World Bulletin of Public Health (WBPH)
Available Online at: https://www.scholarexpress.net
Volume-52 November 2025
ISSN: 2749-3644

COMPARATIVE MORPHOLOGICAL AND MICROCIRCULATORY CHANGES IN THE LYMPHOID STRUCTURES OF THE SPLEEN OF WHITE RATS DUE TO MAGNESION DEFICIENCY

Teshaev Sh.J.https://orcid.org/0009-0002-1996-4275
Turdiev M.R. https://orcid.org/0000-0002-4847-6628
Bukhara state medical institute named Abu Ali ibn Sina, Bukhara city, Uzbekistan

Article history:
Received: September 20th 2025
Accepted: October 14th 2025

Abstract:
In the article, comparative morphological and microcirculatory changes in the lymphoid structures of the spleen of white rats caused by magnesium deficiency were studied. In the study, morphometric parameters, cellular composition, and microcirculatory changes in the lymphoid tissue of the spleen in magnesium deficiency were analyzed based on an experimental model. The results showed that in alimentary magnesium deficiency, a decrease in the morphometric parameters of lymphoid tissue and the number of lymphoid cells in this organ, an increase in the thickness of the vascular wall, and a decrease in the internal diameter were revealed. The study showed that magnesium deficiency significantly affects the immunobiological function of the spleen and causes degen erative and vascular changes in lymphoid structures. The obtained results serve for a deeper understanding of the morphofunctional processes occurring in the immune system during magnesium deficiency and in the future builds.

Keywords: magnesium failure, spleen, limfoid structures, white rats, morphological changes, microcirculation, white pulp, and the immune system.

ACTUALITY. To maintain the health of the human immune system plays an important role. As a member of the spleen, the immune system is of particular interest, because the immune system of humans and animals is one of the most sensitive systems of the body, any effects will respond quickly [1, 3, 7, 10].
Large secondary member of the spleen limfoid, filtration, cleaning, immune, blood and performs functions such as storage of reserves in the form [1, 9, 11].
Different chemical elements, in particular, is important in maintaining the health of the body's physiological activity and micronutrients. Micronutrients, growth, development, reproduction, lactation, it is necessary to provide gemapoez and other vital processes. Active in their body related to the amount of the immune system [6].
Magnesium is important in the implementation of many regulatory processes in the human body. Magnesium 500 more than of enzymes, the structural part is, metabolic reactions take part in which the main elements is one of. Also, Mg proteins, in particular, connective tissue collagen synthesis in, nuklein acids and lipids exchange is a simple idea, and someone with an active take part will [4].
The importance of magnesium deficiency in his body, the study of human health in terms of the quality of the previous level from the clinic evaluation and allows you to avoid element in their time. In the cells in various systems of the body member and the decrease in the amount of mg (Mg-deficiency) as a result of the development of various pathological processes [5, 8].
THE PURPOSE OF THE RESEARCH Alimentar magnesium in failure of white rats talog'i limfoid structures mikrosirkulyator the comparative morphology and changesin the study accounted.
CHECK MATERIALS AND METHODS
6 and 9 months of age in the period of research was conducted in male rats than 80 without white seed. The rules of ethics on the use of animals in experimentation, Xelsinki the requirements of the congress will follow. Rats were kept in viva simple conditions. Experience in the laboratory of the animal's age, sex, weight, nutrition were kept correspond to the conditions in the environment. Two indicators to determine the structure of the spleen morfofunktsinal the organization of a group of animals was. I group - normative (n=40); group ii – rats given magnesium reached of diet (n=40). For modeling a shortage of micronutrients German "Spezialfutter ALTROMIN gmbh & co. KG" prepared by the firm led to the use of a special feed. Special series no. feed 36/2024 have been provided with an official certificate. 2 sticks per day to rats in the control group

World Bulletin of Public Health (WBPH)
Available Online at: https://www.scholarexpress.net
Volume-52 November 2025
ISSN: 2749-3644

were given the usual feed. Without special body weight in feed per day due to the experience of the group 2 sticks of 20 g were used.

