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POSTNATAL MORPHOGENESIS OF HISTOLOGICAL INDICATORS OF THE QUADRICE MUSCLE OF HISORI BREED SHEEP

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Abstract: Some histological indicators of the quadriceps muscle of the hind leg at different physiological stages of postnatal ontogenesis of Hisori sheep were studied, and the diameter of the muscle fiber gradually increased from the first 3 days of postnatal ontogenesis to 60 months, regardless of their living conditions, and the highest indicator was observed at 60 months. It was determined that the absolute index of the muscle fiber area increases slightly during the physiological adult stage of postnatal development of animals, that is, up to 18 months, and continues this process without significant changes in the next 36 and 60 months. While the absolute parameters of muscle fiber diameter and area increase periodically from 3 days to 60 months of postnatal ontogeny, they were found to be higher in animals with adequate conditions compared to those with inadequate conditions.

Key words: Hisori sheep, postnatal ontogeny, adequate conditions, inadequate conditions, hind leg, muscle, growth coefficient, absolute index, muscle fiber diameter, muscle fiber area.

Enter: In addition to the histological indicators of the fibers forming muscle tissue depending on their anatomo-topographical location and the range of movement, they are also affected by the natural living conditions of organisms and features of the geographical relief. Also, the main part of the meat products consumed by humans is made up of cross-sectional muscle tissues, and their quality and quantity depend primarily on the age of animals and natural living conditions, and therefore, together with the morphological composition, the dynamics of the development of histological structures at different physiological stages of postnatal ontogenesis. studying its laws is also of great scientific and practical importance.

As a result of research, it was found that the highest average daily growth of female and male lambs corresponds to the first and second months of their life. According to the author's conclusion, average daily growth decreases with age of both groups of lambs. Average daily growth in male lambs decreased by 40% and by 35.3% in female lambs during pasture feeding period, i.e. 4-8 months. The average increase in the live weight of male lambs from 8 to 12 months of age was observed to be 40%, and in females, it decreased by 2.5 times [5].

In order to accurately assess the meat productivity of animals, the histostructure of the long shoulder muscle of sheep was studied not only the morphology of the muscle fibers, but also their connective tissue layers [6]. The authors found that in the postnatal ontogeny of the West-Siberian meat sheep, the long muscle tissue of the shoulder is composed of well-differentiated and closely spaced demarcated muscle fibers. Muscle fibers are more triangular and rectangular in cross-section. In the longitudinal section, the muscle fibers are undulating, forming a contraction knot and showing a clear longitudinal line, and a layer of connective tissue is visible between the fibers. The oval core is located along the edges (periphery) of the muscle fiber.

Specific morphological features of the histostructure of sheep, dog, rabbit and cat muscle tissue were studied, and it was proved in histological studies that there are several common features in the

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microstructure [2]. That is, the muscle tissue is made up of the first, second and third rows of multifaceted muscle fibers, which are round, oval and have the function of a skeleton.

Insulin-like growth factor 1, a key factor in fibroblast growth, and nerve growth factor are potent stimulators of proliferation and adhesion of myoblasts in vitro [9].

Skeletal muscle tissue includes epimesium, perimesium, and endomesium, which consists of dense connective tissue along with muscle fibers. Connective tissue consists of fibers that hold the main substance without shape. The composition, structure and mechanical properties of the extracellular fluid determine the effectiveness of regeneration. The continuous change of the fluid is very important in the functional recovery of the tissue [10].

The extracellular fluid is composed of many components. Some of them are composed of structural proteins such as collagens and elastins, which form fibrillar and mesh-like structures. Adhesive proteins such as fibronectin, laminin, and fibulin attach structural proteins to transmembrane proteins on the cell surface. The cast forms a three-dimensional framework through which the cell is interconnected with the entire surface [11, 12, 13].

