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Morphological Changes in the Anatomical Parameters of the Small Intestine When Exposed to Herbicides

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Annotation: This article presents the results of morphometric studies of the thickness of the walls of the small intestine of 30,60 and 90-day-old rats normally and when exposed to the herbicide cotorana, through mother's milk. The results of the study showed that when exposed to the herbicide cotoran, there is a lag in the anatomical parameters of the small intestine, which is more noticeable at 30 days of age compared to 90 days of age.

Keywords: rat, cotoran, crypt depth, villi, mesenteric part of the small intestine.

Introduction. Intensive use of minerals, rapid development of technology and chemical industry, especially the widespread use of pesticides and pesticides in agriculture have led to environmental pollution, and have created a real threat to the life of all living beings on the planet.

The problem of environmental protection and rational use of natural resources is one of the global challenges of our time [1,2,4,6].

The morphological structures of the digestive system and especially the reactive change when confronted with various chemical factors of widely used herbicides helps to develop the most effective methods of preventing and treating pathologies of the entire organism, and not just the gastrointestinal tract [3,5,7,8]. Of particular importance is the study of changes in the structure of the small intestine and in its immune system under the influence of cotoran, which passes into the body of cubs through the mother's milk (female rat).

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 kotorana 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.

Materials and methods of research. The objects of the study were white mongrel rats in the number of 120, whose age from birth is 1, 30, 60 and 90 days. The rats of the experimental group are baby rats from the offspring of a mother rat who received a daily solution of cotoran at a dose of 5 MDU intragastrically for 20 days. The effect of kotoran on rats (cubs) of the experimental group, through the mother's milk of a rat, was evaluated.

The subject of the study was histological material obtained from the initial, middle and final sections of the mesenteric part of the small intestine of experimental rats. The materials were fixed in a Buena solution, carried out with alcohols of increasing concentration and poured into paraffin. Sections 5-10 microns thick were made from the blocks on the microtome, and stained with hematoxylin-eosin.

Morphometric measurements were made on four sides of the small intestine wall using the NOVEL Model NLCD-307 microscope manufactured in China in 2016 and on micro-preparations using an ocular ruler: two lateral, mesenteric and mesenteric. The total thickness of the wall, the thickness of each layer separately, the depth of the crypts, the height of the villi, the width, and the distance between them were measured throughout the small intestine.

Results and discussion. In rats of the intact group, the thickness of the mucous membrane of the small intestine from the newborn (165.6± 4.5 microns) to 90 days of age (634.7± 3.4 microns) increases by 3.83 times. The highest growth rate is noticeable at 30 days of age (161.5%), and the lowest at 90 days of age (12.5%)**.**

The results of comparing the thickness of the mucous membrane throughout the mesenteric part of the small intestine showed that in the initial section, the wall thickness up to 90 days of age (708.4 ± 3.0 microns) compared with the newborn (183.1 ± 4.9 microns) increases by 3.87 times. In the middle section of the mesenteric part of the small intestine (from 166.6 ± 4.0 microns to 633.5± 3.7 microns), the wall thickness increases 3.8 times, in the proximal section (from 147.2± 4.6 microns to 562.1 ± 3.5 microns) it increases 3.81 times.

Based on the results of a comparative analysis of the thickness of the mucous membrane, we can say that the outstripping growth is observed in the initial section, the smallest in the middle section of the mesenteric part of the small intestine. The increase in the thickness of the mesenteric part of the mucous membrane of the small intestine in the initial section, apparently, is associated with a large physiological load on the initial section.

Intestinal villi are protrusions of the mucous membrane of the finger-shaped or leaf-shaped, freely protruding into the lumen of the small intestine. They are one of the important parameters of the mucous membrane of the small intestine.

The height of the villi from the newborn age (152.4 ± 4.1 microns) to the 90-day age (573.5 ± 3.1 microns) increases by 3.76 times. The highest growth rate is observed at the age of 30 days (157%), and the lowest at the age of 90 days (12.7%).

