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MICROANATOMICAL STRUCTURE OF THE STOMACH WALL OF RATS OF THE EXPERIMENTAL GROUP UNDER THE ACTION OF KOTORAN

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Abstract:
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About: FARS Publishers has been established with the aim of spreading quality scientific information to the research community throughout the universe. Open Access process eliminates the barriers associated with the older publication models, thus matching up with the rapidity of the twenty-first century.

Introduction. The need for a morphological study of the structure of the stomach wall is dictated by the fact that the end of the 20th century is characterized by a sharp increase in the number of diseases of the stomach. In the USA in 1997, 140,000 patients with gastric bleeding L. Laine (2002) were hospitalized. In Russia in 1999, 64,000 patients with gastrointestinal bleeding were hospitalized, which is almost 2.2 times more than in 1990 (statistical materials of the Ministry of Health. RF. 2000). All this, according to the researchers, is a consequence of an increase in the severity of the course of peptic ulcer of the stomach and 12 duodenal ulcer (K.V. Puchkov et al., 2000; G.B. Cadiere, 1999). Changes in the symptoms and clinic of stomach diseases lead to changes in the ecological and climatogeographic conditions of the environment (V.A. Karpin et al., 2001; B.A. Abdullaev, 2003).

The purpose of the research is me. Fromthe study of the age features of mikroanatomical structure of the wall of the stomach of the rat

Materials and methods. The study was conducted on 150 rats, a newborn, 6, 11, 16, 36, 41, 46 and 52 days of age. All animals were kept in the same vivarium conditions.

Mothers (female rats) of both control and experimental groups received the same daily diet.

In order to determine which period in early postnatal ontogenesis is the most sensitive to the action of harmful environmental factors, the following series of experiments were put: 1) from 1-6 days of life; 2) from 6 to 11 days of development; 3) from 11 to 16 days; 4) from 16 to 22 days. Slaughter was performed 30 days after the end of each series of the experiment.

Results. In 36 day-old rats, a multilayered keratinizing epithelium consisting of three rows of cells is detected in the mucous membrane of the esophageal region. In the basal row, small cells of oval and rounded shape are found, they fit snugly together. There are areas of the epithelial cover, where the cells of the basal layer overlap each other, forming two rows. The upper and middle rows are represented by larger oval-shaped cells. These cells in the epithelium lie loosely, at different depths. In many cells adjacent to the outerboundaries of the epithelial cover, there are no secretory granules (Fig. 19).

In the mucous membrane at the border of the esophageal and intestinal section there is a border fold, on it, depending on the department, the differentepithelium is represented. On the side facing the esophageal region there are folds of the mucous membrane covered with a multilayer keratinizing epithelium. On the surface of the fold directed to the intestinal section, cells are detected single-layered prismatic epithelium. The epithelial cover of the mucous membrane has a different thickness. In the esophageal region, it is 3 times larger than in the muscular (Table 15).

The glandular apparatus of the gastric mucosa is represented by simple tubular unbranched glands of large and small curvature, as well as the pyloric canal. Glands located on the large curvature of the stomach, in comparison with glands on a small curvature, have a greater extent of location. The height of the glands on the large curvature of the stomach ranges from 548.1 to 629.3 μm, on a small curvature their height is less and ranges from 324.9 to 446.6 μm. In the pyloric canal, the height of the glands varies from 284.2 to 345.1 μm. The size of the diameter of the glands of the stomach is not the same throughout its wall. At large curvature, it varies from 32.8 to 41 μm, at low curvature the diameter of the glands ranges from 28.7 to 36.9 μm, in the pyloric channel it is 24.6 - 32.8 μm. The width of the isthmus of the glands along the wall of the organ varies from 16.4 to 20.5 μm. The density of the glands on the large curvature is from 7 to 9, on the small curvature and in the pyloric canal from 7 to 10.

Table 15. Thickness of the membranes of the stomach wall of 36 day-old pups of the experimental group under the action of kotoran μm

$\overline{X} \pm \overline{x} \div$

Structural components of the wall	Esophageal Department	Intestinal department
Thickness of the stomach wall	243,6-406,0* 312,6±12,5±	263,9-406,0* 334,9±10,9±
Muscular membrane	114,8-155,8* 128,7±3,2±	32,8-123,0* 69,7±6,9±
Circular muscle layer	16,4-41,0* 28,7±1,9±	8,2-65,6* 26,3±4,4±

Longitudinal muscular layer	82-131,2* 99,2±3,8±	24,6-73,8* 41,3±3,7±
Mucosa	90,2-147,6 118,1±4,3±	147,6-229,6* 184,5±6,3±
Submucosal base	32,8-57,4* 45,9±1,8±	8,2-24,6* 13,9±1,2±
Epithelial integument	24,6-41,0 32,8±1,2±	8,2-16,4 10,0±0,6±