The experimental and control groups was removed from the experiment the rats under anesthesia without the white seed was dekapitatsiya and air. Divorced opened the abdominal cavity were separated. The part of the spleen in 10% formalin in fiksatsiya neytrallash am and after being washed in running water for 2-4 hours, which increased in concentration and spirtlar xloroform suvsizlantirildi, the wax block was prepared in accordance with generally accepted methods. Mkm wax blocks 4-6 thick cut down gematoksilin – eozin and van for your business, the method was painted. The spleen of drug structure struktur okulyar-check mikrometr morfometrik was using. Limfoid follikul in the spleen, germinativ the center of the diameter, the relative area of the white pulp (compared to the total area of the incision), periarterial limfatik coupling feature of this joint width, as well as the inner diameter and the thickness of the walls of the blood vessels was measured. Each of the five histological measurements in the view area of the incision was carried out. View of the area were selected on a random basis. The white pulp of the spleen structure struktur descriptive of the condition of morfofunksional follikulyar koeffisenti (FC), koeffisenti limfoid (LK) and Kernogan index (KI), such as to identify indicators (2). Rid of this was carried out on the basis of the formula:

a) $FC=(S_{,OP}\times D_{LF})/200$, here S_{OP} – relative of the white pulp area, D_{LF} – limfatik follikul in diameter, 200 – optional koeffisenti

b) $LK=D_{LF}/L_{PALM,}$ where d_{LF} – limfatik follikul in diameter, L_{PALM} – limfatik periarterial coupling feature of this joint width

c) $KI=(2\times L)/D$, here L – central artery devoq of qali, D – central artery internal diameter.

In order to study the structure of the cells of the spleen limfoid, NOVELLA NLCD Model-307 (China) using a microscope, pitches immersiya under structural qismalarida of the white pulp (periarterial limfatik this joint coupling feature germinativ center, the mantiya and marginal area)on the number of cells was counted. Okulyar installed to count the number of cells was carried out using a microscope to morfometrik November.

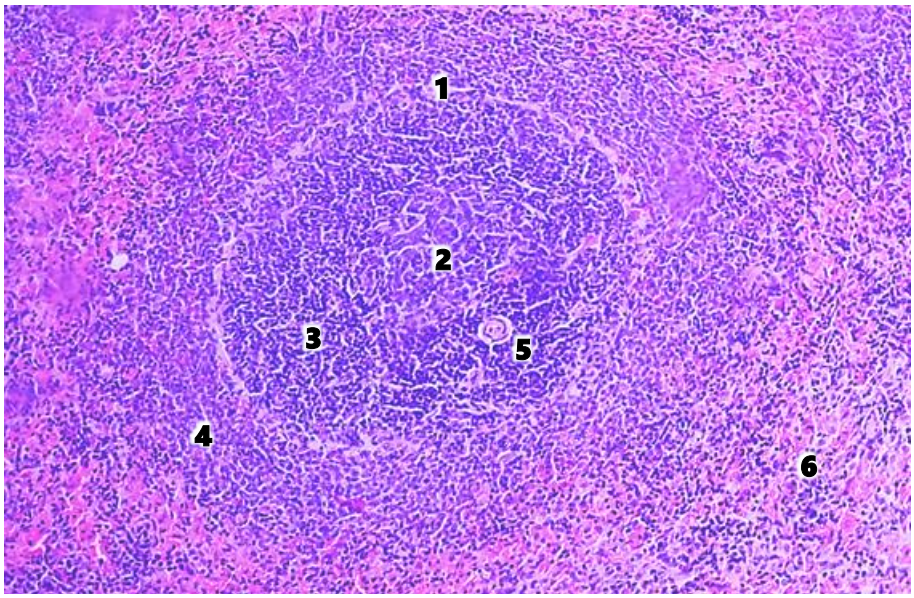
Geese gusto obtained during the research and mathematical data processing sitomorfometrik Pentium IV personal computer with microsoft office Excel "7,0" practical directly through the software package was carried out.