In the initial section of the mesenteric part of the small intestine, the height of the villi from the newborn (171.7 ±4.7 microns) to 90 days of age (640.1 ± 3.0 microns) increases 3.73 times, in the middle section from the newborn (152.0 ±4.1 microns) to 90 days of age (572.5 ± 2.8 microns) increases 3.77 times, in the final segment from the newborn (133.5 ± 3.5 microns) to 90 days (507.8 ± 3.6 microns), it increases by 3.8 times.

A characteristic feature of the mucous membrane of the small intestine of rats is the presence of crypts, the mouth of which opens between the intestinal villi. In rats of the control group, the crypt depth from newborn (8.7 ± 0.16 microns) to 90 days of age (61.4± 1.4 microns) increases by 7.06 times. The highest growth rate is observed at the age of 30 (375.8%), and the lowest at the age of 90 (10.4%). The depth of crypts in the initial section from the newborn (9.7±0.15 microns) to 90 days of age (68.7±1.7 microns) increases by 7.08 times, on average from 8.5±0.17 microns to 61.1±1.3 microns, that is, by 7.18 times, in the final section from 8.0±0.15 microns to 54.3±2.0 microns, or 6.78 times. In all age groups, there is a decrease in the depth of crypts from the proximal mesenteric part of the small intestine to the distal.

In rats treated with the herbicide kotoran through the mother's milk (female rats), at an early stage of postnatal development (30 days), there is a lag in the morphometric parameters of the small intestine wall.

The thickness of the wall of the small intestine of the mesenteric part in the experimental group of rats from newborn age (199.3 ±7.0 microns) to 90 days of age (665.9 ± 3.5 microns) increases 2.6 times. The highest growth rate is observed at the age of 1 month (75.4%) and the lowest - at the age of 90 days (2.6%).

The thickness of the wall of the small intestine throughout its upper part from the period of newborn (221.6 ±8.1 microns) to 90 days of age (737.4±3.47 microns) increases by 3.33 times, in the middle section (from 199.3±6.7 microns to 686.0±3.5 microns) by 3.44 times, in the distal section (from 176.9± 3.5 microns to 574.5± 3.5 microns) by 3.24 times.

As the data show, the greatest growth is observed in the middle department, and the smallest - in the distal department.

The thickness of the small intestine mucosa in the experimental group of rats from newborn (165.6± 4.5 microns) to 90 days of age (570.3± 3.45 microns) increases by 3.44 times. The highest growth rate is observed in 30 days (79.7%), and the lowest in 90 days (27.5%).

In the upper part of the small intestine, the thickness of the mucous membrane from the newborn period (183.1±4.9 microns) to 90 days of age (633.7±3.7 microns) increases by 3.46 times, on average (from 166.6± 4.0 microns to 586.1± 3.26 microns) increases by 3.52 times, in the final (from 147.2±4.6 microns and up to 506.6 ± 3.4 microns) increases by 3.44 times.

The height of the villi of the small intestine in the experimental group of rats from newborn (152.4 ± 3.5 microns) to 90 days of age (514.2 ± 3.5 microns) increases by 3.37 times. The highest growth rate is observed in 30 days (76.3%), and the lowest - in 90 days (27.3%). The height of the villi in the upper mesenteric part of the small intestine from the period of newborn (171.7 ± 4.7 microns) to 90 days of age (569.3 ± 3.5 microns) increases by 3.32 times, in the middle section (from 152.0 ± 4.1 microns and up to 532.1 ± 3.5 microns) increases by 3.5 times, in the final (from 133.5± 3.5 microns and up to 441.4 ± 3.7 microns) increases by 3.30 times.

In the experimental group of rats, the depth of crypts of the mesenteric part of the small intestine from newborn (8.7 ± 0.16 microns) to 90 days of age (56.1± 3.15 microns) increases by 6.45 times. The highest growth rate is observed at the age of 30 (236.8%), and the lowest - at the age of 90 (26.6%). Crypt depth in the proximal part of the small intestine from newborn age (9.7 ±0.15 microns) to 90 days of age (64.7±3.36 microns) increases 6.67 times, on average (from 8.5±0.17 microns to 54.0±2.6 microns) increases 6.35 times, in the distal part (from 8.0± 0.15 microns to 49.8± 3.5 microns) - 6.22 times.

