BRITISH MEDICAL JOURNAL

British Medical Journal Volume-2, No 1
10.5281/zenodo.6442005
British Medical Journal
Volume 2, No 1., 2022
Internet address: http://ejournals.id/index.php/bmj
E-mail: info@ejournals.id
Published by British Medical Journal
Issued Bimonthly
3 knoll drive. London. N14 5LU United Kingdom
+44 7542 987055
Chief Editor
Dr. Fiona Egea

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INTRAORGAN CHANGES OF RAT SPLEEN VESSELS IN EARLY POSTNATAL ONTOGENESIS.

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Abstract:

The aim is to study intraorgan changes in spleen vessels in white rats in early postnatal ontogenesis.

Materials and methods of research. The experiment was carried out on 90 male mongrel rats in the newborn and at 6, 11, 16 and 21 days of age. To study the histotopography of the processes, polyclonal antibodies to CD3 and CD20 (Ventana, Switzerland) were used at a dilution of 1:100, carried out on histological glasses with an adhesive coating (Ventana, Switzerland). In the preparations, the spleen structures were examined morphometrically using an ocular micrometer. The diameter of the periarterial lymphatic couplings of the spleen, lymph nodes and their germinal centers, the width of the mantle, marginal and periarterial zones of lymph nodes, the relative area of connective tissue elements and white pulp (relative to the total area of the cut) were measured.

Results. The spleen of newborn baby rats is functionally immature, lymph nodes are not fully formed, it is difficult to distinguish all zones in them and germinative centers are not determined. When performing IHC with CD 20 markers, it was found that the number of LF without breeding centers in the spleen of the control group of rats reaches a maximum by 6 days of age, and with breeding centers by 11 days of age.

Conclusions. It has been established that, starting from the age of nine months, involutive changes are observed, characterized by an increase in the number of connective tissue elements in the spleen, a decrease in germinal centers in lymph nodes, the total number of lymphocytes in lymph nodes without reproduction centers, periarterial lymphatic couplings.

Keywords: immune system, spleen, lymphoid follicles, early postnatal ontogenesis.

The relevance of the problem. The spleen is considered to be the largest peripheral organ of immunogenesis, which largely determines the immune status: the state of innate and acquired immunity, its humoral and cellular links, the quality and quantity of lymphoid cells in humans and animals [6, 23].

At the suckling age, rats showed signs of intensive growth and morphofunctional development of the spleen, which consisted in a gradual increase in organometric parameters of the organ and morphometric parameters of the white

pulp. By the end of the suckling age (21 days after birth), a qualitative transformation of the spleen parenchyma took place in the form of the formation of mature secondary lymph nodes and zones of periarterial lymphatic vaginas, which was a sign of the onset of functional maturity of the immune apparatus of the organ [11,17,28].

With age, lymphoid nodes with a germinative center are found in isolated cases, their sizes also gradually decrease. The content of connective tissue stroma increases in the spleen, and this process continues in the elderly and, especially, in old age [24, 32].

Thus, the decrease in the overall immune function of the spleen during ontogenesis is largely associated with the suppression of the humoral immune response, that is, with the suppression of B-cell immunity. On the other hand, a certain role is played by a certain weakening of the immune response of the cellular type, due to a reduction in the T-cell pool of spleen lymphocytes as well. In general, the detected changes have a corresponding effect on the state of both B- and T-cell immunity [1,5,21,33].

The aim of the study was to study structural changes in the vascular morphology of the spleen in white rats at the early stages of postnatal ontogenesis.

Materials and methods of research.

The experiment was carried out on 90 male mongrel rats. To identify morphological and morphometric parameters of the spleen structure in postnatal ontogenesis, groups of animals were formed in the newborn and at 6, 11, 16 and 21 days of age.

For histological examination, tissue samples were fixed in 10% neutral formalin, after histological wiring on an automatic carousel type STP 120 by Thermo Fisher Scientific (TFS, USA), poured into paraffin wax at the Histo Star Thermo Fisher filling station (TFS, USA). Sections with a thickness of 3-4 microns were obtained on a rotary microtome NM 325 (TFS, USA).

Immunohistochemical preparations were manufactured in the Ventana Bench MarkXT autostainer (Switzerland). To study the histotopography of the processes, polyclonal antibodies to CD 3 and CD 20 (Ventana, Switzerland) were used at a dilution of 1:100, carried out on histological glasses with an adhesive coating (Ventana, Switzerland). Immunohistochemical reactions were carried out in accordance with the protocol of the antibody manufacturer. The sections were finished with Mayer's hematoxylin.

Finished histological preparations were studied under the CX40 trinocular microscope (Soptop, China), which has a digital image transmission system of the OD400UHW10 4 Mp microscope with a built-in morphometric program.

