10. Animal Tissue

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1. Choose correct option

A. The study of structure and arrangement of tissue is called as ___

a. anatomy

b. histology

c. microbiology

d. morphology

B. __ is a gland which is both exocrine and endocrine.

a. Sebaceous

b. Mammary

c. Pancreas

d. Pituitary

C. _____ cell junction is mediated by integrin.

a. Gap

b. Hemidesmosomes

c. Desmosomes

d. Adherens

D. The protein found in cartilage is _____ .

a. ossein

b. haemoglobin

c. chondrin

d. renin

E. Find the odd one out.

a. Thyroid gland

b. Pituitary gland
c. Adrenal gland

d. Salivary gland

2. Answer the following questions :

(1) Identify and name the type of tissues in the following:
Ans.

(1) Inner lining of the intestine	Columnar epithelium	Epithelial tissue
(2) Heart wall	Cardiac muscles	Muscular tissue
(3) Skin	Squamous and stratified epithelium	Epithelial tissue
	Myofibrils in the skin	Muscular tissue
	Sensory and motor neurons	Nervous tissue
(4) Nerve cord	Sensory and motor neuron	Nervous tissue
(5) Inner lining of the buccal cavity	Ciliated epithelium	Epithelial tissue

B. Why do animals in cold regions have a layer of fat below their skin ?

Ans. Fat is a good insulating substance. The fat is stored in adipocytes of adipose connective tissue. It does not allow body heat to escape out. It also provides energy which is needed for thermoregulation. Therefore, animals living in cold regions have a layer of fat below their skin.

C. What enables the ear pinna to be folded and twisted while the nose tip can't be twisted ?

Ans. The external ear pinna is made up of elastic cartilage. It has perichondrium and matrix made up of elastic fibres. Few chondrocytes are present which gives support. The shape of the pinna is also maintained by elastic cartilage. But can be folded without causing any pain. Whereas, in case of nose tip, several bones and nasal cartilage together make its framework. There is strong protection provided to internal structure of nose by bones like nasal, maxillae, vomer, palatine, etc.

from internal side. The entire framework for the nose is that of bony-cartilaginous and not merely cartilage. Therefore, nose tip cannot be twisted.

D. Sharad touched a hot plate by mistake and took away his hand quickly. Can you recognize the tissue and its type responsible for it ?

Ans. The thermoreceptors present in the skin of Sharad's hand send the sensory message due to the stimulus of heat. The peripheral afferent sensory neuron carried this message of the heat. It is the nervous tissue that recognizes the stimuli. The withdrawal of the hand is due to muscles. The muscles get the message through reflex arc by efferent motor nerves.

E. Priya got injured in an accident and hurt her long bone and later on she was also diagnosed with anaemia. What could be the probable reason ?

Ans. Long bones are characterized by hard matrix made up of ossein. Ossein is made up of mineral salt hydroxy-apatite ($Cao(PO6(OH),$). The calcium and phosphate if taken in ample amount in diet, the bones remain strong and healthy. Injury to the long bone during the accident, indicate that her bone health is not good. Moreover, she is diagnosed with anaemia, which means she has lesser count of RBCs and may be lesser haemoglobin too. The bones undertake the process of haemopoiesis. Anaemic persons have insufficient blood cell production. Thus, the probable reason for Priya's health is either her general ill health or may be due to lack of proper diet and exercise.

F. Supriya stepped out into the bright street from a cinema theatre. In response, her eye pupil shrink. Identify the muscle responsible for the same.

Ans. The muscles which control the pupil's movements are involuntary, smooth muscles.
Shrinking of pupil in bright light is called pupillary response. It is a physiological response that takes place due to optic and oculomotor cranial nerves. When excess light enters the eye, there is automatic and immediate reflex which makes the pupil constrict due to activity of the circular muscle, controlled by the parasympathetic nervous system.

A. What is cell junction ? Describe different types of cell junctions.

Ans. (1) Cell junction is the junctional complex where the adjacent epithelial cells are connected to each other on lateral sides. They are also connected to basement membrane with cell junctions.

(2) Different types of cell junctions are as follows:

(a) Tight junctions (TJS) : Tight junctions maintain cell polarity. It also prevents lateral diffusion of proteins and ions.

(b) Gap Junctions (GJs) : Gap junction is the intercellular connection which allows passage of ions and small molecules between cells. They also help in the exchange of chemical messages between cell.

(c) Adherens Junctions (AJs) : Adherens junctions are involved in various signaling pathways and transcriptional regulations.

(d) Desmosomes (Ds) : Desmosomes pro video mechanical strength to epithelial tissue, cardiac muscles and meninges.
(e) Hemidesmosomes (HDs) : Hemides mosomes allow the cells to strongly ad here to the underlying basement mem brane. They maintain tissue homeostasis.

B. With the help of neat labelled diagram, describe the structure of areolar connective tissue.

Ans. The areolar connective tissue consists of two types of fibres and four types of cells, all embedded within an extracellular ground matrix.

1. Fibres : The fibres are of two types, viz. white fibres and yellow fibres.

(1) White fibres :

(a) The white fibres are made up of collagen which is a type of protein.

(b) They are unbranched, wavy and arranged in bundles.

(c) The white fibres provide flexibility to the tissues.

(d) The white fibres are formed by fibroblast cells.

(2) Yellow fibres:

(a) The yellow fibres are few in number and are made up of elastin and thus have elastic properties.

(b) They are thin, slender and arranged singly.

(c) They are branched and form a network and thus act as supporting framework.

