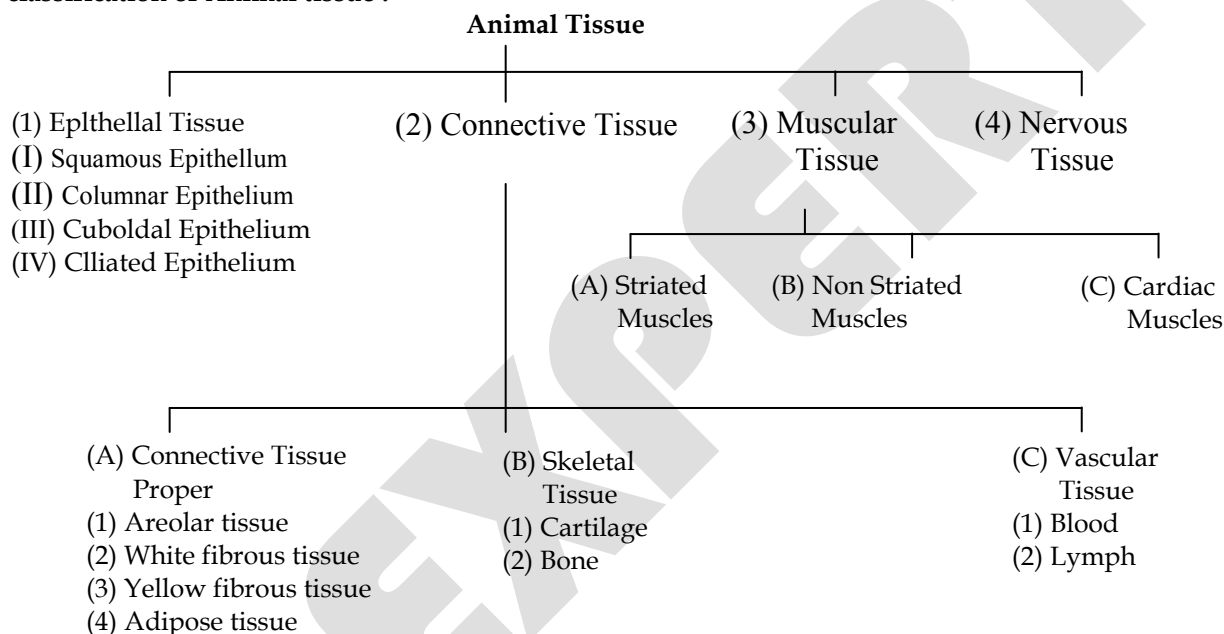
### LONG ANSWER TYPE QUESTION

6. Mention the role of parenchyma, collenchyma & Sclerenchyma.

## TISSUE

### ANIMAL TISSUE

Outline classification of Animal tissue :



- The study of microscopic structure of tissues is called as Histology. Cells of a tissue are often held together by cell junctions.

#### (a) Epithelial Tissue :

[Epi means above & thelial means to grow]

- Always grows on some other types of tissue.
- Cells of epithelium are set very close to each other and the tissue rests on a non-cellular basement membrane.
- Consists of single layer of cells.
- Blood vessels are absent & non-nervous in nature.
- It covers all the organs & lines the cavities of hollow organs like stomach.
- It is primarily protective in function.
- Epithelial tissues are classified as :
  - (i) Squamous epithelium: Also called pavement epithelium.
    - Cells arranged end to end like tiles on a floor.
    - Cells are polygonal in surface view.

- It forms the delicate lining of cavities (mouth, oesophagus, nose, pericardium, alveoli etc.) blood vessels and covering of the tongue and skin.
- Epithelial cells are arranged in many layers (stratum) to prevent wear and tear in skin. This pattern is stratified squamous epithelium.
- (ii) Cubical epithelium : They are cube like cells that fit closely, cells look like squares in section, but free surface appears hexagonal.
  - It is found in kidney tubules, thyroid vesicles & in glands (salivary glands, sweat glands).
  - It forms germinal epithelium of gonads (testes & ovaries)
  - It involves in absorption, excretion & secretion. It also provides mechanical support.
- (iii) Columnar epithelium : Columnar means "pillar-like" epithelium. It forms lining of stomach, Small intestine & colon, forming mucous membranes. Border of microvilli is present at the free surface end of each cell which increases absorption efficiency in small intestine.
- (iv) Ciliated epithelium :
  - Cells may be cubical or columnar.
  - On its free surface are present protoplasmic outgrowths called cilia.
  - It helps in the movement of ova in the fallopian tube.

