

Physiology



**ASSIGN
BUSTER**

Muscles of the body are of three types: skeletal, cardiac and the smooth muscle. They are generally classified into two major groups i. e. the striated and non striated. The striated groups are the skeletal and the cardiac muscle while the non-striated is the smooth muscle. The cardiac and the smooth are also classified as the involuntary muscle, while the skeletal muscle is the called voluntary muscle. The term involuntary means these muscles are not under someone's control they contract without someone's approval striated muscle are composed of multinucleated muscle fibre cell with an excitable plasma membrane the sarcolemma.

An individual muscle fibre cell may extend throughout the whole length of the muscle, this contains a bundle of many myofibrils that are arrange in parallel The striated muscle when viewed under the electron microscope revealed an alternating dark and light band. This bands are thus referred to as A and I bands respectively . the centre of the A band is the H zone which appear less dense than the rest of the A band. The sarcomere is the functional and contractile unit of the muscle fibre it is the region between two Z line.

The A band contain mainly myosin protein while the I band which extend into A band but not into H zone and contains actin, troponin and tropomyosin. All these protein interact to bring about contraction of the muscle fibre. In involuntary muscle the contraction is initiated by many impulses like hormones, nerve stimulus and so on. Structurally, it is different from the voluntary muscle, it lack troponin system. It is located in the wall of the visceral organ like lungs, urethra, bladder etc .

Nerve The nerve cell otherwise called neuron are divided into three groups according to the number of processes they possess viz: unipolar, bipolar, multipolar . They vary in size, shape and many other features. A neurone consist of cell body which give off processes, the cell body is also called the soma or perikaryon which consist of a mass of cytoplasm surrounded by a cell membrane with a large central placed nucleus and a prominent nucleolus. Cell body contains most organelles found in typical cells

The cytoplasm shows the present of granular materials which stains intensely with basic dyes, the Nissl body composed of a rough endoplasmic reticulum, this indicate high level of protein synthesis which is needed for maintenance and repair Most neurone give out small branches called dendrite and a long branch called axon, the dendrite terminate near the cell body, they have irregular thickness and the Nissl body extend into them The axon extend for a considerable length, it has a uniform diameter and devoid of Nissl substance.

The dendrite conducts nerve impulse towards the cell body while the axon conducts impulse away from the cell body. The initial segment of the axon is called the axon hillock. The axon is covered by a sheath, the sheath is been provided by the schwann cell in the peripheral nerves while the oligodendrocyte is the cell providing this sheath in the central nerves. The nerve cell that possesses this myelin sheath is called myelinated neuron.

The presence of the sheath is to increase the velocity of conduction and also to reduce the energy expended in the process of conduction. schwann cell provide myelin sheath to a small segment of the neurone and the spaces between each myelin sheath is known as the node of ranvier. The axon

terminate by dividing into numbers of fine branches called telodendrites which end up in small swellings called terminal boutons, these are the ones involved in synapse

Brain is the tissue present in the cranium, it is been protected by the skull. It is the enlarged, convoluted and highly developed rostra part of the central nervous system. It weighs about 1400g in adult. The brain is divisible into forebrain, midbrain and hindbrain. The forebrain is the cerebrum and the diencephalons, the midbrain remain undifferentiated while the hind brains are the cerebellum, the pons and the medulla. The midbrain, the cerebellum, the pons and the medulla are referred to as the brainstem Cerebrum has two hemispheres and in between them is the lateral ventricle that contains choroids plexus which secrete the cerebrospinal fluid. This is the largest part of the brain that conceals most of the part of the brain it is made up of sulcuses, gyri, and lobes.

The diencephalon has four divisions the thalamus, hypothalamus, epithalamus and the subthalamus. The first three can be seen on a hemisected brain but the subthalamus is located deep inside the brain tissue. The cavity of the diencephalons is the third ventricle. The cavity of the mid brain connect the third ventricle to the lateral ventricle and it is called the aqueduct of sylvus The Pons is located anterior to the Cerebellum it has a convex anterior surface from where the trigeminal nerve emerges, the junction between pons and medulla is marked by a groove through which some cranial nerve emerges

The cerebellum lies in the posterior cranial fossa; it has a considerable weight and has a superficial layer of grey matter it is separated from the

cerebrum by the tentorium cerebelli the fourth ventricle; lies between it and the pons The medulla consist of a rostra open part and a caudal closed portion which is continuous with the spinal cord the junction of the medulla and the spinal cord is always described lying at the level at the upper border of the atlas vertebrae.

