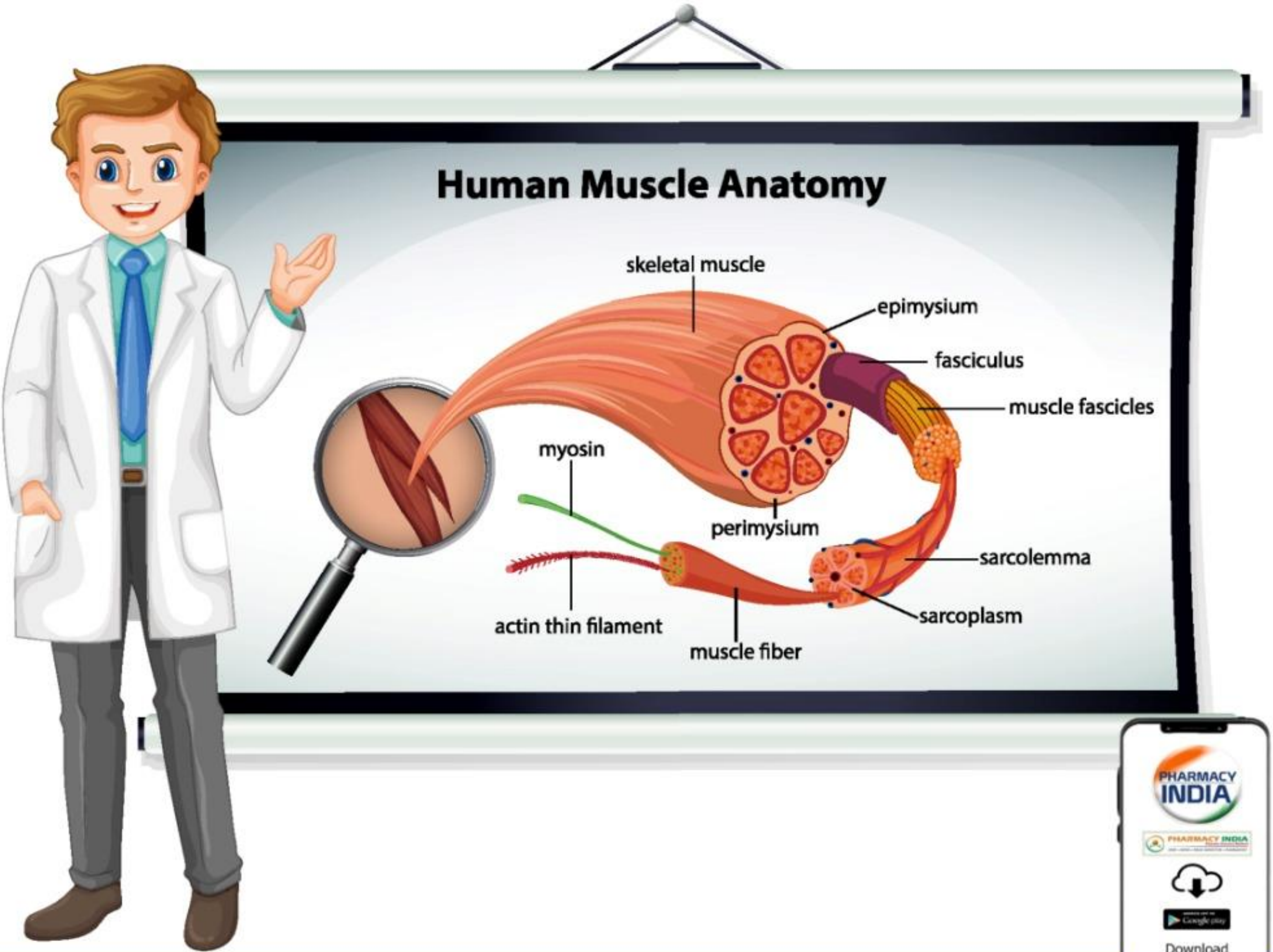
B.PHARMA 1ST SEMESTER

HUMAN ANATOMY AND PHYSIOLOGY- I

(BP101T)



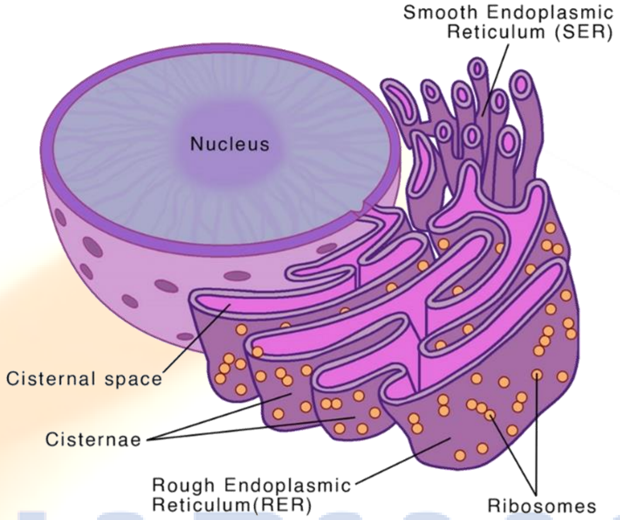
SECTION A

VERY SHORT ANSWERS TYPE QUESTIONS (10 × 2 = 20)

1. Describe the role of smooth endoplasmic reticulum.

Answer

Role of Smooth Endoplasmic Reticulum

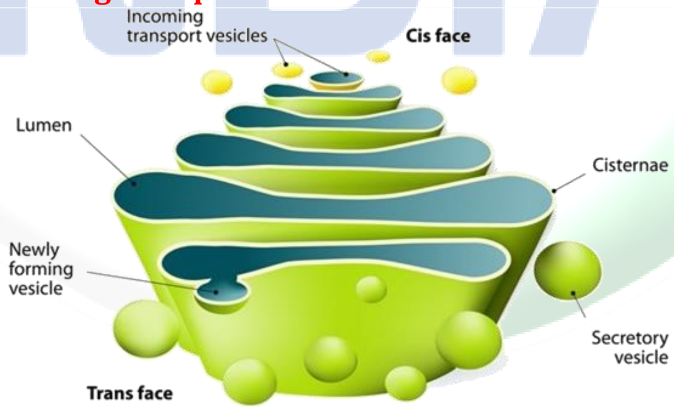


- Smooth ER is responsible for the synthesis of essential lipids such as phospholipids and cholesterol.
- Smooth ER is also responsible for the production and secretion of steroid hormones.
- It is also responsible for the metabolism of carbohydrates.

2. Describe the physiological role of Golgi complex.

Answer

Physiological Role of Golgi Complex

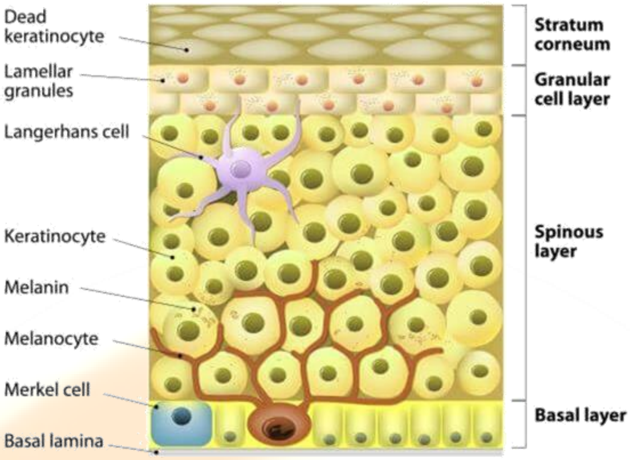


- The packaging and secretion of proteins is the Golgi apparatus' essential role.
- Proteins are delivered to it via the endoplasmic reticulum.
- It puts it in membrane-bound vesicles and transports them to other locations, like lysosomes, the plasma membrane, or secretion.