The statistical processing of the survey data Strelkov (1986) were used without statement, parametrik variatsion was done using statistical methods. The significance of the difference in value compared Styudent t-were assessed using the criteria. Differences of $p\leq0.05$ statistical significance is that it has a value of up to.

RESULTS AND ANALYSIS. 6 months without healthy white seed of the white pulp of rats spleen periarterial zones its with is 88,76±1,14 mkm city and marginal zone width of his nest , respectively, 45,74±1,0mkm 4 and 82,16±1,12 mkm is equal to (fig.1). The relative area of the white pulp 22,18±0,71%, limfoid follikul diameter of 42 are2,46±11,14 mkm to the diameter of the reproduction center, 137,24±3,32 mkm to was. Follikulyar koeffitsent 468,51 to limfoid koeffitsent while 4,75 equal.

The thickness of the wall 17,82 central artery of laboratory animals spleen ±mkm of 0.38, while its internal diameter 21,16±0,46 was to mkm. Kernogan index 1,68 is equal to. Veins are the blood vessels of the thickness of the wall 22,94±0,18 mkm, while its internal diameter 32,74±0.16 is equal to mkm. The thickness of the capillary walls 4,91±0,12 mkm, while the internal diameter 6,14±0,26 mkm make up.

World Bulletin of Public Health (WBPH)
Available Online at: https://www.scholarexpress.net
Volume-52 November 2025
ISSN: 2749-3644



Spleen of a 6-month-old white rat in the control group. Stained with hematoxylin-eosin. Ok. 10 x volume. 10. 1-lymphoid follicle, 2-reproduction center, 3-mantial region, 4-marginal region, 5-PALM, 6-red pulp.

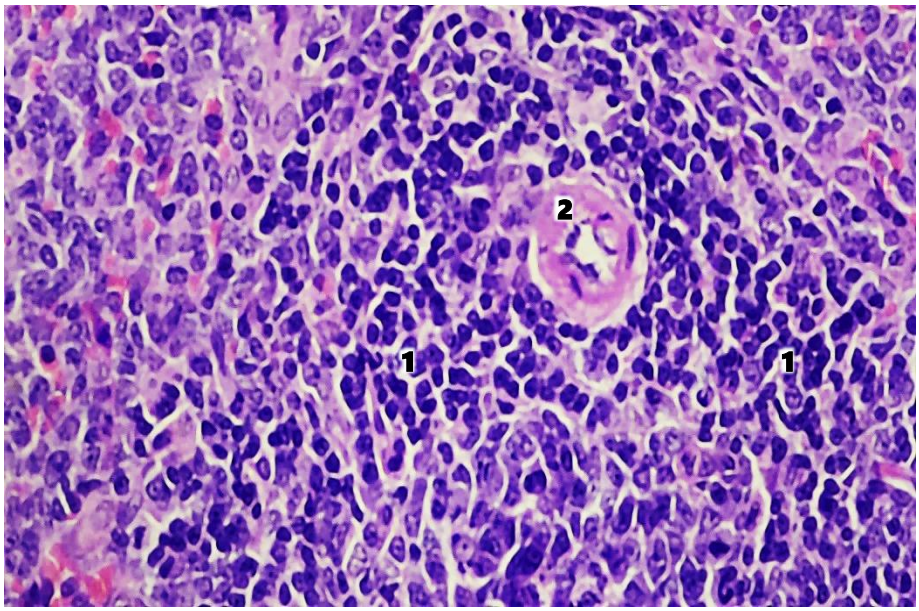
9 monthly intakt without white seed of rats talog'i periarterial sohlekarzem his average width - 83,94±1,22 mkm, manti city and marginal sohasthe width of his nest fit without 43,92±1,06 mkm and 77,16±1,18 mkm is equal to. the relative area of the white pulp 20,12±0,54 %, limfoid follikul 416,14 diameter±9,21 mkm to the diameter of the reproduction center 129,12±2,82 mkm was. Follikulyar koeffitsent 418,63to limfoid koeffitsent while 4,95 equal.