The results of the study and their discussion.

The spleen of newborn baby rats is covered with a capsule on top, which consists of connective tissue. From it, trabeculae containing arteries and veins go deep into the spleen.

The thickness of the capsule at the gate averaged -4.70±0.15, at the front end it averaged 6.2± 0.3 microns, at the rear end it averaged 5.5±0.14 microns. The diameter of the trabecula in the proximal part averaged 11.8±0.12, and in the distal part it averaged 8.7±0.6 microns. The depth of the trabecula averaged 12.12±0.17

microns. The relative area of the white pulp was on average – 24.6 ± 0.6%, and the red pulp was on average – 75.4 ± 0.6%.

The study of the trabecular vessels of newborn rats (Fig.1) showed that the thickness of the venous wall was on average 10.6± 0.7 microns, the inner diameter of the vein was on average 19.8± 0.2 microns, the thickness of the arteriole wall was on average 14.3±0.1, the inner diameter of the arteriole was on average -16.2± 0.3. The thickness of the capillary the walls of the trabecular vessel averaged 4.2 ± 0.1, the internal diameter of the capillary averaged 5.5 ± 0.4 microns. The wall thickness of the venule of the pulpary vessel was on average 8.4 ± 0.3 microns, the inner diameter of the venule was on average 15.1 ± 0.6, the wall thickness of the arteriole was on average 10.9 ± 0.3, and its inner diameter was on average 11.2 ± 0.9 microns. The wall thickness of the capillary of the pulp vessel averaged 4.0 ± 0.1, and the inner diameter was 5.2 ± 0.4.

The wall thickness of the lymphoid follicle venule is on average 5.3 ± 0.3, the inner diameter is on average 14.8 ± 0.2. The wall thickness of the lymphoid follicle arteriole was on average 5.9 ± 0.5, and the inner diameter of the LF arteriole is on average 11.5 ± 0.7 microns. The wall thickness of the capillary of the lymphoid follicle averaged 3.0±0.1, and the inner diameter was 4.8± 0.3.

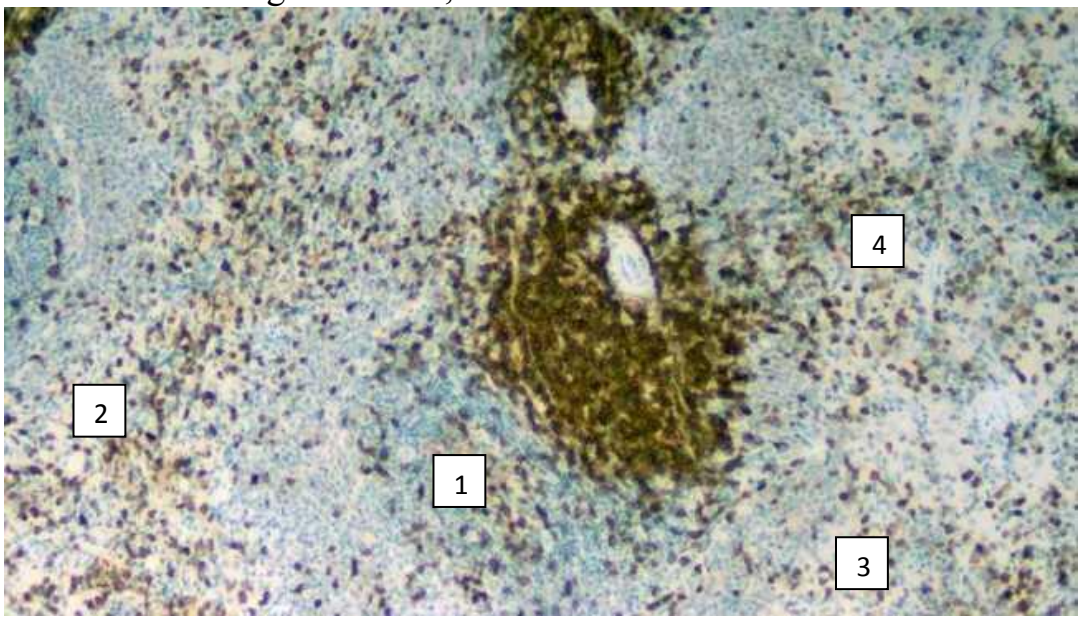

Fig.1. Spleen of a 6-day-old rat. IHH coloring on CD 3

1- white pulp, 2- lymph node, 3- trabeculae, 4 – spleen capsule. Approx. 10 x 20 vol.