3. Give the function of Langerhans cell in Skin?

Answer

Function of Langerhans cell in Skin



- Langerhans cells are phagocytic cells, meaning they engulf other cells or particles.
- Langerhans cells play a role in stimulating the adaptive immune response against pathogens, but they are also known to suppress immune function.
- Langerhans cells help to prevent autoimmunity (an immune response against healthy cells) by promoting immune tolerance.

4. Enlist the names of contractile proteins in human body.

Answer

Names of Contractile Proteins in Human Body

a. Actin and
b. Myosin

5. Identify the blood group known as Universal donor?

Answer

- Group O can donate red blood cells to anybody. It's the universal donor.

6. Differentiate blood capillaries and lymphatic capillaries.

Answer

Blood Capillaries	Lymphatic Capillaries
They are tiniest vessels that contain blood.	They contain lymph.
Reddish, easy to observe.	Colourless, difficult to observe.
Narrower than lymph capillaries.	Wider than blood capillaries.

7. Define systolic and diastolic blood pressure.

Answer

Systolic Blood Pressure - The pressure exerted when the heartbeats.
Diastolic Blood Pressure - The pressure exerted on the walls of the arteries when the heart muscles relax in between two beats.

8. Differentiate preganglionic neurons and post ganglionic neurons.

Answer

Preganglionic Neuron	Postganglionic Neuron
The neurons of the ANS whose cell bodies lay in the CNS and axons terminate in a peripheral ganglion, synapsing with postganglionic neuron.	The neurons of the ANS whose cell bodies lay in the autonomic ganglion and axons terminate in the visceral effector (smooth or cardiac muscle or glands).
Arise from the CNS	Arise from the autonomic ganglion.

9. Write the tissue name known as Pacemaker.

Answer

Pacemaker

- The sinus node continuously generates electrical impulses, thereby setting the normal rhythm and rate in a healthy heart. Hence, the SA node is referred to as the natural pacemaker of the heart.

10. Define Cardiac Output.

Answer

Cardiac Output

- Cardiac output refers to the volume of blood pumped out per ventricle per minute.
- Cardiac Output (CO) = HR x SV

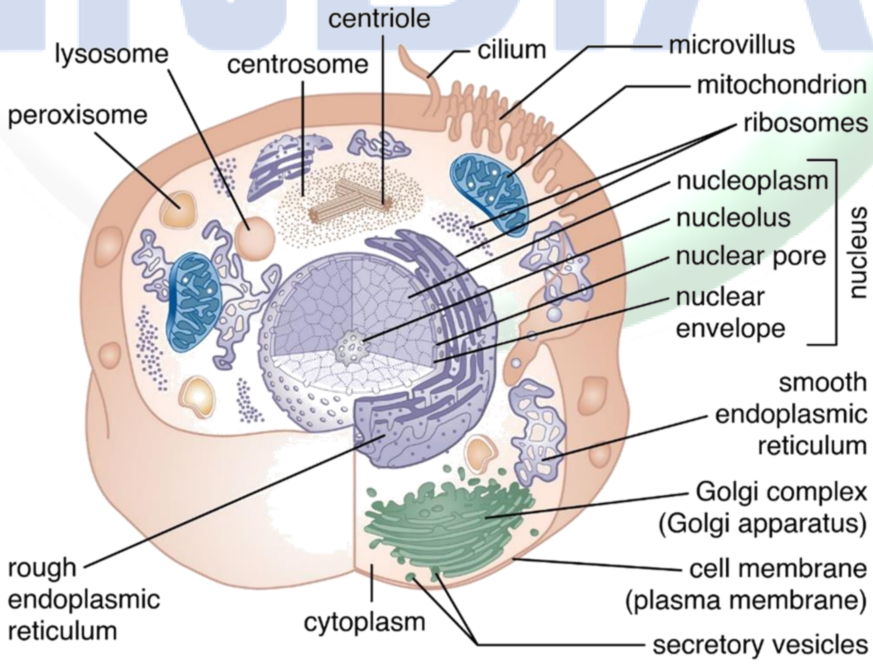
SECTION B

LONG ANSWERS TYPE QUESTIONS (2 × 10 = 20)

1. Discuss cell with well labelled diagram. Explain its organelles in detail.

Answer

Cell



Organelles	Description
Nucleus	• It is the largest structure present almost at the center of a cell. The nucleus contains. • Nucleus: it is a highly coiled filamentous structure present in the nucleus • Chromatin: these are fibrous threads present in the nucleus
Mitochondria	• the mitochondria are made up of proteins, phospholipids and some ribonucleic acid. • known as the "power house" of a cell because "Adenosine tri phosphate" (ATP) is produced in mitochondria.
Endoplasmic reticulum	• it is the most extensive cell organelle, present in the cytoplasm. Endoplasmic reticulum is of two types. • **Rough Endoplasmic Reticulum –** They are composed of cisternae, tubules, and vesicles, which are found throughout the cell and are involved in protein manufacture. • **Smooth Endoplasmic Reticulum –** They are the storage organelle, associated with the production of lipids, steroids, and also responsible for detoxifying the cell.
Golgi apparatus	• it is situated between the nucleus and apex of the cell. • it is concerned with concentration of proteins prior to their secretion. • there are three types of golgi bodies namely cisternae, vesicles and vacuoles.
Lysosomes	• They are small, spherical or oval bodies surrounded by a single membrane. • They damaged intracellular organelles are also broken down and digested by the lysosomes. • Therefore, lysosomes are also called as "Suicidal bag of the cell".
Centrosome	• It is small rod-shaped body found near the nucleus. • It plays an important role during cell division.
Microsomes	• They are extremely small, membrane bound, sac-like bodies present in the cytoplasm. • Microsomes originated from endoplasmic reticulam. • They can be separated by centrifuging a tissue homogenate at very high speed (10000 rpm). Microsomes contain ribosomes and granular matrix.
Ribosome	• Ribosomes are a cell structure that makes protein. Protein is needed for many cell functions such as repairing damage or directing chemical process. Ribosomes can be found floating within the cytoplasm or attached to the endoplasmic reticulam
Plasma membrane	• Barrier that separates the internal components of the cell from the extracellular materials and external environment is the cell membrane. • It is the outer surface of the cell. It is selectively permeable to certain substances. It has osmotic properties. The thickness of cell membrane varies from 75 to 111 angstrom.
Cytoplasm	• The cytoplasm is present both in plant and animal cells.

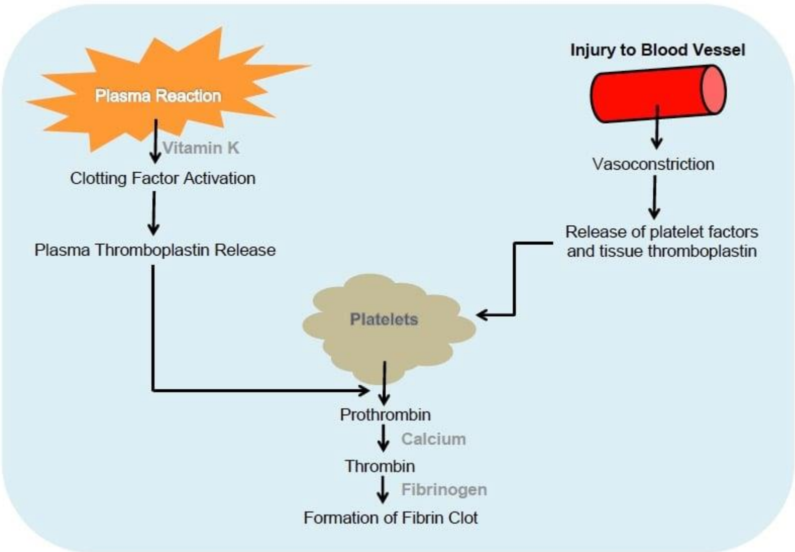
	• They are jelly-like substances, found between the cell membrane and nucleus. They are mainly composed of water, organic and inorganic compounds. • The cytoplasm is one of the essential components of the cell, where all the cell organelles are embedded. • These cell organelles contain enzymes, mainly responsible for controlling all metabolic activity taking place within the cell and are the site for most of the chemical reactions within a cell.

