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Histomarphology of the Muscle Tissue System (Literature Analysis)

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Abstract: Muscle tissue consists of cells specialized for contraction. Muscles are divided into three types according to their structure and function: skeletal muscle cells, cardiac muscle cells, and smooth muscle cells. Skeletal and cardiac muscle cells are called striated muscle cells because they display alternating rows of striations. In all types of muscles, contraction occurs as a result of the movement of myosin and actin enzymes. Nuclei of muscle cell and muscle fiber are synonymous. Knowing this, we will analyze the literature together.

Keywords: Smooth muscle, transverse muscle, cardiac muscle. Myofilament, myoprotofibril, myofibril, actin, myosin. Smooth myocyte

Enter. Muscle tissues are specialized for contraction, and their cells or fibers are characterized by the presence of special threads (myofilaments, myoprotofibrils). These filaments consist of molecules of actin and myosin proteins, which have a fibrous structure. More complex contractile structures - myofibrils - are formed from these threads**.**

There are smooth and transverse muscles in the body of animals. Cross-extensive muscles are divided into skeletal and cardiac muscles, and cardiac muscle, in turn, is divided into working (contracting) and conducting muscle fibers. Also, during embryonic development, smooth muscles develop from mesenchyme, transverse muscles from myotomes of the mesoderm, and heart muscle from the myoepicardial plate formed from the splanchnotome.

Smooth muscle tissue is also called visceral muscle, depending on where it meets in the body. This tissue is found in the walls of blood vessels and internal organs. The structural element of smooth muscle is a myocyte with a spindle-shaped shape (Fig. 1). The length of the cell is 20-500 μm, with a cross-section not exceeding 10 μm. The rod-like nucleus is located in the expanded middle part of the cell, and chromatin in the form of 1-2 nuclei and small granules is visible. Mitochondria and plate-like complexes are gathered around the poles of the nucleus.

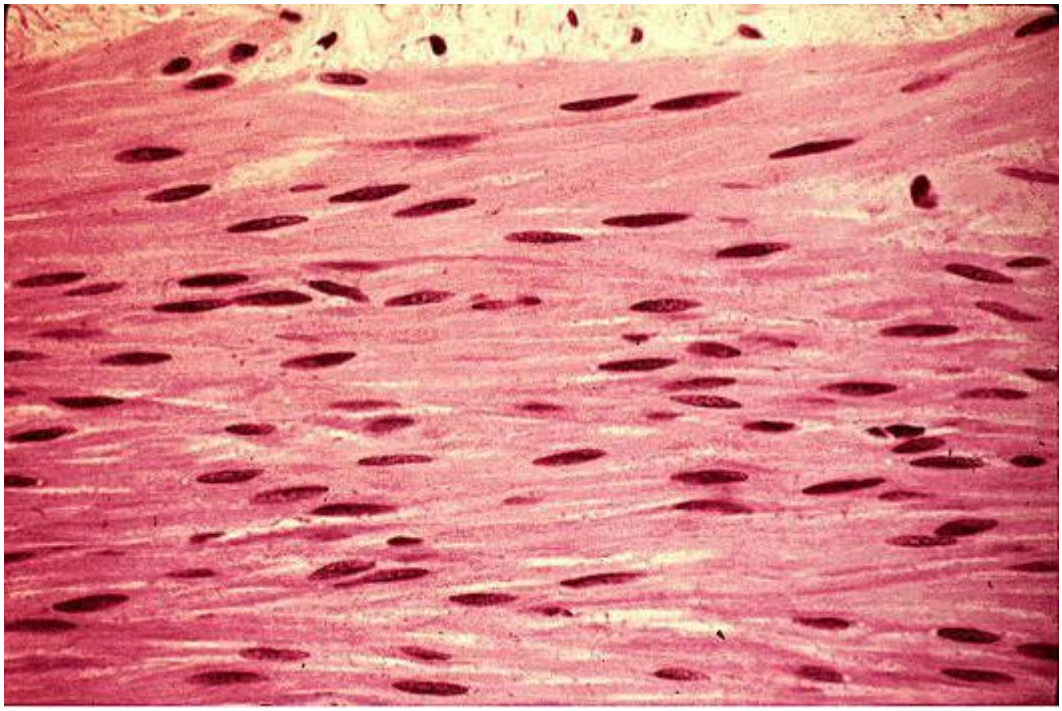

Figure 1. histological structure of smooth muscle tissue.