In embryonic histogenesis, the formation of leiomyocytes occurs with the general fibroblast of the mesenchymal brush as a result of divergent specialization [7, 8]. According to the authors, leiomyocytes undergo promyoblast, myoblast, dedifferentiating, and specialized myocyte stages.

The laws of the formation of the muscles of sheep belonging to different breeds and the factors affecting these processes have been studied, and in the studies, the muscles forming the body of the animal have certain differences in their internal structure according to their location and function [4]. According to the authors, the morphofunctional classification of muscles is based on a number of structural and biochemical parameters, i.e. tissue ratio, muscle fiber diameter, amino acid content. It was found that the live weight of sheep at different stages of postnatal ontogenesis differs between breeds, that is, the weight of 4-month-old Romanov lambs is lower by 32.4 and 26.6%, respectively, compared to that of Kuibyshev and Texel breeds .

It is emphasized that the balance between proliferation, differentiation and fusion during myogenesis should not be disturbed for the correct formation of the finished structure of the muscle [14].

According to the authors, the regeneration of muscle fibers after injury occurs at the expense of myostellitocytes. The division process of myosatellitocytes takes place in an asymmetric type. Activation of myosatellitocytes is characterized by ultrastructural changes. In such cells, the nucleus is bright, one- or two-nucleus, mainly contains euchromatin, the size and diameter of the cytoplasm has increased, a slightly developed endoplasmic reticulum is noted in it, the number of mitochondria and ribosomes has increased. These cells are type II myosatellite cells [1, 3].

Inspection method and materials. The research work was carried out on the muscles affecting the hind leg joints of the adequate - Boysun district, "Boysun terakli" farm and inadequate - Sariosiyo district, "Surkhan hisar koylari" farm, Uzun district "D Ro'zibadal Shokhrukh" farm. . Quadriceps muscles of hind legs of animals at 3 days, 3, 6, 12, 18, 36, 60 months of postnatal ontogeny were taken for scientific tests.

A 0.5 x 0.5 x 0.2 cm section of Sonnig's quadriceps muscle was removed, fixed in neutral formalin, dehydrated in alcohol, concentrated in ether, and frozen in block. Histological sections were performed on HM 304E Semi-automated microtome. The histological preparation was stained

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with hematoxylin and eosin, and the dimensions were taken on a MB 200 microscope (objective 20x10 eyepiece and objective 40x10 eyepiece).

All numerical data obtained as a result of scientific investigations were subjected to mathematical processing according to the method of E.K. Merkureva.

To determine the dynamics of changes in the diameter and area of muscle fibers depending on age, the growth coefficient was determined using the formula developed by K.B. Svechin.

Mathematical-statistical analysis was performed using Student's and Fisher's criteria in Microsoft Excel computer spreadsheet.

The obtained results and its discussion. As a result of scientific investigations, it was observed that the histological dimensions of the quadriceps muscles of the hind legs of Hisori sheep, which were kept in adequate and inadequate natural conditions, show specific dynamics of change according to the anatomo-topographical state, the scope of the task performed, and the natural living conditions of the animals at various physiological stages of postnatal development.

The absolute index of the diameter of the quadriceps muscle fibers of the Hisori sheep reared in adequate natural conditions increased rapidly from 3 days to 3 months of postnatal ontogeny, from 6.43 ± 0.24 μm to 12.92 ± 0.88 μm (K = 2.0 ; r < 0.04) was observed. This size of the muscle increases almost uniformly in the studied later stages of postnatal development, i.e. at 6 months - to 17.16 ± 0.65 μm (K = 1.32; r < 0.04), at 12 months - to 19.9 ± 0, to 53 μm (K = 1.15), at 18 months – to 23.74 ± 0.2 μm (K = 1.19; r < 0.01), at 36 months – to 25.5 ± 0.6 μm (K = 1.04), and at 60 months it reached 28.38 ± 0.88 μm (K = 1.11; r < 0.04). It was found that the growth coefficient of the absolute index of the muscle diameter increases up to 4.41 times during the studied stages of postnatal development of sheep.