It is the structure that occupies the vertebral canal in the vertebral column. Its upper end is continuous with that medulla oblongata at the level of first cervical vertebral. Its lower end lies at the level of the lower border of the first lumbar vertebral in adult, the lowest part of the cord is conical and forms the conus medularis which is continuous with the filum terminale. The transverse section of the spinal cord reveals an H-shaped centrally located grey matter, which is divisible into larger ventral mass; the anterior grey column and narrow posterior grey column.

In some part of the body the spinal cord has a lateral projection of grey matter, at the centre of the H shaped grey matter is the central canal which contains the cerebrospinal fluid {CSF} and it is lined by ependymal The remaining part of the spinal cord apart from the H shaped grey mater is called the white matter. The spinal white matter is divided into right and left column. The spinal cord is not of uniform thickness, it is thickened in two places; cervical and lumbar enlargement. the cervical enlargement is from c5 -T1and correspond to the nerves supplying the upper limb i. e. rachial plexus, while the lumbar enlargement is from L2-S3 and supply the lower limb i. e. the lumbosacral plexus

It is the system that is concerned with how the blood is been pumped and the way it get to the body tissue . it consist of artery, veins and the lymph.

The artery is a hollow tissue having three layers: intima, media and adventitia. the artery is lined with the simple squamous epithelium called the endothelium. the largest artery is the aorta which is the first branch of the heart , the wall of the artery is thicker than that of the vein .

The vein has the same structure as the artery except that it is thinner compared to the artery. two largest vein in the body carries blood to the heart , these are the superior and inferior vena cava . the superior vena cava drains blood from the upper trunk while the inferior vena cava drains the lower trunk . The heart is pyramidal in shape with a base, an apex and three surfaces . It is made up of four chambers, two are atria and two are ventricle. the left side of the heart is concerned with oxygenated blood while the right of the heart is concerned with less oxygenation blood.

The heart is covered by a fibrous structure called fibrous pericardial. The contraction of the heart is regulated by nerve, so during exercise, the heart pumps more and during sleep the heart pumps less. The lymphatic system is concerned with the lymph of the body. the lymph provide the medium by which the substance introduced into the body can dissolves. Present in the lymph are macrophages that are involve in the body immune responds. the lymphatic system is associated with the lymph node and the lymph vessels . there are two major lymphatic trunk the body i. e. he right lymphatic duct and the thoracic duct, both empty into the venous angle i. e. the junction where the internal carotid artery and the subclavian artery joins to form the brachiocephalic vein.

It is the system that helps in the delivery of oxygen and getting rid of carbon IV oxide in the body. It is made up of the mouth, nose, trachea, bronchi,

lungs etc. The lungs are the main organ of respiratory system, it is two in number i. e. right and left lung . the right lung is divided into three lobes while the left has just two lobes. The right lung is also bigger than the left lungs.

The lungs has three surfaces and three borders, the surfaces are diaphragmatic, mediastinal, and costal. The root of the lungs is the area where structures enters or leaves the lung and it is located on the mediastinal surface. The borders are inferior, anterior and posterior borders. In the lung, oxygen is taken in while carbon IV oxide is breath out. the haemoglobin present in the red blood cell are the active player in this transport picking up the oxygen and carrying it round the whole body, and then pick up the waste gas back to the lungs for elimination.

The trachea is composed of a C-shaped cartilage and divides into two smaller tube called the bronchi, which also divides to form the bronchial tube, this lead to the sac like alveoli located in the lungs. Inspiration is an active mechanism but expiration normally is a passive mechanism, though can be achieved actively. inspiration involves muscular contraction and the major muscle of inspiration is the diaphragm which contract during inspiration and flattened out to increase the space that are in the lung and relax during expiration which pump out air as it assumes it dome shape position

Urinary system is the system in the body that is concerned with elimination of body waste through the formation of urine from the blood supplied to it. The system is made up of kidneys, ureters, bladder, and urethra. The kidneys are two in the body and are located at the posterior part of the

abdominal cavity, the right kidney is located slightly inferior to its counterpart on the left side due to the position of the liver.

The root of each kidney is located on its medial side; this is where structures like the veins, arteries enter the kidney while the urethra exits the kidney. The hilum of the right kidney is located slightly below the transpyloric plane while the hilum of the left kidney is on the transpyloric plane. The functional unit of the kidney is the nephron, which is the tubule present in the kidney that is responsible for the re-absorption, secretion of substances in the process of urine formation.

The ureter begins at each expanded end in the sinus of the kidney and end in the urinary bladder. The bladder is located behind and superior to the pubic symphysis, it is the place for temporary storage of urine. The urethra carries urine from the filled bladder to the exterior. It is longer in male than in female and it is described relative to some structures. In male it is divisible into prostatic part, membranous part and the penile part. The prostatic part transverses the prostate while the penile part transverses the penis.