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Subject humane anatomy

Q1. Define following:

a. Motor unit:

A motor unit, the functional unit of muscle contraction, is a single motor nerve and the associated muscle fibers that are innervated upon stimulation from the nerve. A collection of motor units is referred to as a motor pool.

b. Ipsilateral:

On the same side, as opposed to contralateral. For example, a tumor involving the right side of the brain may affect vision ipsilaterally'that is, in the right eye.

c. supination.:

rotation of the forearm and hand so that the palm faces forward or upward also : a corresponding movement of the foot and leg in which the foot rolls outward with an

elevated arch. The position resulting from supination.

D. Axial skeleton:

The axial skeleton is the part of the skeleton that consists of the bones of the head and trunk of a vertebrate. In the human skeleton, it consists of 74 bones and is composed of six parts; the skull (22 bones), the ossicles of the middle ear, the hyoid bone, the rib cage, sternum and the vertebral column.

e. Arteriosclerosis:

refers to the buildup of fats, cholesterol and other substances in and on your artery walls (plaque), which can restrict blood flow. The plaque can burst, triggering a blood clot. Although Arteriosclerosis is often considered a heart problem, it can affect arteries anywhere in your body.

F. Shunt:

In medicine, a shunt is a hole or a small passage which moves, or allows movement of, fluid from one part of the body to another. The term may describe either congenital oracquired shunts; and acquired shunts (sometimes referred to as iatrogenic shunts) may be either biological or mechanical.

Q2. Differentiate between types 1 and type 2 muscle fibers.

Ans 2:

The two types of skeletal muscle fibers are slow-twitch (type I) and fast-twitch (type II). Slowtwitch muscle fibers support long distance endurance activities like marathon running, while fast -twitch muscle fibers support quick, powerful movements such as sprinting or weightlifting. SLOW-TWITCH, TYPE I

Slow-twitch muscle fibers have high concentrations of mitochondria and myoglobin. Although they are smaller than the fast-twitch fibers, they are surrounded by more capillaries (1,2). This combination supports aerobic metabolism and fatigue resistance, particularly important for prolonged submaximal (aerobic) exercise activities.

FAST-TWITCH, TYPE II Fast-twitch type II muscle fibers are further divided into Type IIx and Type IIa.

Typically, these have lower concentrations of mitochondria, myoglobin, and capillaries compared to our slow-twitch fibers, which means they are quicker to fatigue

Q3. Classify the bones according to their shape.

Ans:-

The 206 bones that compose the adult skeleton are divided into five categories based on their shapes. Like other structure/function relationships in the body, their shapes and their functions are related such that each categorical shape of bone has a distinct function.

Long Bones

A long bone is one that is cylindrical in shape, being longer than it is wide. Keep in mind, however, that the term describes the shape of a bone, not its size.

Short Bones

A short bone is one that is cube-like in shape, being approximately equal in length, width, and thickness. The only short bones in the human skeleton are in the carpals of the wrists and the tarsals of the ankles. Short bones provide stability and support as well as some limited motion.Flat Bones

The term flat bone is somewhat of a misnomer because, although a flat bone is typically thin, it is also often curved.

Irregular Bones

An irregular bone is one that does not have any easily characterized shape and therefore does not fit any other classification. These bones tend to have more complex shapes, like the vertebrae that support the spinal cord and protect it from compressive forces. Many bones of the face, particularly the jaw bones that contain teeth, are classified as irregular bones.

Sesamoid Bones

A sesamoid bone is a small, round bone that forms in tendons (sesamo- = “sesame” and -oid = “resembling”). Tendons are a dense connective tissue that connect bones to muscles and sesamoid bones form where a great deal of pressure is generated in a joint.

Q4. What is the difference between artery, vein and capillary?

Ans:- Difference between artery vein and capillary

Arteries:- **1.These blood vessels have thick walls and carry blood from the heart to different body parts.**

2. They do not have valves.

3. All the arteries carry oxygenated blood except the pulmonary artery.

Veins:- ***1.*** **These blood vessels have thin walls and carry blood from different body parts to the heart.**

2) They have valves and prevent backflow of blood.