2. Illustrate haemostasis. Discuss the various pathways of blood coagulation.

Answer

Haemostasis

- "Hemostasis is a physiological defensive reaction to an injury or a cut that seals the blood vessels and thus helps in healing."
- Mainly platelets, endothelial cells of blood vessels, and blood proteins are responsible for hemostasis. Hemostatic mechanism proceeds in the following series of steps:
  - Changes in blood vessel cells
  - Blood clot formation
  - Platelet plug formation
- **Stages of Hemostasis**
  - Hemostasis takes place in two stages:
  - **Primary Hemostasis -** It is caused when bleeding ceases or gets reduced by contraction of the blood vessels, and thrombin signals for platelet assembly and forms a loose platelet plug.
  - **Secondary Hemostasis -** It includes the action of blood proteins and coagulation factors in a sequence to reinforce the platelet plug and marks the onset of the healing process. Blood coagulation is provoked by the extrinsic pathway i.e. tissue damage, but the intrinsic pathway (internal messengers) intensifies the coagulation.



Pathways of Blood Coagulation

- The process of blood coagulation leads to haemostasis, i.e. prevention of bleeding or haemorrhage.
- Blood clotting involves activation and aggregation of platelets at the exposed endothelial cells, followed by deposition and stabilisation of cross-linked fibrin mesh.
- **Platelet Activation**
  - The blood circulating in the blood vessel does not clot under normal circumstances.
  - The blood coagulation process is stimulated when there is any damage to the endothelium of blood vessels. It leads to platelet activation and aggregation.
- **Blood Coagulation Cascade**
  - The process of coagulation is a cascade of enzyme catalysed reactions wherein the activation of one factor leads to the activation of another factor and so on.
  - **Extrinsic Coagulation Pathway**
    - It is also known as the tissue factor pathway. It is a shorter pathway. The tissue factors or tissue thromboplastins are released from the damaged vascular wall.
    - The tissue factor activates the factor VII to VIIa. Then the factor VIIa activates the factor X to Xa in the presence of Ca2+.
  - **Intrinsic Coagulation Pathway**
    - It is the longer pathway of secondary haemostasis. The intrinsic pathway begins with the exposure of blood to the collagen from the underlying damaged endothelium. This activates the plasma factor XII to XIIa.
    - XIIa is a serine protease, it activates the factor XI to XIa. The XIa then activates the factor IX to IXa in the presence of Ca2+ ions.
    - The factor IXa in the presence of factor VIIIa, Ca2+ and phospholipids activate the factor X to Xa.
  - **Common Pathway**
    - The factor Xa, factor V, phospholipids and calcium ions form the prothrombin activator.
    - This is the start of the common pathway of both extrinsic and intrinsic pathways leading to coagulation.
  - The three main steps of the blood coagulation cascade are as follows:

1. Formation of prothrombin activator
2. Conversion of prothrombin to thrombin
3. Conversion of fibrinogen into fibrin

1. Formation of prothrombin activator

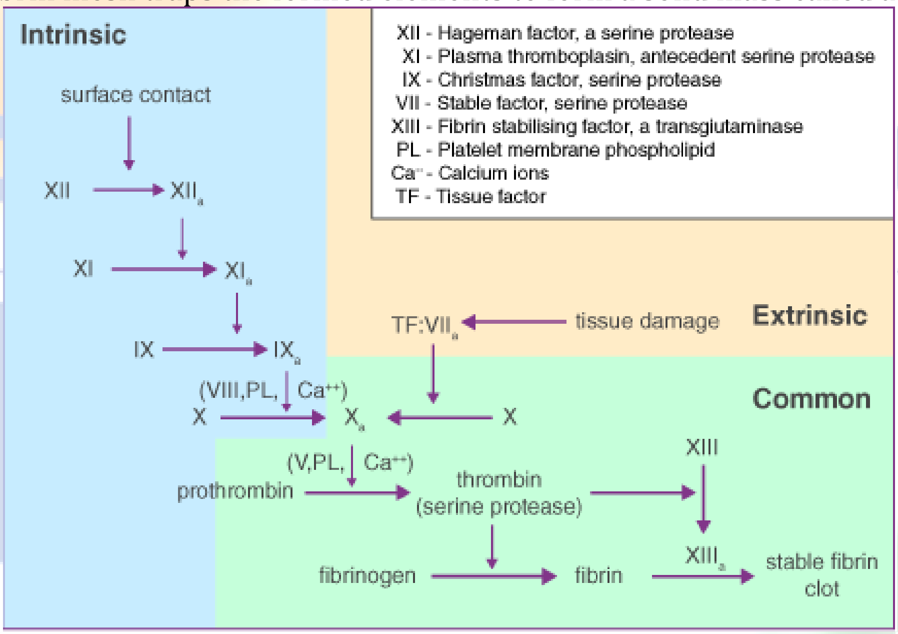
- The formation of a prothrombin activator is the first step in the blood coagulation cascade of secondary haemostasis. It is done by two pathways, viz. extrinsic pathway and intrinsic pathway.

2. Conversion of prothrombin to thrombin

- Prothrombin or factor II is a plasma protein and is the inactive form of the enzyme thrombin. Vitamin K is required for the synthesis of prothrombin in the liver.
- The prothrombin activator formed above converts prothrombin to thrombin.
- Thrombin is a proteolytic enzyme. It also stimulates its own formation, i.e. the conversion of prothrombin to thrombin. It promotes the formation of a prothrombin activator by activating factors VIII, V and XIII.

3. Conversion of fibrinogen into fibrin

- Fibrinogen or factor I is converted to fibrin by thrombin. Thrombin forms fibrin monomers that polymerise to form long fibrin threads. These are stabilized by the factor XIII or fibrin stabilising factor.
- The fibrin stabilizing factor is activated by thrombin to form factor XIIIa. The activated fibrin stabilizing factor (XIIIa) forms cross-linking between fibrin threads in the presence of Ca2+ and stabilizes the fibrin meshwork.
- The fibrin mesh traps the formed elements to form a solid mass called a clot.



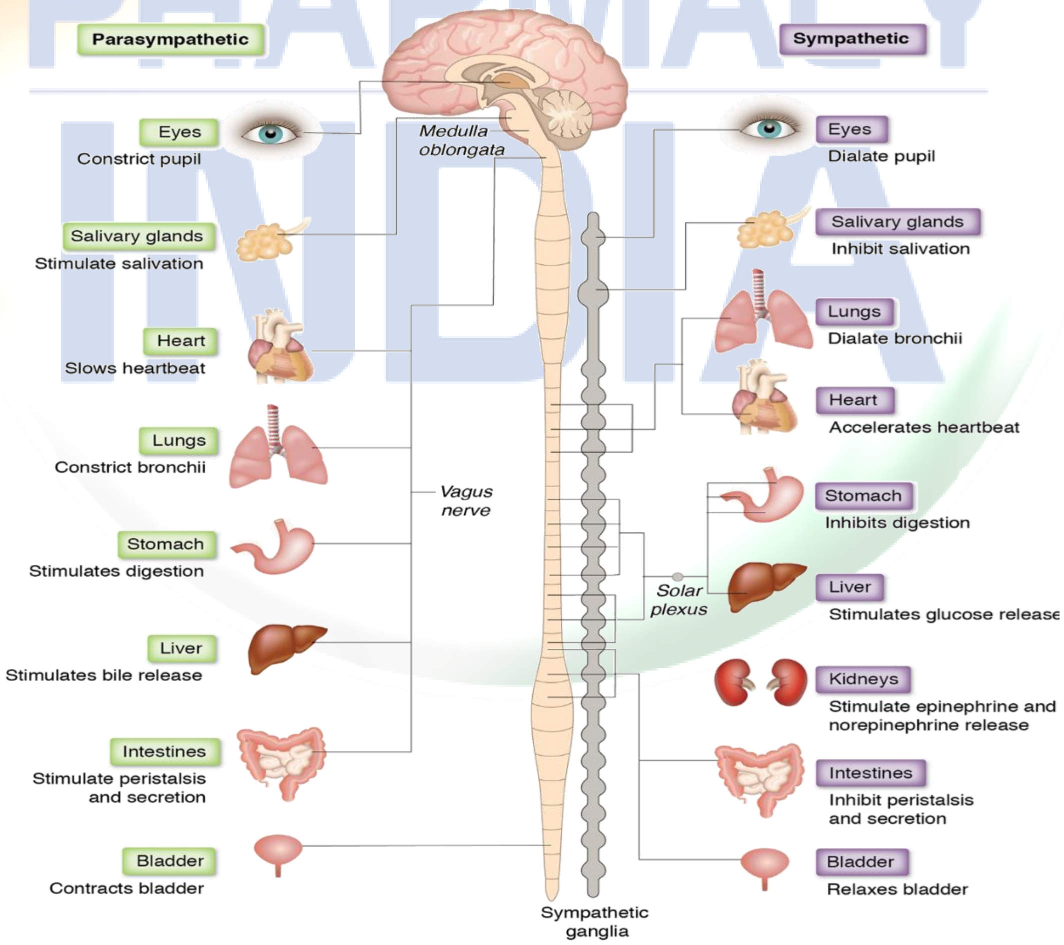
3. Explain the structural and functional difference of Sympathetic and Parasympathetic division of autonomic nervous system.