* - Significant difference in relation to the control group

Bundles of collagen fibers in their own plate of the mucous membrane have a different density of location in the parts of the organ. In the esophageal region, they are oriented longitudinally and fit snugly to each other, especially between the folds of the mucous membrane. In the intestinal department, bundles of collagen fibers pass from the esophageal department without changing their direction, but lie more loosely. Bundles of collagen fibers adjacent to the bottom of the glands change their direction and penetrate between, separating them from each other. The thickness of the bundles of collagen fibers throughout the esophageal and intestinal sections varies slightly from 4.1 to 8.2 μm. Bundles of elastic fibers in the mucous membrane's own plate lie loosely compared to bundles of collagen fibers. In the esophageal region, the bundles of elastic fibers are oriented mainly longitudinally, occasionally between the folds of the mucous membrane they intersect with each other. In the intestinal section, the bundles of elastic fibers are also longitudinally oriented, the bundles locating at the bottom of the glands change their direction towards the lumen of the organ and penetrate between the glands, separating them from each other. The thickness of the bundles of elastic fibers in the mucous membrane's own plate varies slightly in the organ parts from 4.1 to 8.2 μm. Reticular fibers in their own mucosal plate have different directions. In the esophageal region, they are oriented longitudinally. In the intestinal region, reticular fibers form a fine-looped network, fibers lying at the bottom of the glands, change their direction and penetrate between them, separating them from each other. Under its own plate of the mucous membrane lies its muscular plate. It consists of 1-2 rows of smooth muscle cells. The thickness of the mucous membrane increases in the direction from the esophageal to the intestinal region (Table 15). The submucosal base of the stomach of rats is formed by loose connective tissue. Bundles of collagen fibers in the submucosal base, depending on the department, differ in different density of location. In the esophageal region, bundles of collagen fibers lie densely and are oriented longitudinally (Fig. 20).

In the folds of the mucous membrane, bundles of collagen fibers form a network, the loops of which are larger at the base of the fold. Around the vessels of the submucosal base, bundles of collagen fibers are located in a circular direction, tightly adjacent to their walls. In the intestinal section, bundles of collagen fibers lie loosely compared to the esophageal region and are directed longitudinally. The thickness of the bundles of collagen fibers in the submucosal base decreases in the direction from the esophageal region - 20.5 μm to the intestinal - 8.2 μm. Bundles of elastic fibers in the submucosal base are located more densely than bundles of collagen fibers. In the esophageal region, the bundles of elastic fibers are oriented longitudinally. In the folds of the mucous membrane, bundles of elastic fibers form a network, the loops of which are smaller than in the network formed by bundles of collagen fibers. In the intestinal section, the bundles of elastic fibers lying at the mucous membrane's own plate are distributed more loosely than the fiber bundles adjacent to the muscular membrane, and they have a longitudinal direction. The thickness of the bundles of elastic fibers in the submucosal base ranges from 4.1 to 8.2 μm. Around the vessels of the submucosal base, bundles of elastic fibers are located in a circular direction, tightly adjacent to their walls. Reticular fibers in the submucosal base of the esophageal region form a network with small loops in shape. In the intestinal region, the reticular fibers located at the mucous membrane's own plate lie in the longitudinal direction, and the fibers adjacent to the muscular membrane form a network with small loops. The thickness of the submucosal base in the esophageal region is 3 times greater than in the intestinal region (Table 15).

The muscular membrane of the stomach of rats consists of two layers. The inner layer is represented by bundles of myocytes with a longitudinal direction. The outer layer is formed by circularly arranged muscle fibers. At the confluence of the esophagus into the stomach, bundles of myocytes of the longitudinal layer lie transversely, in relation to the wall of the organ. The shape of the myocyte bundles is elongated-oval. In the intestinal section, the location of the bundles of myocytes of the longitudinal layer does not change, but they are more tightly adjacent to each other than in the esophageal region. The thickness of the longitudinal muscular layer is on average 2 times greater in the esophageal region than in the intestinal region (Table 15). Throughout the wall of the stomach, there is an unequal thickness of the circular muscular layer, it is more pronounced in the esophageal region, less in the intestinal region (Table 15). Layers in the muscular membrane and bundles of myocytes in them are separated from each other by layers of connective tissue. The thickness of the muscular membrane is about 2 times greater in the esophageal region than in the intestinal region (Table 15). The outer shell of the organ is serous and consists of a thin connective tissue layer covered with mesothelium. Bundles of collagen, elastic fibers and reticular fibers in the outer shell are oriented in the longitudinal direction. The thickness of the bundles of connective tissue in the outer shell varies from4.1 to 6.2 μm. The thickness of the outer shell ranges from 4.1 to 8.2 μm.

The vascular system of the stomach wall of rats is represented by the vessels of the mucosa, muscular and outer membranes. In the submucosal base of the mucous membrane, arterioles, capillaries and venules are detected. The wall of the arterioles consists of three membranes. The inner shell is formed by endothelial cells of an elongated oval shape, they are located at different distances from each other. The middle muscular membrane is formed by one row of smooth muscle cells that have circular and helical directions. Between the inner and middle shells is a smoothed inner elastic membrane. The outer shell is formed by loose fibrous connective tissue, it distinguishes adventitial cells. The wall of the capillaries consists of one row of endothelial cells. They are elongated oval in shape and lie at different distances from each other. The wall of the venules, as well as in the capillaries, is represented by one endothelial membrane. In the wall of the venules, unlike capillaries, endothelial cells are spindle-shaped and are located at a greater distance from each other. Arterioles lie more often at the base of the folds of the mucous membrane, their lumen is partially filled with shaped elements of blood. The venules in the walls of the organ are located in the longitudinal direction, their lumen is filled with shaped elements of blood (Fig. 21). Most capillaries are detected directly under their own mucosal plate, and in the intestinal region they are found under the bottom of the glands.

The study of the diameter of the lumen and the wall thickness of the vessels of the submucosal base showed that the arteriol of the esophageal region has a larger lumen and a smaller wall thickness (Table 16).

In the connective tissue layers between the muscle layers, and between the muscular and outer membranes, there are vessels. Studies of the diameter of the lumen and the thickness of the vessel wall of the muscular and outer membranes showed that the arterioles and capillaries of the esophageal region have a slightly larger lumen and a smaller wall thickness (Table 16).