2. Cells : The cells are of four types, viz. fibroblasts, mast cells, macrophages and adipocytes.

(1) Fibroblasts :

(a) The fibroblasts are large and flat cells.

(b) They are provided with many branching processes.

(c) They secrete both, yellow and white fibres.

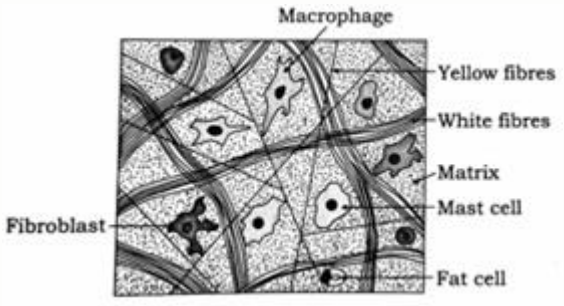
(2) Mast cells :

(a) The mast cells contain heparin and histamine granules in their cytoplasm. (b) The histamine helps in dilating the blood vessels.

(c) The mast cells cause an anti-inflammatory response when injury or infection occurs.

(d) Heparin is an anticoagulant substance, therefore, it prevents the blood clotting.

(e) The mast cells are many. They surround the blood vessels.

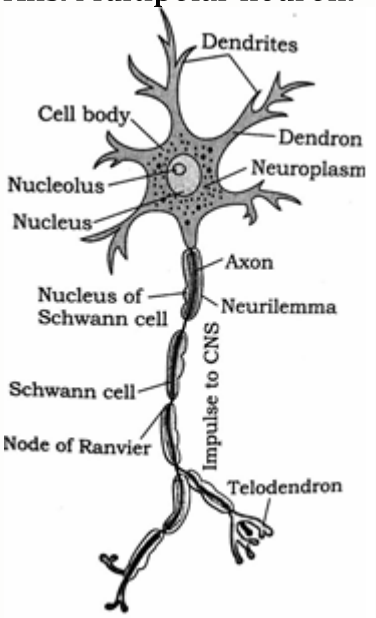


(3) Macrophages : The macrophages are large cells that carry out phagocytosis.

(4) Adipocytes : The adipocytes are the cells that store fats.

C. Describe the structure of multipolar neuron.

Ans. Multipolar neuron:



Multipolar Neuron:

(1) Multipolar neuron is made up of star shaped, cyton and more than two processes.

(2) One long axon and remaining dendrons which are short branched processes are in association with the cyton.

(3) Axon initiates from axon-hillock which is a funnel shaped area.

(4) Cyton contains granular cytoplasm called neuroplasm and centrally placed nucleus.
(5) Neuroplasm has mitochondria, Golgi apparatus, rough endoplasmic reticulum and RNA rich Nissl's granules.

(6) Dendrites carry impulse towards cyton while single, elongated, cylindrical axon carries impulses away from cyton.

(7) Axon is bounded by axolemma and its protoplasm is called axoplasm in which there are large number of mitochondria and neurofibrils. The terminal arborization of an axon is called telodendron.

(8) Axon is enclosed in myelin sheath which is fatty. Outer covering of myelin sheath is neurilemma. Myelin sheath and neurilemma are parts of another cell called Schwann cell. Schwann cell has peripheral nucleus.

(9) The myelin sheath is absent at intervals along the axon and the place is called Node of Ranvier. Such fibres is called myelinated or medullated nerve fibre.

D. Distinguish between smooth muscles and skeletal muscles.
Ans:

Skeletal muscles	Smooth muscles	Cardiac muscles
1. The skeletal or striatedmuscles are also called voluntary or skeletal muscles. They are attached to all bones of the body.	1. The smooth or non-striated muscles are also called involuntary or visceral muscles. They are present in the walls of all visceral organs such as alimentary canal, reproductive and urinary tract, etc.	1. Cardiac muscles are involuntary muscles present only in the heart wall.
2. Cross striations are seen in these muscles due to the presence of dark and light bands.	2. Cross striations are not seen in these muscles due to the absence of dark and light bands.	2. They show striations and intercalated discs and some characters of smooth muscles too.
3. Several muscle fibres are bound together to form small bundles.	3. Muscle cells are arranged in sheets or layers.	3. Adjacent muscles are joined showing branched appearance.
4. The nucleus in the muscle fibres is peripherally placed.	4. The nucleus in the non-striated muscle fibres is centrally placed.	4. The multinucleate condition is
5. The striated muscles are innervated by central and peripheral nervous system.	5. The smooth muscles are innervated by autonomic nervous system.	seen. 5. They are innervated by autonomic nervous system.
6. The striated muscle fibres are under one's own control and will.	6. The non-striated muscle fibres are not under one's control or will.	6. Cardiac muscles work continuously till death and are not under control and will of a person.
7. They bring about all the locomotory movements.	7. They are concerned with peristalsis and other involuntary movements.	7. They are concerned with beating of heart.

4. Complete the following table

Cell/Tissue/Muscle	Functions
1, Cardiac muscles	Continuous generation and conduction of impulses
2. Tendons	Connect skeletal muscles to bones
3. Chondroblast cells	Upon maturity they form chondrocytes
4. Mast cells of areolar connective tissue	Secrete heparin and histamine

5. Match the columns :

'A' Group	'B' Group
(1) Muscle	(a) Perichondrium
(2) Bone	(b) Sarcolemma
(3) Nerve cell	(c) Periosteum
(4) Cartilage	(d) Neurilemma

Ans. (1) Muscle - (b) Sarcolemma

(2) Bone - (c) Periosteum

(3) Nerve cell- (d) Neurilemma

(4) Cartilage - (a) Perichondrium