Answer

Structure and Function of Sympathetic Nervous System

- Three neurons are involved and convey impulses from their origin in the hypothalamus, reticular formation and medulla oblongata to different effector organs and tissues.
- Neurone 01 has its cell body in the brain and its fibre extends into the spinal cords.
- Neurone 02 has its cell body in the lateral column of grey matter in the spinal cord, between the levels of the first thoracic and second or third lumbar vertebrae.

- Neurone 03 has its cell body in a ganglion and terminates in the organ or tissue.
- **Sympathetic Ganglia**
  - ✓ Various sympathetic ganglia originate on either sides of the spinal cord.
  - ✓ These are chains of ganglia extending from the upper cervical level to the sacrum.
  - ✓ The ganglia are attached to each other by nerve fibres.
  - ✓ The fibre from the spinal cord up to ganglia is termed as preganglionic fibre, while the fibre from the ganglia to the effector organ is called as postganglionic fibre.
  - ✓ Most of the organs are supplied with both sympathetic and parasympathetic fibres; however there are few exceptions.
  - ✓ Sweat glands, the skin and blood vessels of skeletal muscles are not supplied with parasympathetic nervous system.
  - ✓ There are three prevertebral ganglia situated in the abdominal cavity close to the arteries. Their names are as follows:
    - ➢ Celiac ganglion
    - ➢ Superior mesenteric ganglion
    - ➢ Inferior mesenteric ganglion



Structure and Function of Parasympathetic Nervous System

- Two neurons are involved in the transmission of impulses from their source to the effector organ.
- Neuron 01 has its cell body either in the brain or in the spinal cord.
- Those originating in the brain are the cranial nerves III, VII, IX, XI arising from nuclei in the midbrain and brainstem, and their nerve fibres terminate outside the brain.
- The cell body of the sacral outflow is in the lateral columns of grey matter at the distal end of this spinal cord.
- Neuron 02 has its cell body either in a ganglion or in the wall of the organ supplied.
- **Neurotransmitters**
  - Noradrenaline is the chemical secreted at the postganglionic nerve endings of sympathetic nervous system; the only exception to this is neuron 02 of the sympathetic nervous system.
  - Acetylcholine is the chemical secreted at the postganglionic nerve endings of the parasympathetic nervous system.
  - Both the chemical messengers of the autonomic nervous system are termed as neurotransmitters.
  - All ganglion transmissions, of the parasympathetic and sympathetic nervous system, are mediated by acetylcholine.

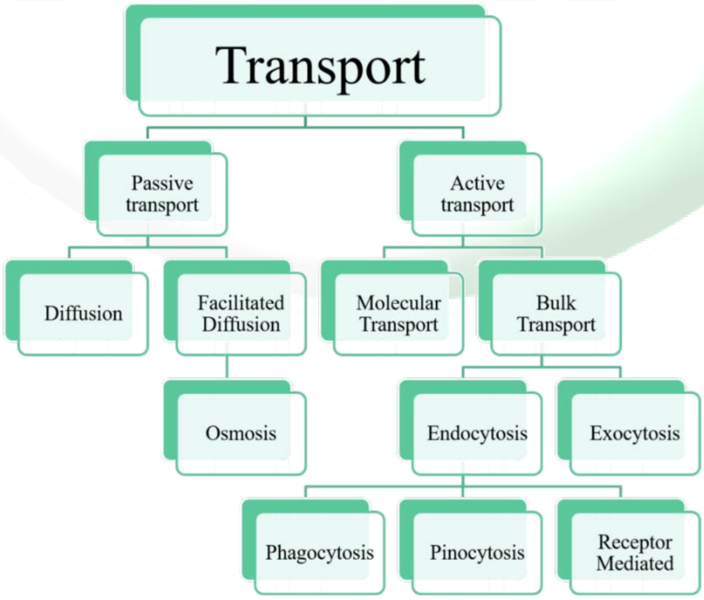
SECTION C

SHORT ANSWERS TYPE QUESTIONS (5 × 7 = 20)

1. Classify transport across plasma membrane. Explain the process of primary active transport.

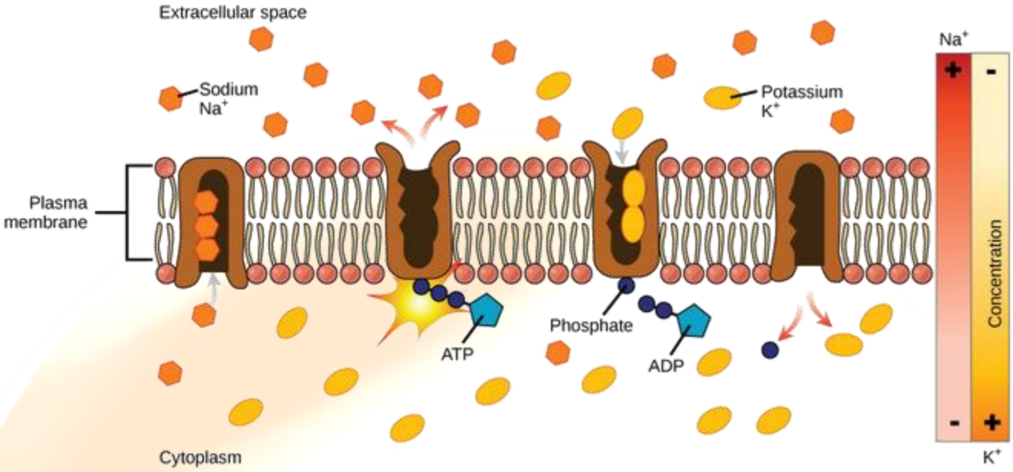
Answer

Classification of Transport across Plasma membrane



Process of Primary Active Transport

- The primary active transport that functions with the active transport of sodium and potassium allows secondary active transport to occur.
- The secondary transport method is still considered active because it depends on the use of energy as does primary transport.