The study of the trabecular vessels of 6-day-old rats showed that the thickness of the venous wall averaged 11.6±0.8 microns, the inner diameter of the venule was on average 20.7±0.6 microns, the thickness of the arteriole wall averaged 14.9±0.22, the inner diameter of the artery averaged -17.1±0.5. The thickness of the capillary wall was on average 4.4± 0.2, the inner diameter of the capillary averaged 5.7 ± 0.3 microns. The wall thickness of the venule of the pulpary vessel is on average 8.4 ± 0.13 microns, the inner diameter of the venule was on average 15.1 ± 0.6, the wall thickness of the arteriole was on average 11.6 ± 0.19, and its inner diameter was on average 12.4 ± 0.5 microns. The thickness of the capillary wall of the pulp vessel was

on average 4.2 ± 0.4, the inner diameter of the capillary was on average 5.5 ± 0.3 microns.

The wall thickness of the lymphoid follicle venule is on average 5.8 ± 0.6, the inner diameter is on average 14.9 ± 0.3. The wall thickness of the lymphoid follicle arteriole was on average 6.3 ± 0.3, and the inner diameter of the LF arteriole is on average 12.1 ± 0.5 microns. The wall thickness of the capillary of the LF vessel averaged 3.2 ± 0.2, and the inner diameter was 5.2 ± 0.3.

The study of the trabecular vessels of 11-day-old rats showed that the thickness of the venous wall was on average 13.1±0.5 microns, the inner diameter of the vein was on average 22.8±0.5 microns, the thickness of the arteriole wall was on average 16.8± 0.5, the inner diameter of the arteriole was on average -20.1±0.12. The thickness of the capillary wall was on average 4.8 ±0.1, the inner diameter of the capillary averaged 5.9 ±0.17 microns.

The wall thickness of the venule of the pulpary vessel averaged 10.3± 0.4 microns, the inner diameter of the venule averaged 19.4± 0.7, the wall thickness of the arteriole was on average 12.8± 0.15, and its inner diameter was on average 13.8± 0.42 microns. The thickness of the capillary wall of the pulp vessel averaged 4.6 ± 0.1, the inner diameter of the capillary averaged 5.7 ± 0.2 microns.

The wall thickness of the lymphoid follicle venule is on average 7.5 ± 0.13, the inner diameter is on average 17.5 ± 0.17. The wall thickness of the lymphoid follicle arteriole was on average 6.8 ± 0.6, and the inner diameter of the LF arteriole was on average 12.4 ± 0.54 microns. The thickness of the capillary wall of the LF was on average 4.0 ± 0.1, the inner diameter of the capillary was on average 5.5 ± 0.2 microns.

The study of the trabecular vessel of 16-day-old rats showed that the thickness of the venous wall was on average 14.4±0.9 microns, the inner diameter of the venule was on average 23.7±0.43 microns, the thickness of the arteriole wall was on average 17.8±0.3 microns, the inner diameter was on average -21.7±0.52. The thickness of the capillary wall was on average 5.4± 0.2, the inner diameter of the capillary averaged 6.3 ± 0.5 microns.

The wall thickness of the venule of the pulpary vessel averaged 10.6 ± 0.6 microns, the inner diameter of the venule averaged 21.0± 0.8, the wall thickness of the arteriole is on average 13.3 ± 0.4, and its inner diameter was on average 15.6 ± 0.7 microns. The thickness of the capillary wall was on average 5.2 ± 0.2, the inner diameter of the capillary was on average 6.0 ± 0.5 microns.

The wall thickness of the lymphoid follicle venule is on average 7.9 ± 0.12, the inner diameter is on average 17.8 ± 0.5. The wall thickness of the lymphoid follicle arteriole was on average 7.2 ± 0.3, and the inner diameter of the LF arteriole is on average 13.1 ± 0.5 microns. The capillary wall thickness averaged 4.2±0.2, the internal diameter of the capillary averaged 6.0±0.4 microns.

The study of the trabecular vessels of 21-day-old rats showed that the thickness of the venous wall averaged 15.7±0.22 microns, the inner diameter of the vein was on average 26.04±0.72 microns, the thickness of the arteriole wall averaged 19.04±0.3, the inner diameter of the artery averaged -23.8±0.4. The thickness of the capillary

wall was on average 5.8± 0.3, the inner diameter of the capillary averaged 6.8 ± 0.7 microns.

The wall thickness of the venule of the pulpary vessel averaged 11.5± 0.8 microns, the inner diameter of the venule averaged 21.6± 0.24, the wall thickness of the arteriole was on average 14.3± 0.8, and its inner diameter was on average 18.2± 0.23 microns. The thickness of the capillary wall averaged 5.5 ± 0.5, the inner diameter of the capillary averaged 6.5 ± 0.1 microns.

The wall thickness of the lymphoid follicle venule is on average 8.9 ± 0.3, the inner diameter is on average 18.2 ± 0.7. The wall thickness of the lymphoid follicle arteriole was on average 8.1 ± 0.4, and the inner diameter of the arteriole is on average 14.3 ± 0.4 microns. The capillary wall thickness averaged 4.5±0.5, the internal diameter of the capillary averaged 6.3±0.1 microns.