A comparison of the vessels in the membranes of the stomach wall revealed that in the arterioles of the esophageal region there is a slight predominance of the diameter of the lumen (Table 16).

In the wall of the stomach of rats, lymphoid formations are found. In the esophageal region, lymphoid formations lie in the form of a 1-2 row chain of lymphocytes. The cells in the chains are tightly adjacent to each other, and the chains of lymphocytes themselves are located on the border of their own mucous membrane plate and submucosal base. Lymphocytes are closely adjacent to the walls of the vessels of the submucosal base.

In the submucosal base of the intestinal section, lymphoid formations form two tightly adjacent chains of lymphocytes. The proximal chain of lymphoid cells is located directly under the bottom of the glands. Throughout the intestinal section, clusters of several lymphocytes located at the bottom of the glands are detected.

At 41 days of age, a multilayered keratinizing epithelium consisting of three rows of cells is detected in the mucous membrane of the esophageal department. In the basal row, small cells of oval and rounded shape are found, they are tightly adjacent to each other. The upper and middle rows are represented by larger and lighter cells, oval in shape. The cells of the upper row are located tighter in relation to each other than in the middle row.

In the mucous membrane of the stomach at the border of the esophageal and intestinal department, a fold is detected. On it, depending on the department, differentepithelium is represented. On the side of the esophageal region there are folds of the mucous membrane covered with a multilayer keratinizing epithelium. On the surface facing the intestinal region, cells of a single-layered prismatic epithelium are detected. The epithelial cover throughout the mucous membrane has different heights. In the region of the esophageal region, it is more than 3 times larger than in the intestinal region (Table 17).

The glandular apparatusof the stomach forms simple tubular unbranched glands of large and small curvature, as well as the pyloric canal. On a large curvature compared to a small one, the glands lie over a large area. On a small curvature, the glands are detected in the area, from the confluence of the esophagus to the entrance to the pyloric canal. In the pyloric canal, they are located on both sides of it.

Table 17. Thickness of the membranes of the stomach wall of 41 day-old pups of the experimental group under the action of kotoran µm

$\overline{X} \pm \overline{x} \div$

Structural components of the wall	Esophageal Department	Intestinal department
Thickness of the stomach wall	263,9-487,2* 375,5±17,2±	385,7-609,0* 456,7±17,1±
Muscular membrane	65,6-205,0* 149,2±10,7±	41,0-246,0* 117,3±15,7±
Circular muscle layer	32,8-49,2* 37,7±1,2±	8,2-73,8* 30,4±5,1±
Longitudinal muscular layer	32,8-164,0* 110,6±10,1±	24,6-205,0 86,9±13,8±
Mucosa	98,4-164,0* 131,2±5,1±	180,4-319,8* 235,3±10,7±
Submucosal base	57,4-82,0* 72,1±1,8±	12,3-24,6* 18,8±0,9±
Epithelial integument	16,4-82,0* 43,5±5,1±	8,2-20,5* 13,1±0,9±

* - Significant difference in relation to the control group

The glands lie on their own plate of the mucous membrane and are separated from each other by thin layers of connective tissue. The height of the glands on the large curvature of the stomach ranges from 243.6 to 588.7 μm, on the small curvature their height is less from 223.3 to 507.5 μm. In the pyloric canal, the height of the glands varies from 243.6 to 324.8 μm. The glands do not have the same bottom diameter, depending on the location. At great curvature, it ranges from 32.8 to 41 μm, at low curvature from 20.5 to 28.7 μm, in the pyloric channel from 24.6 to 32.8 μm. The width of the isthmus of the glands varies at large curvature from 16.4 to 20.5 μm, at the small curvature and in the pyloric canal from 20.5 to 24.6 μm. The density of the glands on the large curvature is from 9 to 20, on the small curvature and in the pyloric canal from 10 to 13. The structure of the glands of the stomach is represented by the main part (bottom and body) and the excretory part (isthmus and neck). The bottom and body of the glands are formed from the main and parietal cells. The isthmus and neck of the glands of parietal and mucous cells. The main cells have an oval and rounded shape, their nucleus is located in the center. Parietal cells are larger in size than the main and oval-shaped cells. In the center of parietal cells is 1-2 nuclei, or one nucleus displaced to the periphery. Mucous cells are elongated oval in shape, in the center of them lies a flattened or triangular nucleus. A study of the quantitative content of cells in the glands of the stomach of rats showed that in the region of the bottom and body of the glands of large curvature, the number of main cells was - 22.0±1.6, parietal - 19.0±1.1. The glands on a small curvature in the region of the bottom and body contain the main cells - 14.7±0.9, parietal - 14.5±0.6. In the pyloric canal at the bottom and in the body of the glands, the number of main cells is 16.1±1.2, parietal - 15.0±0.4. In the region of the isthmus and the cells of the glands on a large curvature, the content of parietal cells is 9.2±0.2, mucous cells - 18.3±0.7. On the small curvature in the isthmus and neck of the glands, the number of parietal cells is 14.4±0.5, mucous cells - 13.0±0.6. In the isthmus and neck of the glands of the pyloric canal, parietal cells contain - 17.9±0.4, mucous cells - 14.5±0.6.