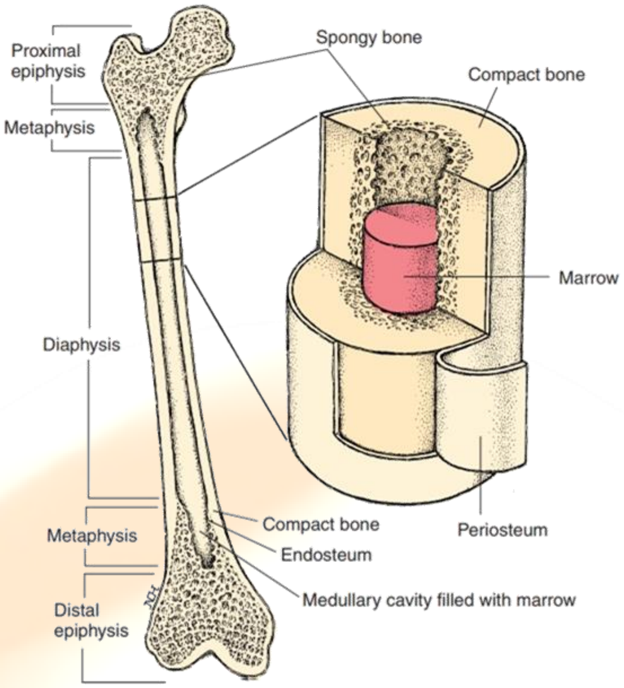


- One of the most important pumps in animals cells is the sodium-potassium pump (Na+-K+ ATPase), which maintains the electrochemical gradient (and the correct concentrations of Na+ and K+) in living cells.
- The sodium-potassium pump moves two K+ into the cell while moving three Na+ out of the cell. The Na+-K+ ATPase exists in two forms, depending on its orientation to the interior or exterior of the cell and its affinity for either sodium or potassium ions. The process consists of the following six steps:
  - With the enzyme oriented towards the interior of the cell, the carrier has a high affinity for sodium ions. Three sodium ions bind to the protein.
  - ATP is hydrolyzed by the protein carrier, and a low-energy phosphate group attaches to it.
  - As a result, the carrier changes shape and re-orients itself towards the exterior of the membrane. The protein's affinity for sodium decreases, and the three sodium ions leave the carrier.
  - The shape change increases the carrier's affinity for potassium ions, and two such ions attach to the protein. Subsequently, the low-energy phosphate group detaches from the carrier.
  - With the phosphate group removed and potassium ions attached, the carrier protein repositions itself towards the interior of the cell.
  - The carrier protein, in its new configuration, has a decreased affinity for potassium, and the two ions are released into the cytoplasm. The protein now has a higher affinity for sodium ions, and the process starts again.

2. Explain the structure of Long Bone with the help of diagram.

Answer

Structure of Long Bone



- The activity of osteoclasts and osteoblasts is particularly rapid at the ends of long bones that extend in length.
- **Bone cells -** Bones are not static tissue but need constant maintenance and remodeling. There are three cell types involved in this process.
  - **Osteoblasts** are responsible for generating and repairing bone. They produce a protein mixture that doctors call osteoid, which is mineralized and becomes bone.
  - **Osteocytes** are inactive osteoblasts that are mineralized and remain within the bone they have created. They communicate with other bone cells and help support metabolic functions within the bone.
  - **Osteoclasts** are large cells with more than one nucleus. They useTrusted Source acids resulting from certain reactions to break down used bone. This process is called resorption. Osteoclasts help remodel injured bones and create pathways for nerves and blood vessels to travel through.
- **Bone marrow**
  - Bone marrow is present in almost all bones where cancellous, or spongy, bone is present.
  - Bone marrow produces blood cells, including:
    - red blood cells, which deliver oxygen to cells
    - white blood cells, essential for the body's immune system
    - platelets, which the body uses for clotting
- The region at the ends of bones is the **epiphysis (plural, epiphyses).**
- New cartilage is constantly being formed here to increase the length.
- Adjacent to this new cartilage, is a thin region known as the epiphyseal plate, where the osteoblasts constantly turn cartilage into bone.
- As more cartilage is formed, the epiphyseal plate advances, leaving bone behind it. Thus, bone is remodeled by cellular activity.
- **Diaphysis** is the region of bone between the epiphysis. The diaphysis forms the middle, cylindrical part of the bone.

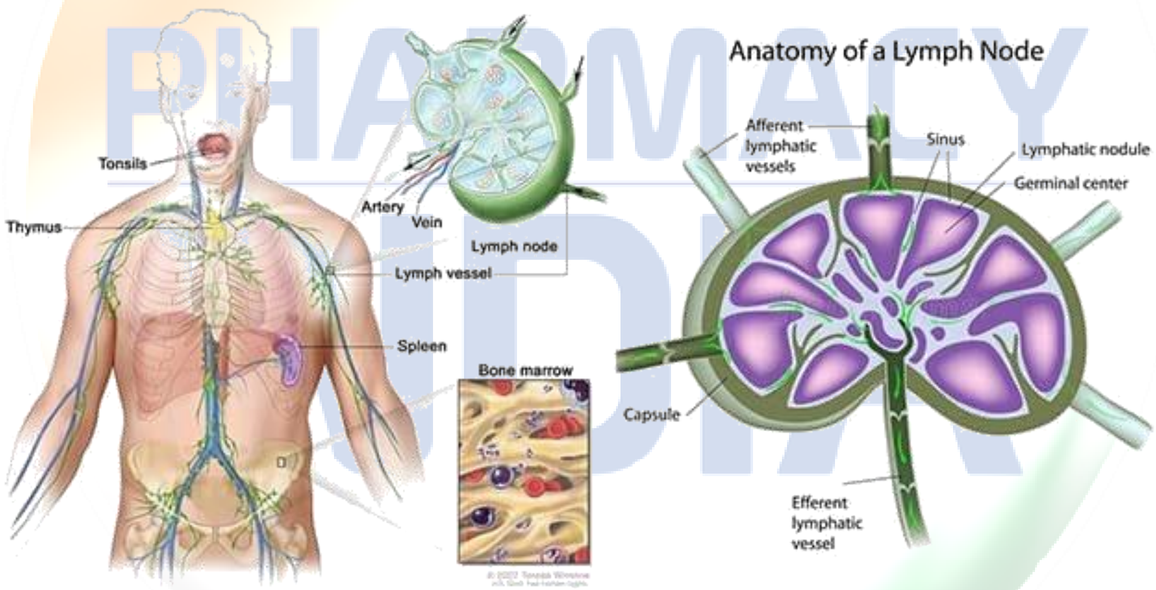
- The **metaphysis** is the region of bone that lies between the diaphysis and the epiphysis, and it includes the epiphyseal plate.
- The ends of long bones, adjacent to the joint, are covered with hyaline cartilage - articular cartilage.
- The articular cartilage absorbs shock and reduces friction in joints.
- The inner region of long bones houses the medullary or marrow cavity.
- In children this cavity is filled with red bone marrow (where blood cells are formed).
- In older individuals, the red bone marrow is replaced by yellow marrow that is largely made up of adipose tissue. The medullary cavity is lined by the endosteum membrane.
- It contains containing bone-forming cells (osteogenic cells and osteoblasts).

3. Discuss the structure and functions of Lymph node.

Answer

Lymph Node

Structure



- Lymph nodes are small solid structures placed at varying points along the lymphatic system such as the groin, armpit and mesentery.
- They range in size from 2 to 10 mm, are spherical in shape and are encapsulated.
- Lymph node is surrounded by a fibrous capsule which dips down into the node substance forming partition or trabeculae.
- The node is made by reticular and lymphatic tissues containing mainly lymphocytes and macrophages.
- Beneath the capsule is the subcapsular sinus, the cortex, a paracortical region and a medulla.
- The cortex contains many follicles and on antigenic stimulation becomes enlarged with germinal centers.
- The follicles are comprised mainly of B cells and follicular dendritic cells.

- The paracortical (thymus-dependent) region contains large numbers of T cells interspersed with interdigitating cells.
- Each lymph node has 4-5 afferent vessels that bring lymph to the node while only one efferent vessel draining lymph away from the node.
- It also has a concave surface called the hilum where an artery enters, a vein and the efferent lymph vessel leave.
- Depending upon the position, the lymph nodes may be superficial or deep lymph nodes. Groups of lymph nodes are present in the neck, collarbone, under the arms (armpit), and groin.

