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CHANGES IN THE ANATOMICAL PARAMETERS OF THE RAT SMALL INTESTINE ARE NORMAL AND UNDER THE INFLUENCE OF ADVERSE ENVIRONMENTAL FACTORS

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Abstract: This article presents the results of studies of the morphometric parameters of the small intestine of 1-month-old rats in normal and under the influence of the pesticide cotoran. Under the influence of the pesticide kotoran, there is a lag in anatomical parameters, expressed in a decrease in the thickness of the mucous membrane, the height of the villi, and the depth of the crypts.

Key words: small intestine, cotoranum, lateral walls, mesenteric. mesenteric edge, villi.

Introduction.

The problem of protecting public health and the environment is one of the most important and fundamental problems of our time. The health of the population acts as the main indicator in assessing adverse environmental factors, which include pesticides.

Scientific progress of the XXI century has even touched agriculture. This phenomenon is expressed not only in technological innovations, mechanization of human labor, but also in the widespread use of chemical science achievements to improve crop growth and protect them from various pests. In order to prevent the negative effects of pesticides, preventive measures are being developed in different countries, among which one of the main ones is the study of their toxic effects on humans and animals [4,7,8].

It is well known that pesticides are chemicals used in agriculture to control pests of crops and weeds. And, as the ancient wisdom says, every coin has a downside: on the one hand, the use of pesticides brings a significant economic effect, and, on the other, the use of significant amounts of them over large areas expands the danger of their combined, complex and combined action with other production factors [3].

After gaining independence, the Republic of Uzbekistan has been systematically working to reduce the use of pesticides without harming agriculture. In particular, work has intensified on the search for drugs with high specificity and effectiveness with a small amount of their use. As a result, over the past 25 years, the range of pesticides used has been updated by 80-85%, and their volume used has decreased tenfold [1,2].

One of the most important problems of morphology is the changes occurring in the organs of the digestive system when exposed to pesticides [5].

Despite a sufficient number of works devoted to the study of the walls of the small intestine of laboratory animals, there is no morphometric characteristic of the layered structure of the walls of the small intestine in postnatal ontogenesis when exposed to pesticides. Also, the effect of the pesticide cotoran on the small intestine, on the structures of its constituent layers in a growing organism through mother's milk, has not been studied in detail.

The purpose of the work. To study the morphometric parameters of the rat small intestine normally and when exposed to cotoran.

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Materials and methods

The study was performed on 60 mature rats with a body weight of 250-300 g. The animals were divided into two groups: The 1st control group included 12 rats, which were injected intragastrically through a probe with 1 ml of distilled water. Group 2 was an experimental group, including 48 rats, which were intragastrically injected with 1 ml of cotoran at a dose of 0.05 mg. Pesticides were administered according to the scheme in the morning. The slaughter of rats was performed at 30, 60 and 90 days of development under ether anesthesia. After opening the abdominal cavity, the small intestine was removed. For a detailed study, pieces from the initial, middle and distal parts of the small intestine were taken. Fragments from the small intestine were fixed in 10% neutral formalin, then carried out over alcohol batteries of increasing concentration and poured into paraffin. Sections with a thickness of 5-8 mm were made from blocks on a microtome. The sections were stained with hematoxylin-eosin.

Morphometric measurements were performed on micro-preparations using an ocular ruler. On micro-preparations of the small intestine, the thickness of each layer separately, the depth of the villi, their height, width, distance between them and the vessels of the submucosal base were measured. The cellular composition of lymphoid structures in various parts of the small intestine and their changes under the action of cotoran were studied.

Research results and their discussion.

In the 30-day-old control group of rats, the wall thickness of the initial mesenteric part of the small intestine ranges from 399.3 microns to 621.2 microns. The greatest thickness is found in the side walls (621.2±3.5 microns) compared with the mesenteric (426.8±4.3 microns) mesenteric (399.3±5.1 microns) walls. The thickness of the mucous membrane in the initial part of the mesenteric part of the small intestine in the side walls (423.9±9.1 microns) is almost 1.2 times greater than the thickness of the mucous membrane of the mesenteric (392.5±5.5 microns) and the mesenteric (373.1±5.8 microns) walls.

Villi and crypts are located in the mucous membrane. The villi of the side walls are the longest (344±8.9 microns) and have a finger-shaped shape. The villi of the mesenteric (289.6±9.4 microns) and mesenteric edge (257.9±6.3 microns) have a leaf-shaped or triangular shape with a wide base.

The thickness of the epithelial layer of villi in all parts of the small intestine is on average 23.2 ± 0.3 microns. The nucleus of epithelial cells has an oval or rounded shape and is located in the basal part of the cell.

The crypt depth of the initial part of the mesenteric small intestine varies from 61.9 to 107.1 microns, deeper crypts are located in the side walls (107.1 ±2.5 microns) compared to mesenteric (79.3±0.9 microns) and mesenteric (61.9±0.93 microns) walls.

he thickness of the submucosal base in the initial part of the mesenteric part of the small intestine is more developed in the mesenteric (24.2 ±0.8 microns) and mesenteric (22.7± 0.6 microns) edges compared to the side walls (21 ± 0.5 microns).

The thickness of the musculoserous membrane of the initial part of the mesenteric small intestine is more pronounced in the mesenteric (59.8±2.7 microns) and mesenteric (45.8±1.7 microns) walls, compared with the lateral (37.3±1.4 microns) walls.

In 1-month-old rats, the greatest wall thickness of the middle mesenteric part of the small intestine is found in the side walls (570.5±3.5) compared with the mesenteric (37.2±4.0 microns) mesenteric (346.6±5.4 microns) walls.