The absolute index of the diameter of the muscle fiber from the first 3 days to 3 months of postnatal ontogeny of sheep under inadequate natural conditions was from 6.28 ± 0.1 μm to 11.98 ± 0.44 μm, or its growth coefficient increased up to 1.9 times. to continue the state (18.08 ± 0.45; K = 1.5; r < 0.02) at 12 months almost unchanged (18.2 ± 0.35 μm), and in the next stages to undergo this process step by step, i.e. at 18 months to 21.58 ± 0.36 μm (K = 1.18; r < 0.02) at 36 months to 23.8 ± 0.37 μm (K = 1.1; r < 0.02) at 60 months It was noted to be equal to 26.16 ± 0.88 μm (K = 1.09; r < 0.03). It was observed that the coefficient of growth of this index of muscle fiber is 4.16 times during the period from 3 days to 60 months of postnatal ontogeny.

It was noted that the diameter of quadriceps muscle fibers of the Hisori breed sheep and the absolute parameters of the fiber area increased in both areas during the period from the first day of postnatal ontogeny to the 60th month, but this indicator was higher in those with adequate conditions compared to those with inadequate conditions.

The absolute index of the Sonnig quadriceps muscle fiber area in the first 3 days of postnatal ontogeny of Hisori sheep, which was maintained in adequate conditions, is 203.6 ± 2.55 μm2, and it increases slightly until the 18th month of development, that is, at 3 months, it is 224.16 ± 3, to 22 μm2 (K = 1.1; p < 0.02), at 6 months to 250.52 ± 4.23 μm2 (K = 1.11), at 12 months to 299.44 ± 4.15 μm2 (K = 1 .19; p < 0.02), reaches 379.9 ± 5.58 μm2 at 18 months (K = 1.15; p < 0.02) and increases almost uniformly in the next 36 and 60 months (respectively : 411.42 ± 5.37 μm2, K = 1.09; 479.4 ± 6.72 μm2, K = 1.16, r < 0.02). It was noted that the growth coefficient of the muscle fiber area index reached 2.35 times during the studied period of postnatal ontogeny.

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The absolute index of this muscle fiber area from 204.56 ± 2.52 μm2 to 230.4 ± 4.05 μm2 from 3 days to 3 months of postnatal ontogeny of Khysori sheep under inadequate natural conditions, or its growth coefficient increased up to 1.12 times during this period. increase this indicator to 260.04 ± 3.18 μm2 (K = 1.12; r < 0.02) at 6 months, to 302.48 ± 3.88 μm2 at 12 months (K = 1.16; r < 0.02) up to 373.8 ± 4.58 μm2 (K = 1.23) at 18 months of age. This indicator of the muscle shows 407.8 ± 5.35 μm2 (K = 1.09) in the next 36 months of postnatal development, and at 60 months it shows the highest level compared to the lower ages (469.2 ± 6.31 μm2, K = 1, 15; r < 0.02), the growth coefficient was found to be 2.29 times during the studied period from 3 days to 60 months.

Therefore, the absolute size of the muscle fiber area shows a unique picture at different physiological stages of postnatal development of animals, and it is observed that this indicator increases somewhat rapidly, especially during the period up to 18 months of age.

Conclusions:

- the diameter of the quadriceps muscle fiber of the rear leg of Hisori sheep from the first 3 days of postnatal ontogeny studied to 60 months increases gradually, regardless of their living conditions, and the highest value was observed at 60 months;

- it was found that the absolute indicator of the quadriceps muscle fiber area of Hisori breed sheep increases somewhat rapidly during the physiological adult stage of postnatal development of animals, that is, up to 18 months of age, and continues this process without significant changes in the next 36 and 60 months of age;

- while the absolute parameters of the diameter and area of the quadriceps muscle fibers of Hisori breed sheep periodically increase from 3 days to 60 months of postnatal ontogeny, they are found to be higher in animals with adequate conditions compared to those with inadequate conditions.

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