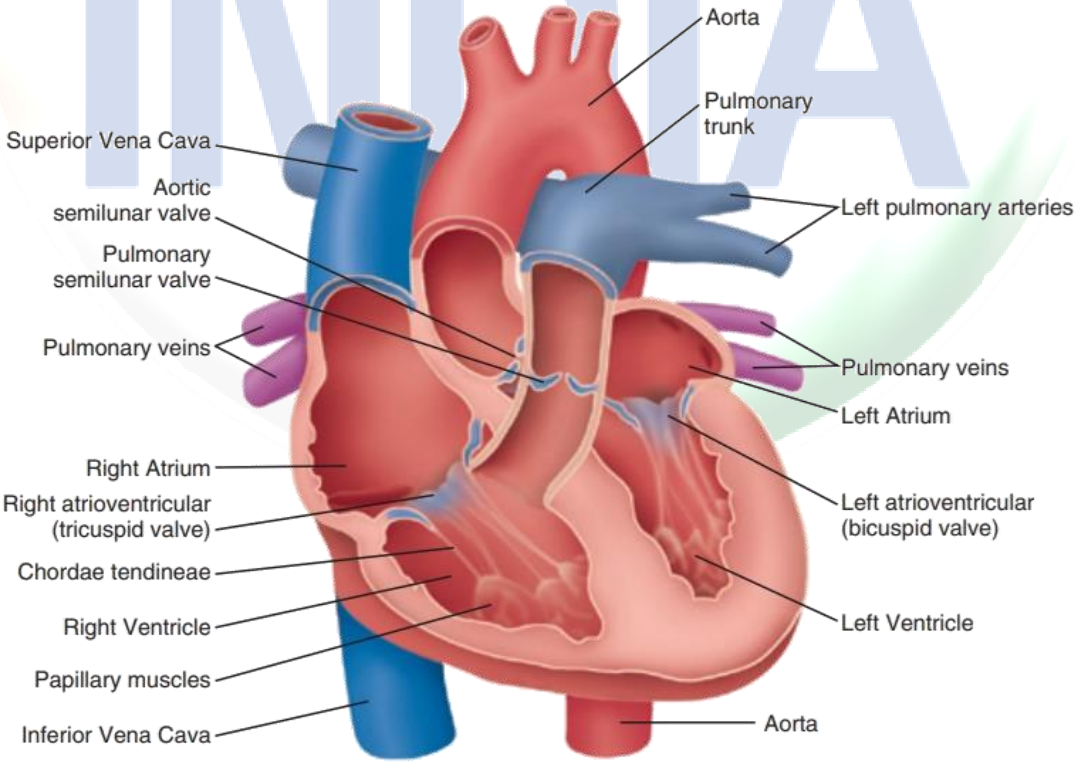
Function

- The primary role of the lymph node is to filter the lymph and then produce an immune response against trapped microbes/antigens.
- Filtering of the lymph helps in removal of particles not normally found in the serum.
- The lymphoide tissues in the nodes break down materials which have been filtered off such as microorganisms, tumor cells and cells damaged by inflammation.
- Lymphocyte develops from the reticular and lymphoid tissue in the nodes.
- Antibodies and antitoxins are also formed by the cells of lymph nodes.

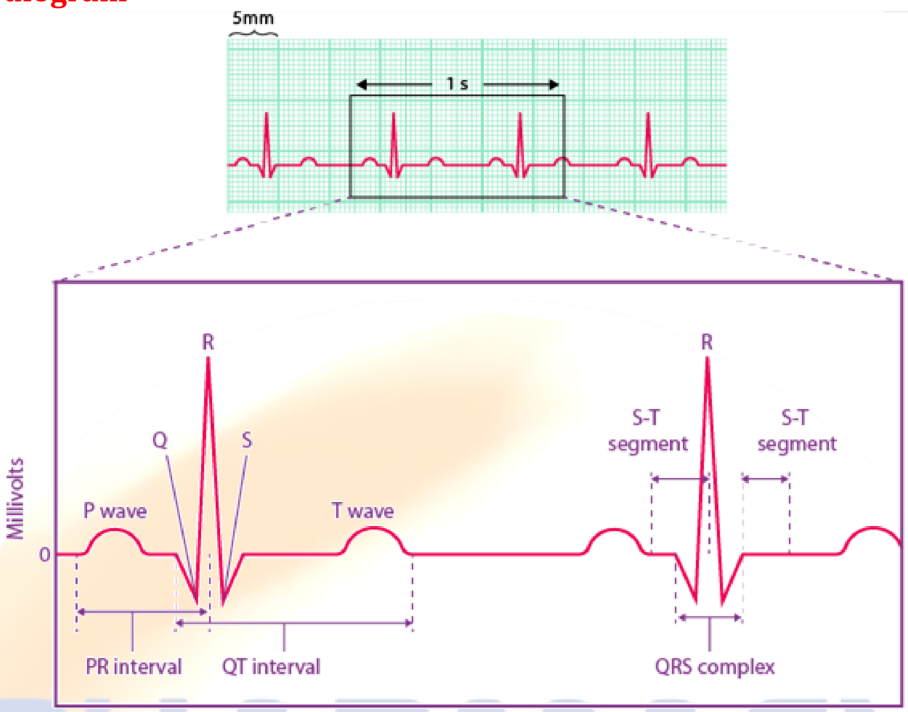
4. Describe Heart with well labelled diagram. Relate electrocardiogram (ECG) with it.

Answer

Structure of Heart



Electrocardiogram



- The electrocardiogram checks for different heart conditions by recording the electrical signal from the heart.
- The ECG shows indirect proof of blood flowing to the muscle of the heart and measures the rhythm and rate of heartbeat.
- For the tool to have a routine working, a standardised system has been developed for placing the electrode. For the heart to view electrical impulses at least 12 in number, ten electrodes are required.
- A lead of an electrode is kept on every arm and leg with the wall of the chest, with six of them. The signals originating from every electrode are recorded, and they are shown in a printed format as an electrocardiograph.
- The **first part of the wave**, called the **P wave**, is a small increase in voltage of about **0.1 mV** that corresponds to the **depolarization of the atria during atrial systole**.
- The next part of the EKG wave is the **QRS complex** which features a small drop in voltage (Q) a large voltage peak (R) and another small drop in voltage (S).
- The QRS complex corresponds to the **depolarization of the ventricles during ventricular systole.**
- The atria also repolarize during the QRS complex, but have almost no effect on the ECG because they are so much smaller than the ventricles.
- The final part of the ECG wave is the T wave, a small peak that follows the QRS complex.
- The T wave represents the ventricular repolarization during the relaxation phase of the cardiac cycle.
- Variations in the waveform and distance between the waves of the ECG can be used clinically to diagnose the effects of heart attacks, congenital heart problems, and electrolyte imbalances.

Wave/ segment	From-to	Cause	Duration (second)
'P wave		Atrial depolarization	0.1
QRS' complex	Onset of 'Q' wave to the end of 'S' wave	Ventricular depolarization	0.08-0.10
'T' wave		Ventricular repolarization	0.2
'P'-'R' interval	Onset of 'P' wave to onset of 'Q' wave	Atrial depolarization and conduction through AV node	0.18 (0.12-0.2)
Q'-T' interval	Onset of 'Q' wave and end of 'T' wave	Electrical activity in ventricles	0.4-0.42
S'-T' segment	End of 'S' wave and onset of 'T' wave	Isoelectric	0.08