The own plate of the gastric mucosa of rats is formed by bundles of connective tissue. Bundles of collagen fibers in their own plate of the mucous membrane are directed longitudinally, and fit tightly to each other throughout its length. In the intestinal section, bundles of collagen fibers adjacent to the bottom of the glands penetrate between the glands and separate them from each other, participating in the formation of connective tissue layers. The thickness of the bundles of collagen fibers of the mucous membrane's own plate in the organ parts ranges from 8.2 to 16.4 μm. Bundles of elastic fibers in the mucous membrane's own plate lie loosely compared to bundles of collagen fibers. In the esophageal and intestinal regions, bundles of elastic fibers are directed longitudinally.

Bundles of elastic fibers located at the bottom of the glands in the intestinal region penetrates between them, participating in the construction of connective tissue layers between the glands. Throughout its own mucosal plate, the thickness of the bundles of elastic fibers varies from 4.1 to 8.2 μm. Reticular fibers in their own mucosal plate in the esophageal and intestinal regions are oriented longitudinally and tightly adjacent to each other. In the intestinal region, reticular fibers lying at the bottom of the glands penetrate between them participating in the formation of connective tissue layers between the glands. Under its own plate of the mucous membrane, its muscular plate is detected. It consists of 1-2 rows of smooth muscle cells. The thickness of the mucous membrane in the intestinal region is 1.5 more than in the esophageal (Table 17).

The submucosal base of the stomach of rats is formed by bundles of loose connective tissue. Bundles of collagen fibers in the submucosal base of the esophageal region have a longitudinal direction and are located tightly in relation to each other. This is most pronounced in the areas adjacent to the mucous membrane's own plate. In the folds of the mucous membrane, bundles of collagen fibers are oriented in different directions, crossing each other. Around the vessels of the submucosal base, bundles of collagen fibers are located in a circular direction, tightly adjacent to their walls. In the intestinal section, bundles of collagen fibers have a greater density of location than in the esophageal and they are directed longitudinally. The thickness of the bundles of collagen fibers in the submucosal base decreases from -16.4 μm in the esophageal region to -8.2 μm in the intestinal region. Bundles of elastic fibers in the submucosal base are located more densely than bundles of collagen fibers, especially in the intestinal region. In the esophageal region, bundles of elastic fibers are directed longitudinally. In the folds of the mucous membrane, bundles of elastic fibers form a network, with small loops. Around the vessels of the submucosal base, the particles of elastic fibers lie circularly, tightly surrounding them on all sides. In the intestinal region, bundles of elastic fibers are directed longitudinally. The thickness of the bundles of elastic fibers in the submucosal base varies slightly from 8.2 μm in the esophageal region to 4.1 μm in the intestinal region. Reticular fibers in the submucosal base form a network. The size of the loops of this network depends on the department of the organ. In the esophageal part of the loop the reticular network is somewhat larger than in the intestinal network. Around the vessels of the submucosal base, the reticular fibers are located in a circular direction. The thickness of the submucosal base in the esophageal region is 3 times greater than in the intestinal region (Table 17).

The muscular membrane of the stomach of rats consists of two layers. The inner layer is represented by bundles of myocytes with a longitudinal direction. The outer layer is formed by circularly oriented muscle fibers. Throughout the muscular membrane, the bundles of myocytes of the longitudinal layer lie transversely with respect to the wall of the organ, the shape of the bundles is elongated-oval. The thickness of the longitudinal muscular layer is greater in the esophageal region than in the intestinal region (Table 17). The circular muscular layer varies slightly in thickness throughout the organ wall (Table 17). Layers in the muscular membrane and bundles of myocytes in them are separated from each other by layers of connective tissue. Bundles of collagen fibers in the longitudinal muscular layer separate bundles of myocytes from each other, surrounding and repeating their shape. In some areas of the esophageal and intestinal parts, bundles of collagen fibers continue into the submucosal base and the connective tissue layer between the circular and longitudinal layers of the muscular membrane. In the circular muscular layer, bundles of collagen fibers are directed longitudinally. The thickness of bundles of collagen fibers inthe muscular membrane of the esophageal and intestinal sections ranges from 4.1 to 8.2 μm.

Elastic fibers between muscle bundles are located more densely than in bundles of collagen fibers. In the longitudinal muscle layer, bundles of elastic fibers surround bundles of myocytes and repeat their shape. In some areas of the esophageal and muscular sections, bundles of elastic fibers continue into a submucosal base and a connective tissue layer between the circular and longitudinal layers. In the circular muscular layer, bundles of elastic fibers are oriented longitudinally. Thickness bundles of elastic fibers in the muscular membrane in the parts of the organ vary from 4.1 μm to 8.2 μm. Reticular fibers, depending on the muscle layer, have a different direction. In the longitudinal layer, they form loops of different sizes surrounding bundles of myocytes. In the circular layer, they are directed longitudinally.

Reticular fibers adjacent to the outer shell and submucosal base, gradually pass into these structures and participate in the formation of border connective tissue layers of these membranes. The thickness of the muscular membrane is greater in the esophageal region than in the intestinal region (Table 17). The outer shell of the organ is serous, it consists of a thin connective tissue layer covered with mesothelium. Thekidneys of collagen, elastic fibers and reticular fibers in the outer shell are oriented longitudinally. The thickness of the bundles of connective tissue tissue in the outer shell varies from 2.1 to 4.1 μm. The thickness of the outer shell in the organ departments ranges from 4.1 to 8.2 μm.