**(b) Connective Tissue :**

The cells of the connective tissue are widely spaced and embedded in an intercellular matrix.

- The nature of matrix decides the function of tissue.
  - White & yellow fibres are present in the matrix.
  - Their basic function is to provide support to different organs & keeping them in place.
- (i) Fluid or vascular tissue :
- (A) Blood & lymph : Blood is a connective tissue, fluid matrix of blood is plasma having wandering or floating cells, called corpuscles, blood helps in the transportation of various materials such as nutritive substances, gases, excretory products, hormones etc.

Plasma : form 55% part of blood.

**Constitution**

90-91% : water  
7% : protein (Albumin, fibrinogen, globulin)  
0.9% : inorganic salt etc.

- Corpuscles: Forms 45% part of blood.
  - RBC's they are also called as erythrocytes, containing red Coloured respiratory pigment called hemoglobin that helps in transportation of oxygen.
  - WBC's (Leucocytes: They are also called as "Soldiers of the body". They are irregular, amoeboid, phagocytic cells that protect our body by engulfing bacterial & other foreign particles. They are of five types: Monocytes, Lymphocytes, Basophiles, Neutrophils, Eosinophils.
  - Blood platelets or thrombocytes: They are spindle shaped cells which are involved in clotting of blood.
- (ii) Skeletal tissue : It is hard connective tissue that forms supportive frame work of the body. It is of two types :

- (A) Bone :Matrix of bone is very hard because of salts such as calcium phosphate,  $\text{CaCO}_3$  (60-70%) etc. and a protein ossein. Bone cells (osteoblasts) are embedded in this hard matrix. Matrix is deposited in the form of concentric layers of lamellae formed round a central canal (Haversian canal), the done cells occupy small spaces between the concentric layers of matrix. The long bones are usually hollow containing cavity called as marrow cavity. It is full bone marrow.
- (B) Cartilage : This tissue is elastic, less harder as compared to bone. Elasticity is due the presence of chondrin (protein). Cells are called as chondroblast, which are widely spaced and matrix is reinforced by fibres. It occurs at joint of bones, in the nose, ear, trachea & larynx. It provides flexibility and great tensile strength.
- (C) Connective tissue proper : it is the most abundant type of connective tissue. It is future divided into following types:
- (D) Areolar tissue : It is the most distributed connective tissue in the body. This tissue fills spaces inside organs & is found between the skin & muscles, around blood vessels, nerves & in the bone marrow.
- There are two types of fibres —
    - Inelastic white fibres
    - Elastic yellow fibres
- (A) Adipose tissue : These are oval & round cells, filled with fat globules. The cells are called as adipocytes. It found in subcutaneous layer below the skin, around the heart, brain & below the eyeballs. It acts as an insulator & prevents loss of heat from the body.
- (B) White fibrous connective tissue : They are very little matrix containing abundant white fibres forming layers. Bundles of this tissue are called as tendons, which attaches muscles to the bones.
- (C) Yellow fibrous connective tissue : They are very elastic due to the presence of a network of yellow fibres in it's matrix called as ligament which attaches bone to bone.

## EXERCISE

### OBJECTIVE DPP - 7.1

- The entire body surface and cavities inside the body are lined by  
 (A) muscle tissue                      (B) epithelial tissue                      (C) connective tissue                      (D) nervous tissue
- Which one of the following is a fluid connective tissue ?  
 (A) Areolar tissue                      (B) cartilage                      (C) Blood                      (D) Ligaments
- The tissue that attaches muscles to the bones is  
 (A) cartilage                      (B) tendon                      (C) ligament                      (D) blood
- The tissue that joins one bone to the other is  
 (A) ligament                      (B) tendon                      (C) blood                      (D) ) cartilage
- Areolar tissue is a  
 (A) nervous tissue                      (B) muscular tissue                      (C) connective tissue                      (D) epithelial tissue
- Tendon is a structure which connects