5. Explain the anatomy and physiology of Vision.

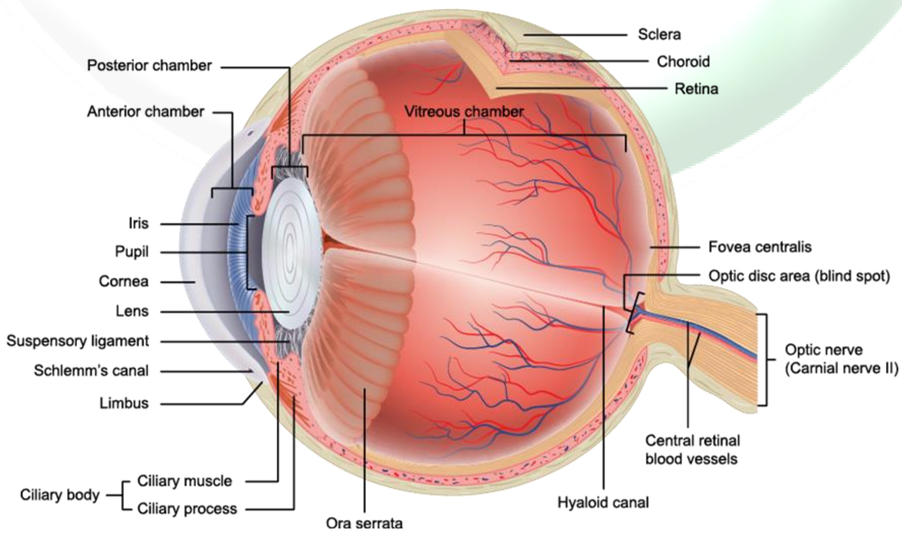
Answer

Anatomy of Vision

The External Structure of an Eye

The parts of the eye that are visible externally include the following:-

- **Sclera:** It is a white visible portion. It is made up of dense connective tissue and protects the inner parts.
- **Conjunctiva:** It lines the sclera and is made up of stratified squamous epithelium. It keeps our eyes moist and clear and provides lubrication by secreting mucus and tears.
- **Cornea:** It is the transparent, anterior or front part of our eye, which covers the pupil and the iris. The main function is to refract the light along with the lens.
- **Iris:** It is the pigmented, coloured portion of the eye, visible externally. The main function of the iris is to control the diameter of the pupil according to the light source.
- **Pupil:** It is the small aperture located in the centre of the Iris. It allows light to enter and focus on the retina.



The Internal Structure of an Eye

The internal components of an eye are:

- **Lens:** It is a transparent, biconvex, lens of an eye. The lens is attached to the ciliary body by ligaments. The lens along with the cornea refracts light so that it focuses on the retina.
- **Retina:** It is the innermost layer of the eye. It is light sensitive and acts as a film of a camera. Three layers of neural cells are present in them, they are ganglion, bipolar and photoreceptor cells. It converts the image into electrical nerve impulses for the visual perception by the brain.
- **Optic nerve:** It is located at the posterior portion of the eyes. The optic nerves carry all the nerve impulses from the retina to the human brain for perception.
- **Aqueous Humour:** It is a watery fluid present between the cornea and the lens. It nourishes the eye and keeps it inflated.
- **Vitreous Humour:** it is a transparent, jelly-like substance present between the lens and the retina. It contains water (99%), collage, proteins, etc. The main function of vitreous humour is to protect the eyes and maintain its spherical shape.

Physiology of Vision

- Physiological events of vision consists of following;
- Refraction of light entering the eye
- Focusing of image on the retina by accommodation of lens
- Convergence of image
- Photo-chemical activity in retina and conversion into neural impulse
- Processing in brain and perception

Refraction of light entering the eye:

- Light wave travels parallel to each other but they bend when passes from one medium to another. This phenomenon is called refraction.
- In normal eye, light wave focused on retina.

Accommodation of lens to focus image:

- Accommodation is a reflex process to bring light rays from object into perfect focus on retina by adjusting the lens.
- Focus on nearer object: Ciliary muscle contract - ciliary body pull forward and inward - tension on suspensory ligament of lens reduced - lens become thicker and round due to its elasticity - possible to focus near object.
- Focus on distant object: Ciliary muscles relaxes - ciliary body return to its normal resting state - tension on suspensory ligament of lens increases - lens become thinner and flat - possible to focus distant object.

Convergence of image:

- Human eye have binocular vision, it means although we have two eye, we perceive single image
- In binocular vision, two eye ball turns slightly inward to focus a close object so that both image falls on corresponding points on retina at same time. This

phenomenon is called convergence.

Photo-chemical activity in retina and conversion into neural impulse

1. Photochemical activity in rods:

- Rods contains light sensitive pigment-rhodopsin.
- Rhodopsin is a molecule formed by combination of a protein scotopsin and a light sensitive small molecule retinal (retinene).
- When light is falls on rod cell, it is absorbed by rhodopsin and it breaks into scotopsin and 11 cis- retinal. The process is known as bleaching.
- 11 cis-retinal absorb photon of light and change into all trans-retinal which inturn activates scotopsin into enzyme.
- This reaction produces large amount of transducin which activates another enzyme phosphodiesterase.
- Phosphodiesterase hydrolyses cGMP which causes to cease the flow of Na+ ion inside rod cell. This causes increased negative charge inside cell creating hyperpolarized state.
- Hyperpolarized rod cells transmit the neural signal to bipolar cell.
- Bipolar cell, amacrine cell and ganglion cell process the neural signal and generate action potential to transmit to brain via optic nerve.

2. Photochemical activity in cones:

- The neural activity in cone cell is similar to that of rod cell but there are three different types of cone cells and each cone cell contains different photo-pigment and are sensitive to red, green and blue.
- The perception of color depends upon which cone are stimulated.
- The final perceived color is combination of all three types of cone cell stimulated depending upon the level of stimulation.
- The proper mix of all three color produce the perception of white and absence of all color produce perception of black.

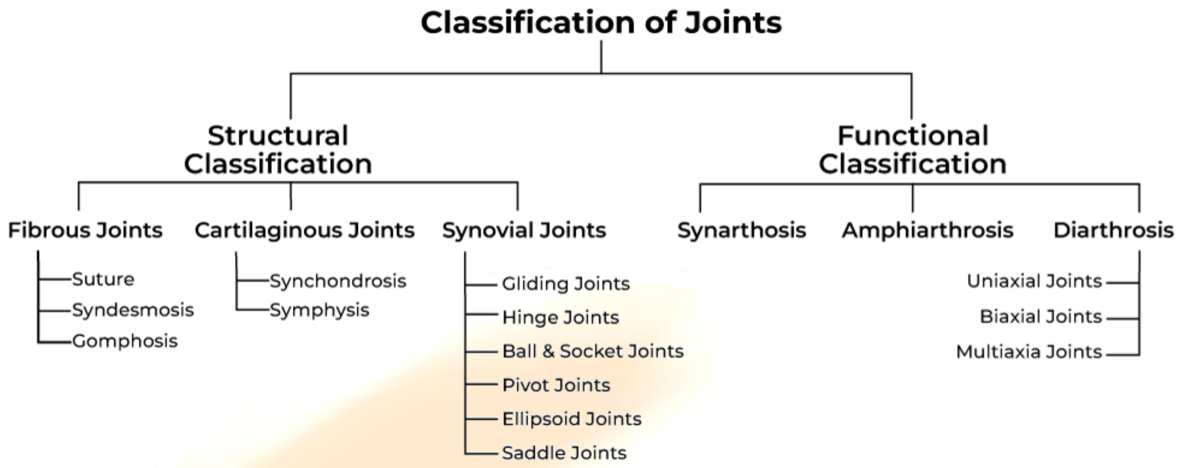
Processing of image in brain and perception:

- All visual information originates in retina due to stimulation of rods and cones are conveyed to brain.
- Photoreceptor cells, bipolar cells and ganglion cells transmit impulse directly from retina to brain.
- The nerve fiber of ganglion cells from both eyes carries impulse along two optic nerve.
- The optic nerves meets at optic chiasma where fibers from nasal half of each retina cross-over but fibers from temporal half of each retina do not cross-over.
- The optic nerve after crossing the chiasma is called as optic tract.
- Each optic tract continues posteriorly until it synapse with neuron in thalamus called lateral geniculate body which project to primary visual cortex in occipital lobe of cerebrum and image is perceived.