The thickness of the wall talog'i central artery of laboratory animals 17,92±spends 0.34 mkm, while its internal diameter 21,07±0,42 was to mkm. 1,70 Kernogan index equal to. The thickness of the wall of blood vessels veins 25,82±spends 0.34 mkm, while its internal diameter 34,96±0,48 mkm make up. The average thickness of the capillary wall - 5,12±0,32 mkm, while the internal diameter 6,82±of 0.38 was to mkm.

The amount of lymphocytes in the white pulp structure struktur of spleen 6 monthly laboratory animals when analyzing the average in the center of the reproduction - 120,32±1,22 units, periarterial the average in the area - 102,18±1,24, mantiya in the field of average - 133,48±1,34 units, the average marginal area - 100,17±1,16 units, respectively. 9 month age period increased in rats while the average white in the center - 114,64±1,16 units, periarterial the average in the area - 93,24±1,14 units, mantiya in the field of average - 126,63±1,18 units, the average marginal area - 92,96±1,12 than detected (fig.1).

I am modeling the breed of rats in the group without magnesium shortage spleen white periarterial sohacwidth white rats in the control group and 9 times respectively in comparison with the 6-month period decreased to month age 1,01. Manti city and marginal sohasthe width of his nest , respectively, in 6-month age period and 1,02 times, 9 times, respectively, while to decrease your monthly yoshdavrida 1,01 were determined. The relative area of the white pulp of the young during the period of 6 months was 1.6%, while 9-month age period 3,0% were observed to be reduced by. Diameter corresponding to the period for both age limfatik follikul without 1,02 times, respectively, and decreased the diameter of the center germinativ 1,01 1,02 times.

World Bulletin of Public Health (WBPH)
Available Online at: https://www.scholarexpress.net
Volume-52 November 2025
ISSN: 2749-3644



Spleen of a 6-month-old white rat in the group of alimentary Zn deficiency. Stained with hematoxylin - eosin. Ok. 10 x volume. 40. 1-Lymphocyte count decreased, 2-Vessel wall thickened, diameter reduced.

The thickness of the wall of the central artery of laboratory animals talog'i age 6 and 9 months, respectively, in the period corresponding to the period of the internal diameter sezilarsiz 1,01 premium times without narrowing at the level of the age.The thickness of the walls of blood vessels veins in 6-month age period from 3.5% to 9 months of age during the period of 4.2% in the corresponding period of the age of the inner diameter without decreased by 3,2% and 4,1% increase. The thickness of the capillary walls 6 and 9 months of age corresponding to 1.2 times the internal diameter of the case in the period corresponding to the period of the age of 1,09 increased by 1.2 times and were determined to be without. Structures determines the functional state of the spleen in young limfoid follikulyar koeffitsent 6 1,04 times the monthly period, 9-month period in young 1,05 times, indicating the ratio of t and b fields corresponding to the size of the period without age limfoid koeffitsent 1,01 times blood toreflect a level of conductivity of miriv age of 6 and 9 months, respectively, in the period kernogan index 1,01 times were determined to be increased.

White seed of the white pulp of rats for 6 months without talog'i germinativ center, periarterial limfatik this joint coupling feature, and the number of lymphocytes in the marginal areas mantiya breed rats in the control group in comparison with the white without the fit without 1,0%, 4,4%, 2,8% 3,5%, and 9 month age period while without becoming was 1.7%, 6,3%, and the reconstruction of 3.7 3.8% and decreased by.