References

1. Buklis Yu.V. Study of the immune structures of the spleen under conditions of chronic radiation exposure to the body // Morphology.–2010.– Volume 137.-№ 4. – P. 42
2. Nikityuk D. B., Klochkova S. V., Alekseeva N. T., Kvaratskhelia A. G. Modern ideas about the general patterns of macro-microscopic anatomy of lymphoid organs // Journal of Anatomy and Histopathology. - 2015. - V.4, No. 2 (14). — pp. 9-13
3. Sapin M.R., Biglich G.L. Human anatomy. Volume 1. M.: GEOTAR-Media, 2008. P.608
4. Khasanova, D. A. (2020). Current problems of safety of genetically modified foods (literature review). Biology and Integrative Medicine, (5), 20-27.
5. Khasanova, D. A. (2016). Dogwood as a medicinal plant. Biology and Integrative Medicine, (4).
6. Khasanova, D. A. (2016). Medicinal plant Datura. Biology and Integrative Medicine, (2).
7. Khasanova, D. A. (2021). Possible risks of the impact of genetically modified products on the thymus and spleen of experimental animals. in innovative development: the potential of science and modern education (pp. 279-287).
8. Khasanova, D. A. (2020). Modern Problems of Safety of Genetically Modified Foods (Literature Review). Biology and Integrative Medicine, (5 (45)).
9. Khasanova, D. A. (2017). Modern tools for improving the efficiency of regional innovation structures. in the problems of effective use of the scientific potential of society (pp. 112-121).
10. Khasanova, D. (2021). Morphological features of the thymus in the norm and under the influence of a genetically modified product in the experiment. Society and Innovation, 2(2/S), 407-411.
11. Khasanova, D. (2021). The study of the carcinogenic properties of genetically modified products on the morphology of the spleen. Collection of scientific works ΛΌGOΣ.
12. Khasanova, D. (2021). Structural and functional features of the spleen of rats in the norm and with the introduction of a genetically modified product. Society and Innovation, 2(4), 114-122.

13. Ahrorovna, K. D. (2021). Evaluation of the effect of a genetically modified product on the morphological parameters of the spleen of experimental animals. Academicia: an international multidisciplinary research journal, 11(1), 885-888.
14. Ahrorova, K. D. (2021). Morphofunctional properties of the lymphoid structures of the spleen in norm and under the influence of various factors. Academicia: an international multidisciplinary research journal, 11(1), 459-465.
15. Ahrorovna, K. D. (2021). Age-related morphofunctional features of changes in the thymus gland of experimental animals under the influence of genetically modified product. Middle European Scientific Bulletin, 11.
16. Ahrorovna, K. D. (2020). Effect of a genetically modified product on the morphological parameters of the rat's spleen and thymus. European Journal of Molecular and Clinical Medicine, 7(1), 3364-3370.
17. Akhrorovna, K. D. (2021). Anatomical characteristics of the rat spleen during the introduction of a non-genetically modified product. Conferencea, 7-8.
18. Akhrorovna, K. D. (2021). Macroanatomic characteristics of the thymus gland in rats in early postnatal ontogenesis. Conferencea, 22-23.
19. Akhrorovna, K. D. Medical Field Morphological Features of Human and Mammalian Spleen in Postnatal Ontogeny. JournalNX, 7(1), 252-256.
20. Feng T, Elson CO. Adaptive immunity in the host-microbio-ta dialog. Mucosal Immunol. 2011;4 (1):15-21. doi: 10.1038/ mi.2010.60.
21. Khasanova, D. A. (2021). Morphofunctional changes in thymus gland of rats affected by genetically engineered crops. in advanced research: problems and new approaches (pp. 120-125).
22. Khasanova, D. (2020). Wirkung eines gen-modifizierten produkts auf die morphologischen parameter der strukturen der milz Weißer ratten. InterConf.
23. Khasanova, D. A. (2021). Microscopic structure of the rat spleen during the introduction of a genetically modified product. British Medical Journal, 1(1.2).
24. Khasanova, D. A. (2021). Histological structure of the rat spleen in early postnatal ontogenesis. Art of Medicine. International Medical Scientific Journal, 1(2).
25. Takemura N., Uematsu S. Isolation and Functional Analysis of Lamina Propria Dendritic Cells from the Mouse Small Intestine // Methods in molecular biology (Clifton, N.J.). 2016. № 1422. P. 181–188. DOI:10.1007/978-1-4939-3603-8_17.
26. Xasanova, D. A. (2021). Age-related morphofunctional features of changes in the thyroid gland of experimental animals under the influence of Gmo. Scientific progress, 1(6).