The thickness of the mucous membrane in the initial part of the mesenteric part of the small intestine in the side walls (367.3± 8.7 microns) is almost 1.4 times greater than the thickness of the mucous membrane of the mesenteric (338.2±5.5 microns) and the mesenteric (321.6±6.0 microns) walls.

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The villi of the side walls are the longest (288.7±8.8 microns) and have a finger-shaped shape. The villi of the mesenteric (234.1±9.8 microns) and the mesenteric margin (201.6±6.3 microns) have a leaf-shaped or triangular shape with a wide base.

The crypt depth of the initial part of the mesenteric small intestine is in the range from 72 to 113 microns, deeper crypts are located in the side walls (96.4 ± 2.5 microns) compared to mesenteric (67.2 ±1.1) and mesenteric (48.6 ±0.8 microns) walls.

The thickness of the submucosal base in the initial part of the mesenteric part of the small intestine is more developed in the mesenteric (22.1 ± 0.7 microns) and mesenteric (20.4±0.7 microns) edges compared to the side walls (18.3± 0.6 microns).

The thickness of the musculoserous membrane of the initial part of the mesenteric small intestine is more pronounced in the lateral (36.1±1.4 microns) and mesenteric (56.7±2.7 microns) walls compared to the mesenteric (44.7±1.7 microns) wall.

In 1-month-old rats, the wall thickness of the terminal mesenteric part of the small intestine is greater in the side walls (513±3.3) compared with the mesenteric (316.5±4.1) mesenteric (288.6±5.5 microns) walls.

The thickness of the mucous membrane in the initial part of the mesenteric part of the small intestine in the side walls (311.6±8.7 microns) is almost 1.4 times greater than the thickness of the mucous membrane of the mesenteric (279.4± 5.5 microns) and the mesenteric (263.7±6.0 microns) walls.

The villi of the side walls are the longest (256.2±8.9 microns) and have a finger-shaped shape. The villi of the mesenteric (203.8±9.8 microns) and mesenteric edge (173.3±6.1 microns) have a leaf-shaped or triangular shape with a wide base.

The thickness of the epithelial layer of the villi of the small intestine is on average 21.8 ± 0.25 microns. The nucleus of epithelial cells has an oval or rounded shape and is located in the basal part of the cell.

Deeper crypts are located in the side walls (93.8±2.5 microns) compared to mesenteric (65.6±1.0) and mesenteric (47.2±0.7 microns) walls.

The thickness of the submucosal base is more developed in the mesenteric (20.8± 0.7 microns) and mesenteric (19.1±0.6 microns) edges compared to the side walls (17.5±0.6 microns).

The thickness of the musculoserous membrane of the initial part of the mesenteric small intestine is more pronounced in the mesenteric (43.1±1.6) mesenteric (54.5±2.6 microns) walls compared with the lateral (34.7±1.4 microns) walls.

In 1-month-old rats of the experimental group, the thickness of the walls of the small intestine in the initial part of the mesenteric part of the small intestine is on average 498.4 ± 3.8 microns, in the middle part of the small intestine 468.8 ± 3.8 microns, and in the distal part, on average 455.1± 3.5 microns. The thickness of the mucous membrane along the circumference is greater in the side walls (420-523) than in the mesenteric and mesenteric (259.3-351.7 microns).

There are villi in the mucous membrane, the surface of which is covered with a single-layer cylindrical epithelium. The thickness of the epithelial cells of the villi is on average 21.8 ± 0.2 microns.

In the initial section of the mesenteric part of the small intestine, the height of the villi is in the middle section of the mesenteric part of the small intestine, on average 236.1 ±8.8 microns, and in the distal section 158mkm to 298 microns, on average 232.3 ± 8.7 microns.

The height of the villi along the circumference of the wall of the small intestine varies throughout, longer villi are noted in the side walls (170-316 microns), smaller in the mesenteric (118-275 microns) and mesenteric (103-198 microns) walls. Small pits up to 8-24 microns deep are located between the villi in all parts of the small intestine. Its own plate is located under the basement membrane of the mucous membrane. The thickness of the submucosal base in the initial section is from 14 to 26

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microns, on average 21.8 ± 0.2 microns, in the middle section from 12 microns to 25 microns, on average 16.5 ± 0.6 microns, in the distal section its thickness varies from 11 microns to.

The muscle membrane consists of smooth muscle cells located in the initial sections of the mesenteric part of the small intestine in 3-6 rows, and in the final sections 2-3 rows. The muscle bundles are located longitudinally from the outside, and circularly from the inside. The thickness of the musculoserous membrane is greater in the initial part of the mesenteric part of the small intestine, which ranges from 20 to 41 microns, on average 29.5 ± 1.3 microns. In the middle part of the small intestine, the thickness of the musculoserous membrane varied from 16 to 39 microns, on average 27.6 ±1.4 microns, on average 27.6 ±1.4 microns, and in the final section the thickness decreases from 15 to 37 microns, on average 26.8 ±1.4 microns.

The serous membrane of the small intestine consists of thin bundles of elastic and collagen fibers. Reticular fibers are found in places. The serous membrane is externally covered with a single layer of squamous epithelial cells. The vascular system of the musculoskeletal system consists of arterioles, capillaries and venules. In the field of view there are 1-2 arterioles with a diameter from 6x6 microns to 10x10 microns, 0-2 venules with a dimeter of 4x6 to 6x10 microns, the same number of capillaries with a dimeter from 4x4 microns to 6x10 microns, the same number of capillaries with a diameter from 4x4 microns to 6x6 microns.

Thus, under the influence of the pesticide kotoran, the morphometric parameters of the small intestine change, expressed in a decrease in the thickness of the mucous membrane, the height of the villi, the depth of the crypts compared with the control group. These changes are associated with the negative effects of pesticides through the mother's body during the intrauterine and lactation period.

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