In the cytoplasm, there are many myofilaments located along the length of the cell, which gives the cytoplasm a linearity. They have a smooth contour and do not have any signs of transverse linearity. The phrase "smooth muscle" is used accordingly. Myosin (thickness 17 nm), actin (7 nm) and intermediate (10 nm) myofilaments are distinguished. Myofilaments do not aggregate into real myofibrils in a smooth muscle cell. Amitotic division of myocytes is more common, as well as their mitotic pathway There is also information about division by li.

Transverse muscle tissue. The structural unit of striated muscle tissue is the muscle fiber (Fig. 2), which has a transverse linearity that can be seen even with the help of a small objective of a microscope.

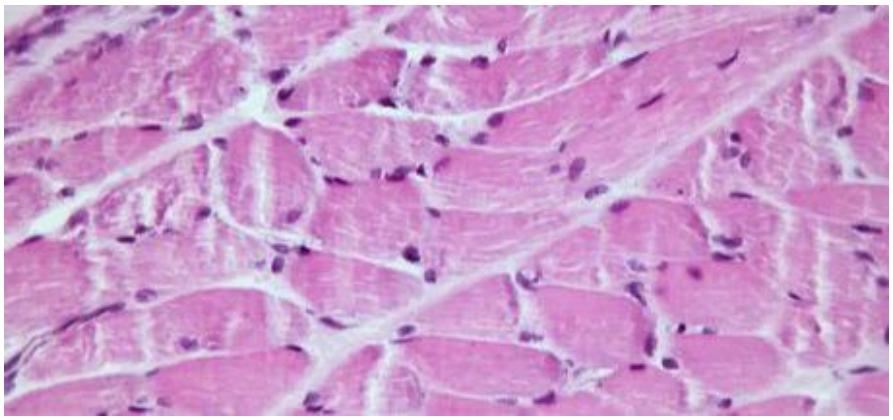

Fig. 2. Histological structure of transverse muscle tissue.

Muscle fibers are symplastic in structure. The diameter of the fiber is up to 100 μm, and the length can reach 12.5 cm. The shape of myosymplast is similar to a cylinder with a rounded tip.

It is a collection of many cells with a special, complex structure, which are united to perform a common task. The fiber has a shell - sarcolemma (sarcos - meat, muscle), cytoplasm (sarcoplasm), organelles and many cores. Also, the sarcoplasm stores the contractile filaments that aggregate into myofibrils.

When the sarcolemma is examined using an electron microscope, it is seen that it consists of two layers, and there is a space between the layers with a width of 14-24 nm. The inner sheet is the