3) All the veins carry deoxygenated blood except the pulmonary vein.

Capillary:- ***1) These blood vessels are narrow and have very thin walls, they connect arteries and veins.***

2) They do not have valves

3) As it connects arteries and veins, therefore, it contains both oxygenated and deoxygenated blood.

Q5. What do you know about the mechanism of skeletal muscle contraction?

Ans:- Muscle contraction occurs when the thin actin and thick myosin filaments slide past each other. It is generally assumed that this process is driven by cross-bridges which extend from the myosin filaments and cyclically interact with the actin filaments as ATP is hydrolysed. Current biochemical studies suggest that the myosin cross-bridge exists in two main conformations. In one conformation, which occurs in the absence of MgATP, the cross-bridge binds very tightly to actin and detaches very slowly. When all the cross-bridges are bound in this way, the muscle is in rigor and extremely resistant to stretch. The second conformation is induced by the binding of MgATP. In this conformation the cross-bridge binds weakly to actin and attaches and detaches so rapidly that it can slip from actin site to actin site, offering very little resistance to stretch. During ATP hydrolysis by isolated actin and myosin in solution, the cross-bridge cycles back and forth between the weak-binding and strong-binding conformations. Assuming a close correlation between the behaviors of isolated proteins in solution and the cross-bridge action in muscle, Eisenberg and Greene have developed a model for cross-bridge action where, in the fixed filament lattice in muscle, the transition from the weak-binding to the strong-binding conformation causes the elastic cross-bridge to become deformed and exert a positive force, while the transition back to the weak-binding conformation upon binding of MgATP, causes deformation which, during fibre shortening, leads to rapid detachment of the cross-bridge and its re-attachment to a new actin site. From the results of in vitro experiments, it was furthermore suggested that relaxation occurs when the transition from the weak-binding to the strong-binding conformation is blocked. Results of recent mechanical and X-ray diffraction experiments on skinned fibre preparations are

consistent with the assumed close correlation between the behaviors of isolated proteins in solution and the behaviour of cross-bridges in muscle. Furthermore, X-ray diffraction experiments allowed to provide experimental evidence for the postulated structural difference between attached weak-binding and attached strong-binding cross-bridges. Finally, recent studies have confirmed the prediction of Eisenberg and Greene that the rate limiting step in vitro determines the rate of force generation in muscle.

Q6. What is the anatomical position of scapula and clavicle in human body?

Ans:- ***the anatomical position of scapula:-***

The scapula, also known as the shoulder blade, is a flat triangular bone located at the back of the trunk and resides over the posterior surface of ribs two to seven. The scapula, along with the clavicle and the manubrium of the sternum, make up the pectoral (shoulder) girdle which connects the upper limb of the appendicular skeleton to the axial skeleton.

The scapula is an important bone as each scapula provides a point of attachment for a number of muscles that make up the arm and shoulder. It also articulates with the humerus and clavicle, forming the glenohumeral (shoulder) joint and acromioclavicular joint respectively. However, because the medial aspect of the scapula is not directly attached to the axial skeleton, but is rather held in place and connected to the thorax and vertebral column by muscles, the scapula can move freely across the posterior thoracic wall (scapulothoracic joint). This allows the arm to move with the scapula, providing a wide range of movement and mobility for the upper limb compared to the lower limb.

- ***The anatomical position of clavicle in human body:***

The clavicle, or collarbone, is a long bone that serves as a strut between the shoulder blade and the sternum (breastbone). There are two clavicles, one on the left and one on the right. The clavicle is the only long bone in the body that lies horizontally. Together with the shoulder blade, it makes up the shoulder girdle. It is a touchable bone, and in people who have less fat in this region, the location of the bone is clearly visible, as it creates

a bulge in the skin. It receives its name from the Latin clavicula. because the bone rotates along its axis like a key when the shoulder is abducted. The clavicle is the most commonly fractured bone. It can easily be fractured due to impacts to the shoulder from the force of falling on outstretched arms or by a direct hit.