The vascular system of the stomach wall of rats is represented by the vessels of the mucosa, muscular and outer membranes. In the submucosal base of the mucous membrane, arterioles, capillaries and venules are detected. Arterioles lie more often at the base of the folds of the mucous membrane. In the lumen of the arterioles of the esophageal region, single shaped elements are found. In the intestinal section, the lumen of the arterioles is partially filled with shaped elements. The venules in the submucosal base are located in the longitudinal direction in their Lumen shaped elements of blood

Most capillaries are detected directly under their own mucosal plate, and in the muscular region they are found under the bottom of the glands. The study of the diameter of the lumen and the thickness of the vessel wall of the submucosal base showed that the venules of the submucosal base of the esophageal region have more lumen (Table 18).

In the connective tissue layers between the muscle layers and between the muscular and outer membranes lie vessels. The lumen of most of the arteries of the muscular and external membranes is partially filled with shaped elements of the blood. The lumen of these membranes is also filled with shaped elements of blood. A study of the diameter of the lumen and the thickness of the vessel wall of the muscular and outer membranes showed that the capillaries and venules have a slightly larger lumen and a smaller wall thickness (Table 18). A comparison of the vessels in the membranes of the stomach wall revealed that the arterioles and capillaries of the submucosal base have a larger lumen (Table 18.).

In the wall of the stomach of rats, lymphoid formations are found. In the esophageal region, lymphoid formations lie in the form of a 1-2 row chain of lymphocytes. Cells in chains are located at a short distance from their own mucosal plate. Lymphocytes are close to the walls of blood vessels. In the intestinal region, lymphoid formations are detected in the form of 2-3 row chains of lymphocytes. Cells in chains are tightly adjacent to each other and to their own plate of the mucous membrane

Throughout the intestinal section, there are numerous clusters of 3-4 lymphoid cells, these formations lie under the bottom of the glands.

In 46-day-old rats, a multilayered keratinizing epithelium consisting of three rows of cells is detected in the mucous membrane of the esophageal part of the stomach. In the basal row, small cells of oval and rounded shape are found, they are tightly adjacent to each other. The upper and middle rows are represented by larger and lighter cells, oval in shape. The density of cells in the top row is greater than average.

Compared with the cells of the basal series, in the cells of the upper layers of the epithelium, the nuclei are displaced to the periphery, in some of them there are no secretory granules. Above the epitheal cover of the esophageal region lies the cuticle. In the mucous membrane at the border of the esophageal and intestinal sections, a fold is detected. On the surface of the fold, depending on the department, therearedifferentepithelium. On the side of the esophageal region, there are folds of the mucous membrane with a multilayer keratinizing epithelium. On the surface facing the intestinal section, cells of the single-layered prismatic epithelium are detected.

The epithelial cover throughout the mucous membrane has a different thickness. In the esophageal region, it is 3 times greater than in the intestinal region (Table 19).

Table 19. Thickness of the membranes of the stomach wall of 46-day-old pups of the experimental group under the action of a catopaon μm

$\overline{X} \pm \overline{x} \div$

Structural components of the wall	Esophageal Department	Intestinal department
Thickness of the stomach wall	406,0-832,3* 669,9±32,8±	406,0-751,1* 578,5±26,5±
Muscular membrane	213,2-328,0* 267,3±8,8±	155,8-287,0* 195,2±10,1±
Circular muscle layer	73,8-123,0* 95,9±3,7±	32,8-49,2* 41,0±1,3±
Longitudinal muscular layer	106,6-246,0 168,1±10,7±	32,8-237,8* 153,4±15,7±
Mucosa	106,6-328,0* 188,6±17,1±	164,0-328,0* 250,9±12,6±
Submucosal base	41,0-246,0* 108,2±15,7±	16,4-57,4* 36,1±3,1±
Epithelial integument	32,8-49,2* 41,0±1,2±	8,2-16,4* 13,1±0,6±

* - Significant difference in relation to the control group

The glandular apparatus of the stomach is formed by simple tubular unbranched glands of large and small curvature, as well as the pyloric canal (Fig. 26). On a large curvature in comparison with a small one, the glands lie on a larger area. The height of the glands on the large curvature of the stomach ranges from 466.9 to 649.6 μm, on a small curvature their height is less than from 385.7 to 507.5 μm.

In the pyloric canal, the height of the glands varies from 385.7 to 426.3 μm. The diameter of the bottom of the glands is from 16.4 to 24.6 μm. The width of the isthmus of the glands ranges from 8.2 to 12.3 μm. The density of the glands on the large curvature is also in the pyloric canal from 12 to 14, on the small curvature from 8 to 11. A study of the quantitative content of cells in the glands of the stomach of rats showed that in the region of the bottom and body of the glands of large curvature, the number of main cells was - 16.7±1.4, parietal - 12.7±0.5. The glands on a small curvature in the region of the bottom and body contain the main cells - 15.6±0.8, parietal - 12.8±0.6. In the pyloric canal at the bottom and in the body of the glands, the number of the main cells is equal - 19.6±1.5, parietal±±±±± - 16.6±0.6. In the region of the isthmus and neck of the glands at high curvature, the content of parietal cells is - 19.0±0.9, mucous cells - 19.3±0.3. On the small curvature in the isthmus and neck of the glands, the number of parietal cells is equal to -

16.8±1.1, mucous cells - 17.3±0.6. In the isthmus and neck of the glands of the pyloric canal, parietal cells contain - 11.8±0.4, mucous cells - 15.6±0.7.±±±±±±±