6. Classify Joints. Explain the structure of Synovial Joint.

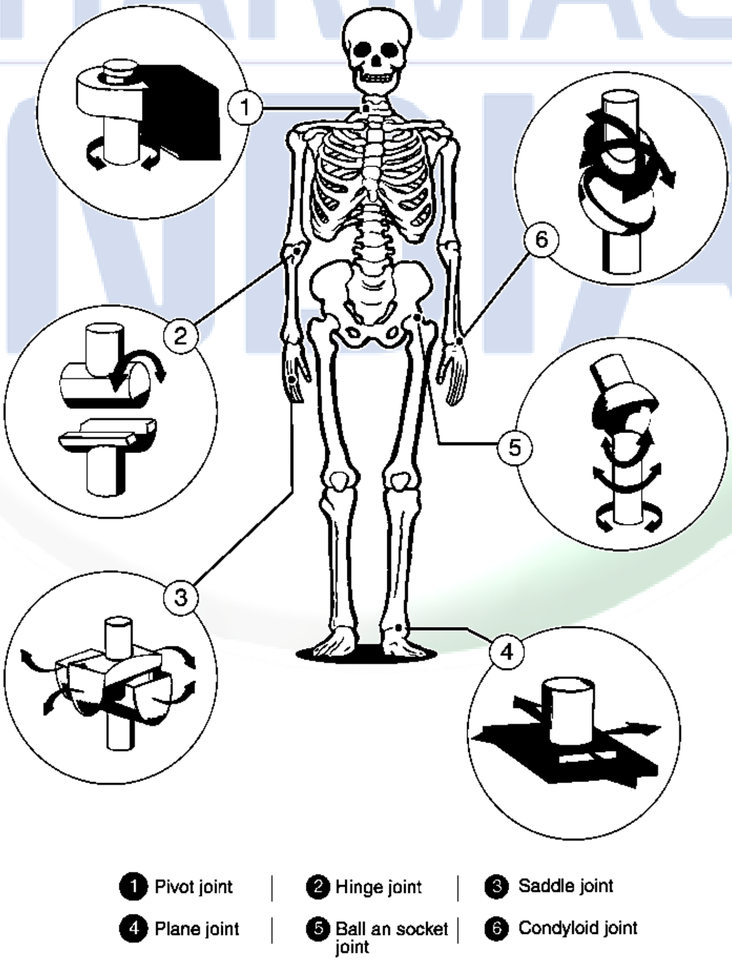
Answer

Classification of Joints



Structure of Synovial Joint

- The synovial joints are the most common type of joint because this joint helps us to perform a wide range of motion such as walking, running, typing and more.
- Synovial joints are flexible, movable, can slide over one another, rotatable and so on. These joints are found in our shoulder joint, neck joint, knee joint, wrist joint, etc.



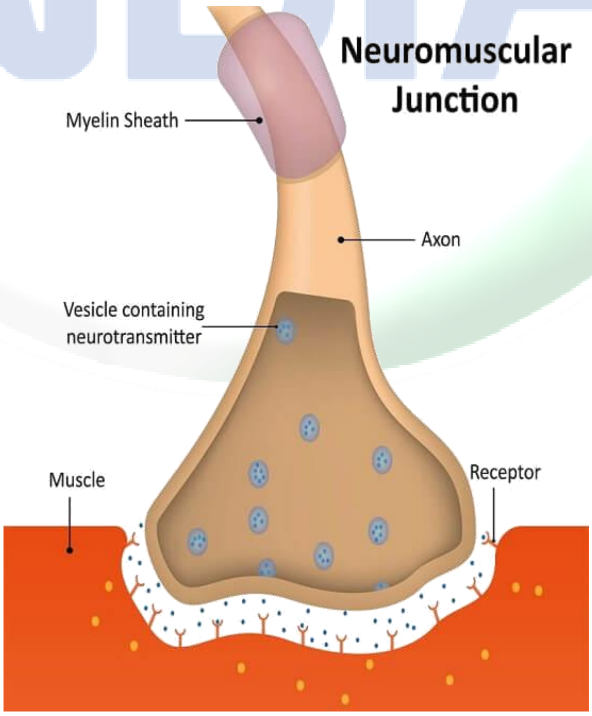
1. **Ball and Socket Joints -** Here, one bone is hooked into the hollow space of another bone. This type of joint helps in rotatory movement. An example ball and socket joint are the shoulders.
2. **Pivotal Joints -** In this type of joint, one bone has tapped into the other in such a way that full rotation is not possible. This joint aid in sideways and back-forth movement. An example of a pivotal joint in the neck.
3. **Hinge Joints -** Hinge joints are like door hinges, where only back and forth movement is possible. Example of hinge joints is the ankle, elbows, and knee joints.
4. **Saddle Joints -** Saddle joint is the biaxial joint that allows the movement on two planes–flexion/extension and abduction/adduction. For example, the thumb is the only bone in the human body having a saddle joint.
5. **Condyloid Joints -** Condyloid joints are the joints with two axes which permit up-down and side-to-side motions. The condyloid joints can be found at the base of the index finger, carpals of the wrist, elbow and the wrist joints. This joint is also known as a condylar, or ellipsoid joint.
6. **Gliding Joints -** Gliding joints are a common type of synovial joint. It is also known as a plane or planar joint. This joint permit two or more round or flat bones to move freely together without any rubbing or crushing of bones. This joint is mainly found in those regions where the two bones meet and glide on one another in any of the directions. The lower leg to the ankle joint and the forearm to wrist joint are the two main examples of gliding joints.

7. Discuss the phenomenon of neuromuscular junction with the help of diagram.

Answer

Phenomenon of Neuromuscular Junction

- A neuromuscular junction (NMJ), also called a myoneural junction, is the connection between a motor neuron and a muscle fibers. These neurons are the site at which the neuron transmits a signal from the brain to the muscle fiber, causing it to contract.



Steps of Signalling at Neuromuscular Junctions

The events involved in the transmission of a signal at a neuromuscular junction are summarized in the six steps below.

1. Firstly, the signal from the axon terminal of the previous neuron travels down the motor neuron to the presynaptic axon terminal. This causes the activation and opening of calcium channels in the membrane, allowing calcium ions to enter the neuron.
2. The axonal terminal contains neurotransmitters (specifically, acetylcholine) that are packaged into vesicles. When calcium floods into the neuron, it binds the proteins on the surface of these vesicles, called SNARE proteins. These SNARE proteins mediate vesicle fusion, prompting the vesicles to fuse with the cell membrane.
3. Once they have fused to the membrane, the vesicles can release their contents (acetylcholine) outside the cell, through the process of exocytosis.
4. As a result, acetylcholine floods the synaptic cleft, where it can reach the postsynaptic membrane by diffusion.
5. Acetylcholine binds to acetylcholine receptors, also called nicotinic acetylcholine receptors. These are present in the many folds of the postsynaptic membrane (the sarcolemma). Thus, the increased surface ara that is generated by these folds serves to maximize the number of receptors to which acetylcholine can bind on the membrane.
6. The binding of acetylcholine to its receptors causes ion channels to open, allowing sodium and potassium ions to flood the cell. This causes depolarization, permitting calcium ions to enter the cell. It is the calcium ions that carry out muscle contractions.


PHARMACY INDIA
JOIN US
IF YOU ARE
B.PHARMA
STUDENT
GET IT ON Google Play
Download
PHARMACY INDIA
App from play store
WHATSAPP
TYPE "PINDIA"
& SEND US ON
8006781759 FOR PHARMA UPDATES
WhatsApp
TELEGRAM
SCAN QR CODE
TO JOIN BIGGEST
PHARMA TELEGRAM GROUP
(10000+ STUDENTS)
@PHARMACYINDIA24
Instagram
FOLLOW
PHARMAINDIA24
GET RECENT PHARMA JOBS UPDATES
pharmaindia24
WEBSITE
pharmacyindia.co.in
GET LATEST PHARMA
JOBS UPDATES
Download PHARMACY INDIA Mobile
App From Play Store
GET B. PHARMA NOTES