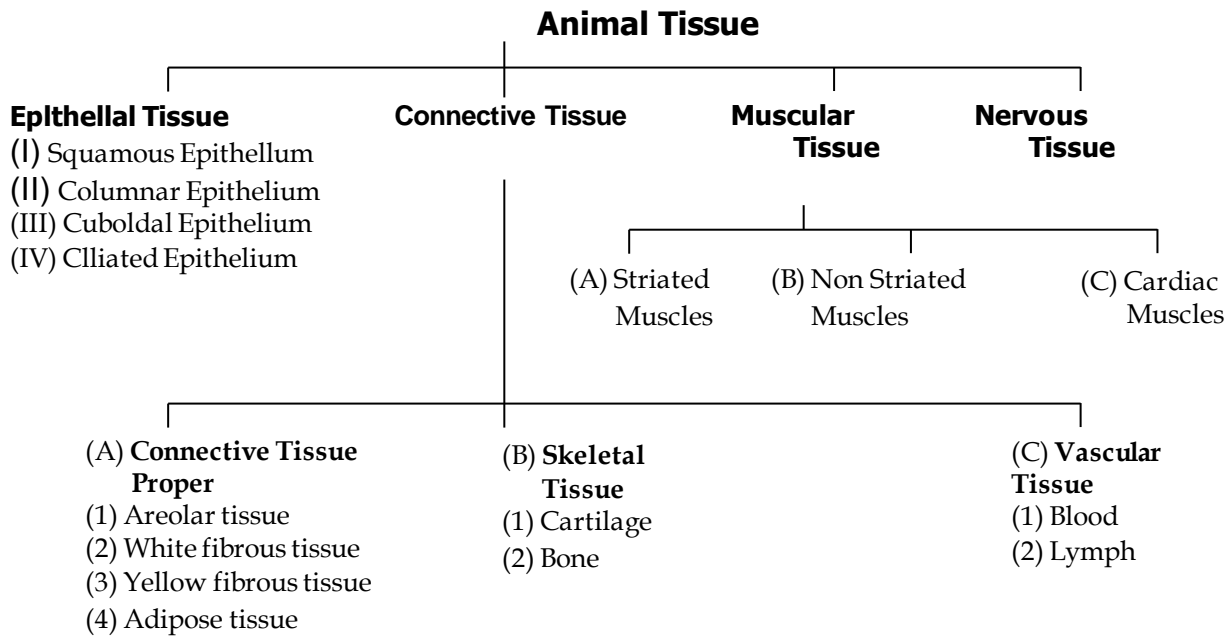


**Outline classification of Animal tissue :**

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

**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 :
  - 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 squalors epithelium.
  - 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 absorbtion, excretion & secretion. It also provides mechanical support.
  - 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 absorbtion efficiency in small intestine.
  - Ciliated epithelium :**
    - Cells may be cubical or columnar.
    - On it's free surface are present protoplasmic outgrowths called cilia.
    - It helps in the movement of ova in the fallopian tube.

**Connective Tissue :**

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

- The mature 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.

**Connective tissue proper** : it is the most abundant type of connective tissue.

It is future divided into following types:

A. **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  
Elastic yellow fibres

B. **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.

C. **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.

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

**VERY SHORT ANSWER TYPE QUESTIONS**

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

**SHORT ANSWER TYPE QUESTIONS**

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

**LONG ANSWER TYPE QUESTION**

- Give summarized classification of animal-tissue

**MUSCULAR TISSUE**

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

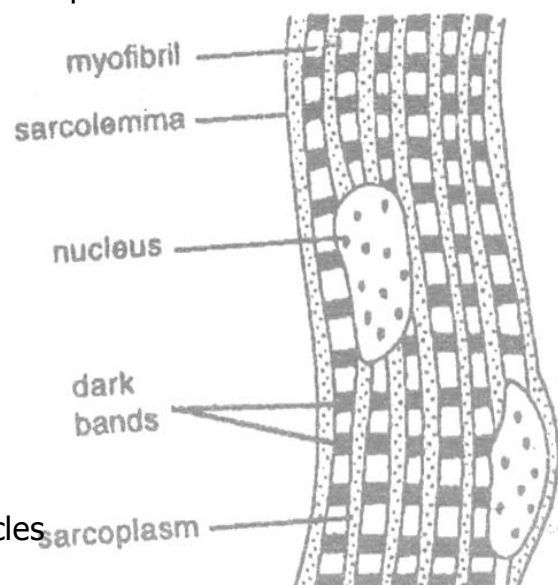
**(a) Features :**

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

**(b) Types :**

It is of three types :