The own plate of the gastric mucosa of rats is formed by loose fibrous structures of connective tissue. Bundles of collagen fibers in their own plate of the mucous membrane of the esophageal and muscular sections are directed longitudinally and tightly adjacent to each other. In the intestinal section, bundles of collagen fibers lying closer to the lumen of the organ penetrate between the glands and separate from each other, participating in the formation of connective tissue layers. Thetuft of collagen fiber bundles in the mucous membrane's own plate varies from 8.2 to 16.4 μm in the stomach. Bundles of elastic fibers in the mucous membrane's own plate are directed longitudinally and have an unequal density of location. A large density of their location is detected in the esophageal region. In the intestinal region, part of the bundles of elastic fibers adjacent to the proximal part of its own plate, penetrates between the glands, participating in the formation of connective tissue layers. The thickness of the bundles of elastic fibers in the mucous membrane's own plate ranges from 4.1 to 12.3 μm. Reticular fibers in their own mucosal plate lie denser than bundles of collagen and elastic fibers and they are directed longitudinally in the esophageal region. In the intestinal section, reticular fibers organize a small-cell network and penetrate between the glands, participating in the formation of connective tissue layers between them. Under its own plate of the mucous membrane, its muscular plate is detected. It consists of 1-2 rows of smooth muscle cells. The thickness of the mucous membrane in the intestinal region is 1.3 times greater than in the esophageal region (Table 19).

The submucosal base of the stomach of rats is formed by bundles of connective tissueand. Bundles of collagen fibers in the submucosal base of the esophageal region have a longitudinal direction, are located tightly in relation to each other. This is most pronounced in the areas adjacent to the mucous membrane's own plate. In the folds of the mucous membrane, the bundles of collagen fibers are oriented in different directions, they often intersect each other. Around the vessels of the submucosal base of the bundle collagen fibers lie in a circular direction, tightly located adjacent to their walls am. In the intestinal region, bundles of collagen fibers are located less densely than in the esophageal and are directed longitudinally. The thickness of the bundles of collagen fibers in the submucosal base ranges from 8.2 μm in the esophageal region to 16.4 μm in the intestinal region. Bundles of elastic fibers in the submucosal base are located more densely, than bundles of collagen fibers, this is especially pronounced closer to the mucous membrane's own plate. In the esophageal and intestinal regions, bundles of elastic fibers are directed longitudinally. In the folds of the mucous membrane of the esophageal region, bundles of elastic fibers form a network with loops of different sizes. Around the vessels of the submucosal base, bundles of elastic fibers lie circularly, tightly surrounding them on all sides. The thickness of the bundles of elastic fibers in the submucosal base varies slightly from 8.2 µm in the esophageal region to 4.1 µm in the intestinal region. Reticular fibers in the submucosal base form a network. In the intestinal region, the size of the loops is less than in the esophageal. In some areas of the esophageal region, between the folds of the mucous membrane, reticular fibers are directed longitudinally. Around the vessels of the submucosal base, the reticular fibers are located in a circular direction. The thickness of the submucosal base in the esophageal region is 2.9 times greater than in the intestinal region (Table 19).

The muscular membrane of the stomach of rats consists of two layers. The inner layer is represented by bundles of myocytes with a longitudinal direction. The outer layer is formed by circularly oriented muscle fibers. Bundles of myocytes of the longitudinal layer, starting from the confluence of the esophagus, lie transversely with respect to the wall of the organ, then gradually as they approach the pyloric canal, they are located obliquely. The shape of the bundles of myocytes of the longitudinal layer is elongated-oval. The thickness of the longitudinal muscular layer decreases slightly from the esophageal to the intestinal region (Table 19). The circular muscle layer in the esophageal region is 2 times larger in thickness than in the intestinal region (Table 19).

The vascular system of the stomach wall of rats is represented by the vessels of the mucosa, muscular and outer membranes. In the submucosal base of the mucous membranes, arterioles, capillaries and venules are detected. The wall of the arteriole consists of three membranes, they fit snugly together. Arterioles are found closer to their own mucosal plate and at the base of the folds of the mucous membrane at the epithelial cover. In the esophageal and intestinal parts, the lumen of the arteriole is partially filled with shaped elements of the blood. Venules in the submucosal base lie in the longitudinal direction, directly at the epithelial cover. (Fig. 27). In the esophageal region, capillaries are detected under their own plate of the mucous membrane. In the intestinal region, they lie under the bottom of the glands. The lumen of most venules and capillaries is filled with shaped elements of blood.

Studies of the diameter of the lumen and the thickness of the wall of the vessels of the submucosal base showed that the lumen and thickness of thestenkand (Table 20) slightly predominate in the arterioles of the intestinal region.

The lumen of most vessels of the outer and muscular membranes is partially filled with shaped elements of the blood. The study of the diameter of the lumen and the thickness of the wall of the vessels of the muscular and external membranes showed that the lumen and wall thickness in the arterioles of the intestinal region are slightly larger (Table 20).

In the connective tissue layers between the muscle layers and between the outer and muscular membranes lie vessels.

A comparison of the vessels in the membranes of the organ wall revealed that in the arterioles, capillaries, venules of the submucosal base of the intestinal region have a slightly larger lumen and a smaller wall thickness (Table 20).

In the wall of the stomach of rats, lymphoid formations are found in the esophageal region lymphoid formations are detected in the form of a 2-row chain of lymphocytes continuing from the submucosal base of the esophagus to the stomach. Cells in chains are close to each other and to the epithelium. At the border of the entry of the esophagus into the stomach, there are single lymphoid formations in the form of clusters of lymphocytes of 6-8 cells. In its own plate of the mucous membrane of the esophageal region, a single-row chain of lymphocytes is detected. In the intestinal region, lymphoid formations are 1-2-row chains of lymphocytes, tightly adjacentto the mucous membrane plate at the u. Throughout the intestinal section, clusters of 2-3 lymphocytes lying above the bottom of the glands and single lymphocytes in the connective tissue layers between the glands are found. Lymphocytes are close to the walls of the vessels of the submucosal base in the form of a 1-2-row chain.