In the experimental group, the thickness of the submucosal base from the period of newborn (9.7 ± 0.18) microns to 90 days of age (29.5± 1.55) microns increases by 3.04 times. The highest growth rate is observed in 30 days (62.8%), and the lowest in 90 days (9.6%).

Throughout the small intestine, the thickness of the submucosa varies at all stages of postnatal ontogenesis: in the upper part from the newborn period (9.8 ± 0.17 microns) to 90 days of age (31.9± 1.43 microns) increases by 3.26 times, in the middle part (from 10.0± 0.18 microns to 28.9± 1.56 microns) - in 2.89 times, in the final section (from 9.3 ± 0.18 microns to 27.8 ± 1.62 microns) - 2.99 times.

Conclusion.Kotoran, negatively affecting the morphological structures of the small intestine, leads to a lag in the morphometric parameters of the intestine: the thickness of the mucous membrane, submucosal base and muscle-serous membrane. The lag is more pronounced in 30-day-old rats, and less pronounced in 90-day-old. This happens, apparently, due to the connection of compensatory and protective mechanisms of the body.

Список литературы:

1. Анучина А. В. Токсическое воздействие пестицидов на организм человека и животных //Международный студенческий научный вестник. – 2019. – № 1. – С. 105–108.
2. Каримов И.А. Влияние разных доз нитратовых пестицидов на физиологические показатели организма экспериментальных животных: Дис. … канд. биол. наук. – Душанбе, 2018. – 258 с.

3. Alana M. Chin, David R. Hill, Megan Aurora, and Jason R. Spence. Morphogenesis and maturation of the embryonic and postnatal intestine. Semin Cell Dev Biol. 2017 Jun; 66: 81–93.
4. Chłopecka M, Mendel M, Dziekan N, Karlik W. The effect of glyphosate-based herbicide Roundup and its co-formulant, POEA, on the motoric activity of rat intestine - In vitro study. Environ Toxicol Pharmacol. 2017 Jan;49: 156-162. doi: 10. 1016/j. etap. 2016. 12. 010.
5. Darwiche W, Delanaud S, Dupont S, Ghamlouch H, Ramadan W, Joumaa W, Bach V, Gay-Quéheillard J. Impact of prenatal and postnatal exposure to the pesticide chlorpyrifos on the contraction of rat ileal muscle strips: involvement of an inducible nitric oxide synthase-dependent pathway. Neurogastroenterol Motil. 2017 Feb; 29 (2). doi: 10. 1111/ nmo. 12918.
6. McGhee JR, Fujihashi K. Inside the mucosal immune system. PLoS Biol. 2012;10 doi: 10. 1371/journal. pbio. 1001397.
7. Tukhsanova N.E. Quantitative Relationship of Lymphocytes in the Lymphoid Nodules of the Small Intestine of Rats in Normal and Under the Influence of Kotoran// American Journal of Medicine and Medical Sciences. - 2019.-№9(12) PP. 467-470
8. Tukhsanova N. E., Khojiev D.Ya., Khasanova D.A. Reactive changes the cellular composition of the lymphoid structures of the intestine under the expose of cotoran // Fundamentalis scientiam/ Madrid Spain. №4 (5) 2017, P. 77.127.
9. Muzafarovna, K. S. (2023). PATHOLOGICAL CHANGES OF THE FOOT IN CHILDREN WITH SCOLIOSIS. *Horizon: Journal of Humanity and Artificial Intelligence*, *2*(4), 148-153.
10. Muzaffarovna, K. S. (2023). Scoliotic Changes in Morphometric Parameters of Children and Adolescents. *Scholastic: Journal of Natural and Medical Education*, *2*(4), 124-128.