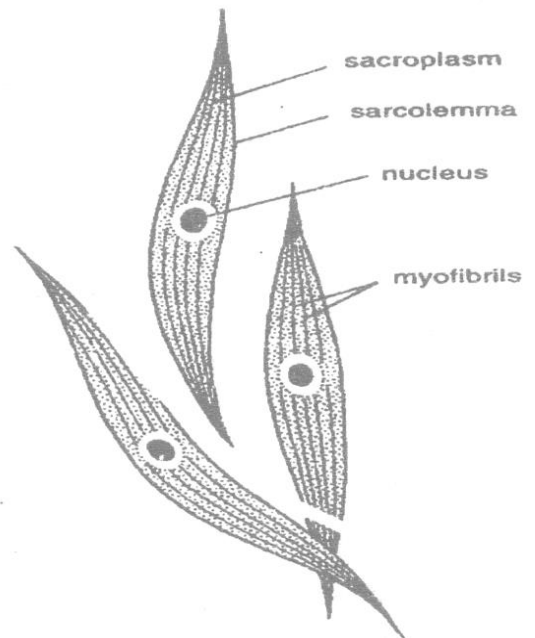
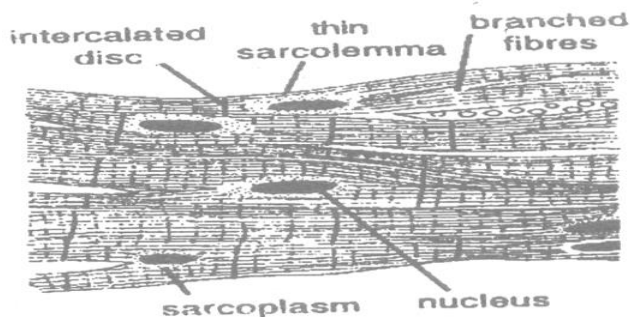
- striated muscles :** They are also called as voluntary muscles because these are under the control of one's will. Muscle fibres or cells are multinucleated and unbranched. Each fibre enclosed by thin membrane which is called as sarcolemma. Cytoplasm is called as sarcoplasm. These muscles get tired & need rest.
- Non striated muscles:** They are involuntary muscles.



## ANIMAL TISSUE

## SPECIAL ADVANCED STUDY MATERIAL / QUESTION BANK

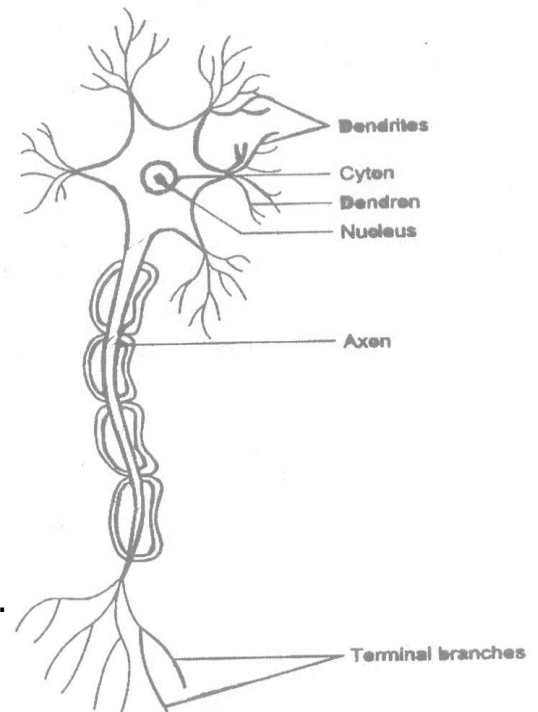
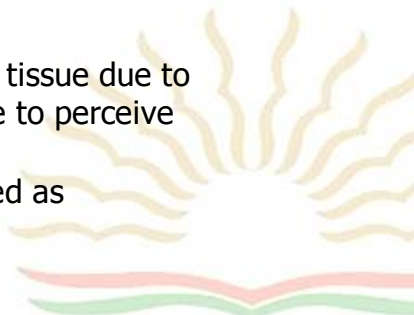
also called as smooth muscles. These muscle fibres are uninucleated & spindle shaped. They are not enclosed by membrane but many fibres are joined together in bundles. Such muscles are found in the walls of stomach, intestine, urinary bladder, bronchi, iris of eye etc. peristaltic movements in alimentary 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 dendron which are further subdivide 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



*Nerve fibres are of two types :*

(i) **Medullated fibres**

(ii) **Non-medullated fibres**

**(a) Functions :**

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

**EXERCISE-2**

- 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

**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 ..... (nephrons/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****(exercise 1)**

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

**(exercise 2)**

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