In 52-day-old rats, a multilayered keratinizing epithelium, which consists of three rows of cells, is detected in the mucous membrane of the esophageal part of the stomach. In the basal row, small cells of oval and rounded shape are found, they are tightly adjacent to each other. The upper and middle rows are represented by larger and lighter cells, oval in shape. The cells in the upper row are located more loosely than in the middle row. Compared with the cells of the basal series in the cells of the upper layers of the epithelium, the nuclei are displaced to the periphery. In many cells of the upper and middle rows there are no secretory granules. Above the epithelial integument of the esophageal region lies the cuticle (Fig. 28).

In the mucous membrane ofthe organ at the border of the esophageal and intestinal sections, a fold is detected. On the surfaces of the fold, depending on the department, differentepithelium is represented. On the side of the esophageal region, there are folds of the mucous membrane with a multilayer keratinizing epithelium. On the surface facing the intestinal section, I find cellsof a single-layered prismatic epithelium.

The epithelial cover throughout the mucous membrane has an unequal height. In the esophageal region, it is greater than in the intestinal region (Table 21). The glandular apparatus of the stomach is formed by simple tubular unbranched glands of large and small curvature, as well as the pyloric canal.

Table 21. The thickness of the membranes of the stomach wall of 52-day-old pups of the experimental group under the action of kotoran µm.

$\overline{X} \pm \overline{x} \div$

Structural components of the wall	Esophageal Department	Intestinal department
Thickness of the stomach wall	406,0-832,3* 578,5±32,8±	406,0-913,5* 673,9±39,1±
Muscular membrane	147,6-328,0* 217,3±13,8±	73,8-205,0* 141,1±10,1±
Circular muscle layer	57,4-82,0* 71,3±1,8±	24,6-73,8* 49,2±3,7±
Longitudinal muscular layer	82,0-237,8* 137,8±11,9±	32,8-131,2* 87,7±7,5±
Mucosa	131,2-287,0* 208,3±11,9±	164,0-524,8* 334,5±27,7±
Submucosal base	82,0-246,0* 164,0±12,6±	12,3-20,5* 15,6±0,6±
Epithelial integument	24,6-32,8* 27,8±0,6±	12,3-24,6* 18,8±0,9±

* - Significant difference in relation to the control group

The height of the glands on the large curvature of the stomach ranges from 507.0 to 710.5 µm, on the small curvature from 507.0 to 609.0 µm. In the pyloric canal, the height of the glands varies from 304.5 to 406.0 µm. The diameter of the bottom of the glands of great curvature and the pyloric canal is from 16.4 to 20.5 µm, in the glands of small curvature it is 20.5-24.6 µm. The width of the isthmus of the glands is 12.3 - 16.4 µm.

The density of the glands on the large curvature is from 13 to 15, on the small curvature and in the pyloric canal from 10 to 14.

The cells that form the parts of the glands are tightly adjacent to each other. A study of the quantitative content of cells in the glands of the stomach of rats showed that in the region of the bottom and body of the glands of large curvature, the number of main cells was - 27.0±1.4, parietal - 19.2±1.4. The glands on a small curvature in the region of the bottom and body contain the main cells - 21.8±0.9, parietal - 15.5±0.7. In the pyloric canal at the bottom and in the body of the glands, the number of main cells is 28.2±0.9, parietal - 22.6±0.9. In the region of the isthmus and the neck of the glands on a large curvature, the content of parietal cells is - 14.9±1.7, mucous membranes - 26.8±0.9.

On the small curvature in the isthmus and neck of the glands, the number of parietal cells is 16.6±0.8, mucous cells - 20.8±0.8. The isthmus and neck of the glands of the pyloric canal contain parietal cells - 20.1±1.1, mucous cells - 17.8±1.2.

The own plate of the gastric mucosa of rats is formed by bundles of connective tissue. Bundles of collagen fibers in their own plate of the mucous membrane of the esophageal and intestinal sections are directed longitudinally and tightly adjacent to each other. In the intestinal section, bundles of collagen fibers lying closer to the lumen of the stomach penetrate between the glands and separate them from each other, participating in the formation of connective tissue layers. The thickness of bundles of collagen fibers in the own plate of the mucous membrane in the stomach parts ranges from 2.1 to 4.1 μm. Bundles of elastic fibers in their own mucous membrane plate in the esophageal and intestinal sections are directed longitudinally, but have different densities. In the intestinal section, they lie more densely. Bundles of elastic fibers, lying in the intestinal region closer to the lumen of the stomach, penetrate between the glands, participating in the formation of intergal connective tissue layers. The thickness of the bundles of elastic fibers in its own mucous membrane plate varies from 3.1 to 4.1 μm in the stomach.

Reticular fibers in their own plate of the mucous membrane of the esophageal region are directed longitudinally and are located more densely in relation to each other than bundles of collagen and elastic fibers. In the intestinal region, reticular fibers organize a small-cell network and penetrate between the glands, participating in the formation of intergestous connective tissue layers. Under its own plate of the mucous membrane, its muscular plate is detected. It consists of 1-2 rows of smooth muscle cells. The thickness of the mucous membrane in the muscular region is greater than in the esophageal region (Table 21).