- (A) a bone with another bone (B) a muscle with a bone  
(C) a nerve with a muscle (D) a muscle with a muscle
7. Fluid part of blood after removal of corpuscles is  
(A) plasma (B) lymph (C) serum (D) vaccine
8. Which of the following structures joins skeletal muscle to bone ?  
(A) Ligament (B) Tendon (C) Blood (D) Bone
9. Yellow muscle fibers are also called as  
(A) bone (B) muscle (C) ligament (D) none of these
10. Ligament joins  
(A) bone to the muscle (B) muscle to muscle (C) bone to bone (D) none of these

**SUBJECTIVE DPP – 7.2****VERY SHORT ANSWER TYPE QUESTIONS**

1. The special property of muscle fibres to contract forcefully and return to relaxed state  
Is called ..... (Excitability/contractility/flexibility)
2. A branch of science dealing with the study of bones is called .....  
(Ornithology/physiology/osteology)
3. The fluid matrix of blood is called.....(plasma/lymph/serum)

**SHORT ANSWER TYPE QUESTIONS**

4. What do you mean by division of labour?
5. Write the composition of mammalian blood.

**LONG ANSWER TYPE QUESTION**

6. Give summarized classification of animal-tissue

## TISSUE

### MUSCULAR TISSUE

Movements are brought about in our body with the help of muscular tissues.

(a) **Features :**

- They are long fibre-like cells called muscle fibres.
- They are capable of contraction or relaxation

(b) **Types :**

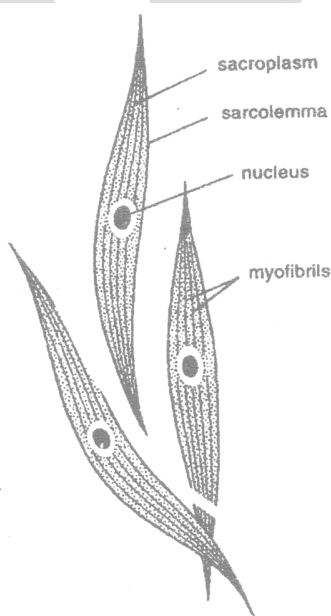
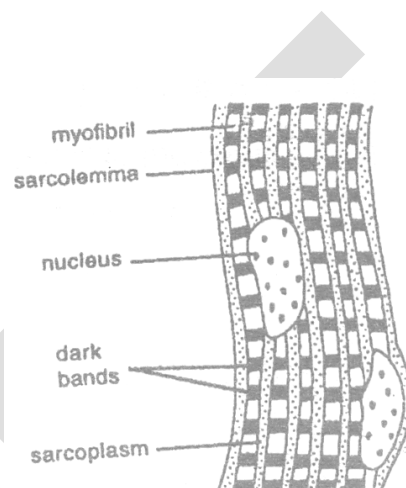
It is of three types :

- (i) **striated muscles :** They are also called as voluntary muscles because these are under the control of one's will. Muscle fibres or cells are multinucleated and unbranched.

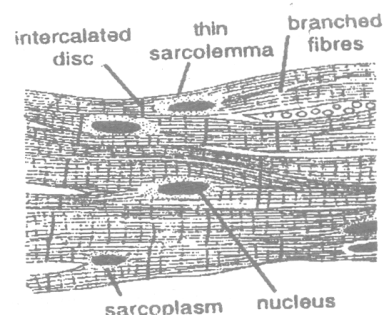
Each fibre enclosed by thin membrane which is called as sarcolemma.

Cytoplasm is called as sarcoplasm. These muscles get tired & need rest.

- (ii) **Non striated muscles:** They are involuntary muscles also called as smooth muscles. These muscle fibres are uninucleated & spindle shaped. They are not enclosed by membrane but many fibres are joined together in bundles. Such muscles are found in the walls of stomach, intestine, urinary bladder, bronchi, iris of eye etc. peristaltic movements in alimentary canal are brought about by smooth muscles.



(iii) cardiac muscle fibres : They are also involuntary muscles. Only found in the walls of heart. Their structure is in between the striated & non-striated muscles. They are uninucleated & branched. Branches are united by intercalated disc. In these muscles rhythmic contraction & relaxation occurs throughout the life.

