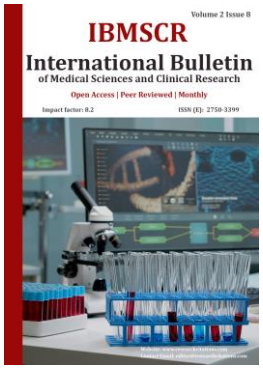

FUNCTIONAL ACTIVITY OF THE MUSCULAR SYSTEM

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Annotation: Through this article, we will try to explain to you the function of the muscular system. The purpose of studying the physiology of these muscles is to hopefully gather more information about their function. This will help you make the correct diagnosis in the future.
Key words: Troponin, tropomyosin, anisatrope, isotropic, sarcomere, actin Introduction: Skeletal muscle is the main part of the locomotor apparatus in humans, and skeletal muscles perform the following functions: 1. It ensures that the human body is kept in a certain position. 2. Participates in the movement of the body in space. 3. It ensures that some members of the body move relative to each other. 4. Muscles serve as a source of energy.

The main part: the movement of the human body in space, the eye

Two main types of muscles are of great importance in carrying out movement, blood vessels and heart activity, and digestive tract activity. These are smooth and transverse muscles (skeletal and cardiac transverse muscles). Skeletal muscles. Classification of skeletal muscle fibers. Skeletal muscle in vertebrates, including humans, is composed of several types of muscle fibers that differ in their structure and functionality. Currently, 4 types of fibers are distinguished: 1. Slow cyclic oxidizing type of muscle fiber: These fibers are very rich in myoglobin protein, which has the property of binding O2 (close to hemoglobin according to its properties). If the muscle consists mainly of such fibers, it looks red due to its dark red color, and such muscles are also called red muscles. These muscles are important in maintaining the posture of humans and animals. Fatigue of such muscle fibers occurs slowly, because these fibers are very rich in myoglobin and mitochondria. Recovery after fatigue also occurs quickly. 2. Muscle fiber of fast periodic oxidation type. Muscles composed of such fibers have the characteristic of rapid contraction, and fatigue is hardly noticeable for a long time. This situation is explained as follows: firstly, there is a large number of mitochondria in the fibers, and secondly, it is due to the formation of a large amount of ATF by oxidation and phosphorylation.

The main function of such fibers is participation in the emergence of fast and powerful movements. 3. Muscle fiber of fast periodic glycolytic oxidation type. A characteristic feature of such fibers is that ATF in them is formed due to glycolysis. It captures less mitochondria than other fibers. Muscles composed of this type of fiber contract quickly and strongly, but tire quickly. Such fibers do not contain myoglobin, therefore, such fibers are pale in color, therefore, such muscles are also called white muscles. 4. Tonic fibers. The difference from the fibers shown above is that in tonic fibers, the motor axon forms many synaptic connections. Fibers contract slowly because the activity of myosin ATF is very low. The relaxation of the fiber is also slow. This type of muscle fiber works best in isometrics. 1. Excitability is the property of responding to given influences with changes in ion permeability and membrane potential. Under natural conditions, the acetylcholine mediator released from the motoneuron

into the synaptic cleft is considered to be an effector. In laboratory conditions, electric current is often used as an effector. When exposed to electricity, first the nerve fibers are excited, and the nerve endings release the mediator acetylcholine, in this case, muscle-mediated action is observed. It can be seen that the nerve is excitable in relation to the muscle. 2. Conduction is the transfer of the action potential along the muscle fiber. 3. Contractility - when a muscle is stimulated, it is understood as its shortening or tightening. The functional unit of the contractile apparatus of a muscle cell is the sarcomere. Sarcomeres are separated from each other by Z-plates. The sarcomeres are arranged in series in the myofibril, so the overall contraction of the sarcomeres leads to the contraction of the myofibrils and the overall contraction of the muscle fibers. Myofibrils of a muscle fiber with a diameter of 1 μm and a diameter of 6-8 nm are composed of 2500 protofibrils on average. Protofibrils are composed of actin and myosin proteins. Myosin filaments are twice as thick as actin filaments. When the muscle fiber is at rest, the fibers in the myofibrils are arranged in such a way that the ends of the thin long actin filaments fit into the clefts between the thicker myosin filaments. The tropomyosin protein molecule is located in the longitudinal groove of the actin helix. Another protein troponin is attached to tropomyosin every 40 nm. Troponin and tropomyosin play an important role in the communication between actin and myosin. Discs that refract light twice look dark under an ordinary microscope. These are called anisotropic discs. The parts of the fiber adjacent to these discs refract light on the same surface, appear clear under the microscope, and are called isotropic discs. Anisotropic disks are denoted by the letter A, and isotropic disks by the letter I. In the middle of the anisotropic disc, we see a light border marked with the letter N. In the electron microscope, we see that the M-line passes through the middle of the N frame. This M-line forms a membrane to which myosin filaments attach. A dark Z-line-thin membrane passes through the center of the isotropic disk, and myofibrils attach to this membrane. If the area of the Z plate is electrically affected by microelectrodes, sarcomere contraction is observed. In this case, the disk area A does not change, but the areas N and I are reduced. It can be seen that the length of the myosin filament does not change during contraction. A similar situation is observed when the muscle is stretched, that is, the length of actin and myosin filaments does not change. Thus, sequential processes that lead to the contraction and relaxation of the muscle fiber can be described as follows: exposure - action potential - its transfer across the cell membrane and into the muscle fiber - release of Ca+2 from the side cisternae of the sarcoplasmic reticulum and towards the myofibrils diffusion - movement of actin and myosin protein threads "sliding" to each other - activation of calcium pumps - decrease in the concentration of free Sa+2 ions in the sarcoplasm - relaxation of myofibrils.

Conclusion: In short, the movement system of the muscles provides partial movement of all skeletal muscles, heart, blood vessels and other organs. Muscles serve as a set of all human movements. In short, the plasticity of smooth muscles ensures normal functioning of internal organs.

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