The submucosal base of the stomach of rats is formed by bundles of loose connective tissueand. Bundles of collagen fibers in the submucosal base of the esophageal region are directed longitudinally and tightly adjacent to each other, to a greater extent this is expressed in areas adjacent to the epithelium

In the folds of the mucous membrane, bundles of collagen fibers are oriented in different directions, and often intersect each other. The vessels of the submucosal base of the bundle of collagen fibers cover a dense ring. In the intestinal section, bundles of collagen fibers are located more densely than in the esophageal and are directed longitudinally. The thickness of the bundles of collagen fibers throughout the submucosal base ranges from 4.1 to 8.2 μm.

Bundles of elastic fibers in the submucosal base are located more densely than bundles of collagen fibers. In the esophageal region, between the folds of the mucous membrane, bundles of elastic fibers are directed longitudinally.

In the folds of the mucous membrane of this section, bundles of elastic fibers form a network with loops of different sizes. In the intestinal section, the bundles of elastic fibers have a greater density of location compared to the esophageal and are directed longitudinally. Around the vessels of the submucosal base, bundles of elastic fibers lie circularly, tightly surrounding them on all sides. Throughout the submucosal base, the thickness of the bundles of elastic bundles varies from 4.1 to 8.2 μm.

Reticular fibers in the submucosal base form a network. In the intestinal region, the size of the loops is less than in the esophageal. In some areas of the esophageal region, between the folds of the mucous membrane, the reticular fibers are directed longitudinally and tightly adjacent to each other. Around the vessels of the submucosal base, the reticular fibers are located in a circular direction. The thickness of the submucosal base varies significantly from the esophageal to the intestinal region (Table 21).

The muscular membrane of the stomach of rats consists of two layers. The inner layer is represented by bundles of myocytes with a longitudinal direction. The outer layer is formed by circularly oriented muscle fibers. Bundles of myocytes of the longitudinal layer starting from the place of confluence of the esophagus into the stomach lie transversely with respect to the wall of the organ, the shape of the bundles is elongated-oval. As you approach the pyloric canal, there are areas where the bundles of myocytes of the longitudinal layer are located obliquely. The thickness of the longitudinal muscular layer gradually decreases from the esophageal to the intestinal region (Table 21).

The circular muscle layer decreases from the confluence of the esophagus to the pyloric canal (Table 21).

Layers in the muscular membrane and bundles of myocytes in them are separated from each other by layers of connective tissue. The thickness of the muscular membrane prevails in the esophageal part of the organ (Table 21).

The outer shell of the organ is serous, it consists of a thin connective tissue layer covered with mesothelium.

The vascular system of the stomach wall of rats is represented by the vessels of the mucosa, muscular and outer membranes.

In the submucosal base of the mucous membrane, arterioles, capillaries and venules are detected. The wall of the arteriole consists of three membranes, they fit snugly to each other. The inner shell is formed by rounded endothelial cells that fit snugly together. The middle muscular membrane is represented by one row of smooth muscle cells that have a circular or spiral direction. Between the inner and middle shells is the inner elastic membrane, the bends of which are small and they are located tightly to each other. The outer shell is formed by loose wavy connective tissue. It distinguishes adventitical cells. The walls of the capillaries consist of a single row of endothelial cells. They are rounded in shape and are located at a short distance from each other. The wall of the venules, as well as in the capillaries, is represented by a single endothelial membrane. In the wall of the venule, in contrast to the capillaries, endothelial cells are oval in shape and lie at different distances from each other. Arterioles are found at the mucous membrane's own plate. The venules in the submucosal base are located in the longitudinal direction under the epithelial cover (Fig. 30).

Capillaries are detected under the mucous membrane's own plate. In the intestinal region, they lie under the bottom of the glands. In the lumen of most vessels of the submucosal base, the shaped elements of the blood are detected.

Studies of the diameter of the lumen and the thickness of the vessel wall of the submucosal base showed that there is no significant difference in the lumen e and thicknessof the vessel wall in the organ parts (Table 22). In the connective tissue layers between the muscle layers and between the outer and muscular membranes, there are vessels. The structure of the wall of arterioles, capillaries and venules coincides with the structure of the vessels of the mucous membrane. In the lumen of most vessels, there are vessels. In the lumen of most vessels external and muscular membranes are detected by the shaped elements of the blood. The study of the diameter of the lumen and the thickness of the wall of the vessels of the muscular and external membranes showed that there was no significant difference in the lumen and thickness of the vessel wall in the parts of the organ (Table 22). Comparison of the vessels in the membranes of the stomach wall revealed that in the arterioles, capillaries and venules of the submucosal base there is slightly more lumen (Table 22).

In the wall of the stomach of rats, lymphoid formations are found. In the esophageal region, lymphoid formations are detected in the form of a 1-2-row chain of lymphocytes, continuing from the submucosal base of the esophagus to the stomach. Cells in chains are close to each other, and to the epithelium. At the border of the confluence of the esophagus into the stomach there are single lymphoid formations in the form of an accumulation of lymphocytes of 7-10 cells, these clusters are oval and rounded in shape and are located on top of the fold located on the border of the esophagus and

Stomach. In its own plate of the mucous membrane of the esophageal region, single lymphocytes are found.

In the intestinal section, lymphoid formations are a 1-2-row chain of lymphocytes, tightly adjacent to their own mucous membrane plate. Throughout the intestinal section, areas are identified where 2-3 lymphocytes lie under the bottom of the glands, and single lymphocytes in the intermucosal connective tissue layers.

Around the vessels of the submucosal base, lymphoid formations lie in the form of a 1-row chain and clusters of 6-8 cells. The thickness of the stomach wall is greater in the intestinal region (Table 21).

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