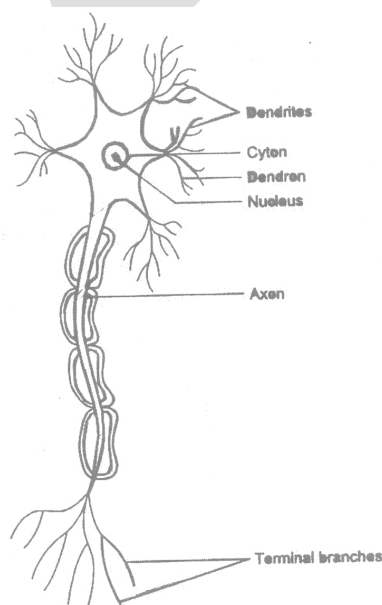


### NERVOUS TISSUE

- They are highly specialized tissue due to which the animals are able to perceive and respond to the stimuli.
- Their functional unit is called as nerve cell or neuron.
- Cell body is cyton covered by plasma membrane.
- Short, hair like extensions arising from cyton are dendrons which are further subdivided into dendrites.
- Axon is long, tail like cylindrical process with fine branches at the end. Axon is covered by a sheath.
- Axon of one neuron is very closely placed to the dendrons of another neuron to carry impulses from one to another neuron in the form of electrochemical waves. This close proximity is called as synapse.

#### (a) Types :

Nerve fibres are of two types :



(i) **Medullated fibres**

(ii) **Non-medullated fibres**

#### (b) Functions :

- (i) They control all the body activities
- (ii) They co-ordinate between various parts during any body function.
- Spinal cord & brain are made up of nervous tissue.

**EXERCISE****OBJECTIVE DPP – 8.1**

- Contraction and relaxation are unique features of  
(A) epithelial tissue (B) connective tissue (C) muscle tissue (D) nervous tissue
- The tissue which is under the control of animal's will is  
(A) cardiac muscle (B) striated muscle (C) non-striated muscle (D) cartilage
- The muscle which work throughout life without undergoing fatigue is  
(A) striated muscle (B) non-striated muscle (C) cardiac muscle (D) all of the above
- Which of the following is a voluntary muscle ?  
(A) striated muscle (B) Unstriated muscle (C) cardiac muscle (D) (A) and (B)
- Wall of urinary bladder consists of  
(A) striated muscle (B) Unstriated muscle (C) both of above (D) none of these
- Intercalated discs are present in  
(A) striated muscle (B) Unstriated muscle (C) cardiac muscle (D) all of the above
- The function unit of nervous tissue is called as  
(A) cyton (B) synapse (C) neuron (D) axon
- Which type of tissue forms spinal cord and brain ?  
(A) muscle tissue (B) Nervous tissue (C) epithelial tissue (D) Epidermis
- Involuntary tissue forms wall of which of the following organ ?  
(A) intestine (B) stomach (C) bronchi (D) all of the above
- Movements in body are brought about by  
(A) muscle tissue (B) epithelial tissue  
(C) Bones (D) tendons and ligaments

**SUBJECTIVE DPP – 8.2****VERY SHORT ANSWER TYPE QUESTIONS**

- Spindle-shaped, non-striated, involuntary muscle fibres present in hollow internal organs like urinary bladder are called ..... (smooth muscle fibres / striated muscle fibres / cardiac muscle fibres)
- The brain and the spinal cord are made up of ..... (neurons / erythrocytes / neurons)
- The small, branched processes of a nerve cell are called ..... (dendrites / axons / neurons)

**SHORT ANSWER TYPE QUESTIONS**

- What is the function of nervous tissue ?
- State the main features of muscular tissue.

**LONG ANSWER TYPE QUESTION**

- Describe the structure of neuron with labeled diagram.



**ANSWER KEY**

(Objective DPP # 5 .1)

Q	1	2	3	4	5	6	7	8	9	10
A.	A	D	A	A	B	C	A	D	B	C

(Objective DPP # 6 .1)

Q	1	2	3	4	5	6	7	8	9	10
A.	A	B	D	B	B	D	A	C	A	B

(Objective DPP # 7 .1)

Q	1	2	3	4	5	6	7	8	9	10
A.	B	C	B	A	C	B	A	B	C	C

(Objective DPP # 8 .1)

Q	1	2	3	4	5	6	7	8	9	10
A.	C	B	C	A	B	C	C	B	D	A