CONCLUSION. Significant changes in the lymphoid structures of the white pulp of the spleen were observed in white outbred rats with modeled magnesium deficiency. In particular, the width of the periarterial lymphoid bundle, the mantle and marginal zones, the diameter of lymphoid follicles and germinal centers decreased even at the age of two compared to the control group. A decrease in the relative area of the white pulp, as well as a decrease in the follicular and lymphoid coefficients, indicates a decrease in the functional activity of the immunocompetent areas of the spleen. With magnesium deficiency, thickening of the walls of the central artery, vein, and capillary, and a decrease in diameter were observed. An increase in the Kernogan index indicates a change in the permeability of microcirculatory vessels. The results of the study indicate a negative effect of magnesium deficiency on the components of the white pulp of the spleen, the state of blood vessels, the composition of lymphocytes, and a decrease in immunological reactivity.

World Bulletin of Public Health (WBPH)
Available Online at: https://www.scholarexpress.net
Volume-52 November 2025
ISSN: 2749-3644

LITERATURE LIST:

1.Alekseeva N.T., Kvarasxeliya A.G., Along With The Major Religions D.A. Baxmet A.A. Popov M.V., Verdiyan G.G., Klochkova S.V. Funktsionalnaya selezenki pride in morphological immunnix struktur povrejdayutshix faktorov deystvii. Anatom matter gistopatologii magazine. 2021; 10(3): 91-97.provinces: 10.18499/2225-7357-2021-10-3-91-97.

2.Volkov, V.P. Noviy algorithm morfometricheskoy funktsionalnoy immunomorfologii selezenki otsenki [electronic resource] / V.P. Volkov // Universum: Medisina pharmacology I: the electronic journal nauchniy.-2015.-№5-6 (18). URL: http://7universum.com/ru/med/archive/item/2341.

3.Twisted In L.Yu., Kozlov V.A. Sapojnikov S.P., Geraev RA. The reaction that neither michelle limfoidnoy tv selezenki belix amiloidogenez. In The Act Of Medical Eurasica. 2020;(3):30-36 provinces: 10.47026/2413-4864-2020-3-30-36.

4.Pestrikova T.Yu., Yurasova E.A. I Yurasov.V. Role of magnesium in biologicheskaya defisita v narushenii gomeostaz jentshin: sunny literature. Gynecology. 2016; 18 (2): 63-66.

5.Troegubova N. A. Rilova N. V., Gilmutdinov R. R., Rilova N. V. I sportsmenov magnesium metabolism in ts it // So the problem vremennie nauka I obrazovaniya. — 2014. — № 4. S. 1-7.

6.Fedorov V.I. Problema opredeleniya mikroelementov v krovi cheloveka k sivorotke // I lecture Analytics. 2005. T.9. n 4. S.358-366.

7.Chava S.V., Buk Yu.V. Struktur xarakteristik of immunnix obrazovaniy selezenki vozdeystviya radiasionnogo factor in michelle nizkoy intensivnosti handle pos. Morfologicheskie will vedomost. 2011;(4):65-68.

8.A Shilov. M. V defisita role in magnesium serdechno-sosudistom kontinuume // Lechebnoe delo. 2013. № 4. S. 73-82. URL: https:// cyberleninka.ru/article/n/rol-defitsita-magniya-v-serdechno-sosudistom-kontinuume.

9.The ces, m. f. Normal structure, function and Histology of the spleen / Ces m. f. // Toxicologic Pathology. – 2006. – No. 34. – P. 455-465. provinces: 10.1080/01926230600867743

10.In the riv MA, Ferraina S,Paleari is a Tape, MV, Di Sabatino A. From stiffness to sadness: the spleen's progress. From Inter Emerge As Med. Aug 2019;14(5):739- 743. provinces: 10.1007/s11739-019-02115-2.

11.Tarantino, G. Spleen: an old rolan for a new player? / G. Tarantino, S. Savastano, Capone, D. [et al.] // World journal of gastroenterology. – 2011. – Voles. 17, № 33. – P. 3776-3784.