plasmolemma of the myosymplast, and the outer sheet is the basement membrane. Here, too, argyrophilic fibers are attached to the basal membrane. The main feature of the inner sheet of the sarcolemma is the ability to distribute the impulse to the entire fiber. This sheet crosses the fiber in the form of T-tubes (transverse) and attaches to the plasmolemma of the opposite side. The spacing of adjacent T-tubes is equal to each other. Such a system of tubes is distributed throughout the sarcoplasm and ensures rapid propagation of the impulse throughout the fiber. The ends of the muscle fibers go to the tendons. In these places, the fiber forms finger-like bumps that penetrate into the tendon. Connective tissue fibers (argyrophilic fibrils) attached to the sarcolemma surrounding the muscle fiber contribute to a strong connection with the tendon. The thin layers of soft connective tissue surrounding the muscle fibers are called endomysium. Its fibers attach to the sarcolemma. The bundles (bundles) of muscle fibers are surrounded by a perimysium of the same tissue. The connective tissue that wraps the whole muscle from the outside is called epimysium. Blood and lymph vessels and capillaries enter the muscle through this connective tissue. Afferent (sensing) and efferent (motor) nerve fibers go to the muscle fibers. In the cytoplasm, there are many myofilaments located along the length of the cell, which gives the cytoplasm a linearity. They have a smooth contour and do not have any signs of transverse linearity. The phrase "smooth muscle" is used accordingly. Myosin (thickness 17 nm), actin (7 nm) and intermediate (10 nm) myofilaments are distinguished. Myofilaments do not aggregate into real myofibrils in a smooth muscle cell. Amitotic division of myocytes is more common, as well as their mitotic path There is also information about how it can be divided by li.

Cross-striated muscle tissue. The structural unit of the transverse-striated muscle tissue is the muscle fiber (Fig. 2), which is also visible with the help of small lenses of the microscope. has linearity. Muscle fibers are symplastic in structure. The diameter of the fiber is up to 100 μm, and the length can reach 12.5 cm. The shape of myosymplast is similar to a cylinder with a rounded tip. It is a collection of many cells with a special, complex structure united to perform a common task. The fiber has a shell - sarcolemma (sarcos - meat, muscle), cytoplasm (sarcoplasm), organelles and many cores. Also, the sarcoplasm stores the contractile filaments that aggregate into myofibrils.

When the sarcolemma is examined using an electron microscope, it is seen that it consists of two layers, and there is a space between the layers with a width of 14-24 nm. The inner sheet is the plasmolemma of the myosymplast, and the outer sheet is the basement membrane. Here, too, argyrophilic fibers are attached to the basal membrane. The main feature of the inner sheet of the sarcolemma is the ability to spread the impulse throughout the fiber. This sheet crosses the fiber in the form of T-tubes (transverse) and attaches to the plasmolemma of the opposite side. The spacing of adjacent T-tubes is equal to each other. Such a system of tubes is spread over the entire sarcoplasm and ensures rapid propagation of the excitation throughout the fiber. The ends of the muscle fibers go to the tendons. In these places, the fiber forms finger-like bumps that penetrate into the tendon. Connective tissue fibers (argyrophilic fibrils) attached to the sarcolemma surrounding the muscle fiber contribute to a strong connection with the tendon. The thin layers of soft connective tissue surrounding the muscle fibers are called endomysium. Its fibers attach to the sarcolemma. The bundles (bundles) of muscle fibers are surrounded by a perimysium of the same tissue. The connective tissue that surrounds the whole muscle from the outside is called epimysium. Blood and lymph vessels and capillaries enter the muscle through this connective tissue. Afferent (sensing) and efferent (motor) nerve fibers go to the muscle fibers.

Hisori raw material of the quadriceps muscle of the sheep protein content at the 3- and 18-month stages of postnatal ontogenesis acceleration compared to other ages, i.e. adequate and inadequate respectively, in 3 days - 78.16±0.94%; 76.56±0.5% if there is, in 3 months - 80.42±0.9%; 79.83±0.98%, at 18 months - 84.29±0.89%; It was noted that it reached 479.4±6.72 μm2

The conclusion. The histomorphological structure of the muscle tissue system was studied on the basis of literature analysis. Muscle tissue consists of cells specialized for contraction. Muscle tissue is divided into three types according to its structure and function:

Skeletal muscle cells - linear, voluntary control.

Cardiac muscle cells - linear, involuntary control.

Smooth muscle cells - unstriated, are divided into muscles that have voluntary control.

Skeletal and cardiac muscle cells are called striated because they show alternating rows of striations.

In all types of muscle tissue, contraction occurs as a result of the movement of myosin enzymes along actin enzymes.

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