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Review Article

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Immune Protection of the Small Intestinal and Chemical Factors affecting It

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Abstract One of the large peripheral parts of the immune system is intestinal-associated lymphoid tissue. The immune structures associated with the mucous membrane are immunologically active tissue. About 80% of all immune cells in the body are associated with the intestinal mucosa. It is in close contact with the flow of microbial material, and serves as the first barrier in its path.

Keywords small intestine, lymphoid tissue, chemical factors

Introduction

The jejunum is a section of the small intestine, which occupies an intermediate position between the duodenum and the ileum, and from a morphological position it reflects the basic principle of the structure, being the most functionally active section, especially the proximal part [6, 21]. The polyfunctionality of the small intestine allows it to participate in many processes determined by immune responses that induce restoration, protection, and radioresistance [16]. It was lymphocytes that received the status of the main cells that provide the immune process and the specificity of immune responses [21].

Among the immune formations of the digestive system, lymphoid nodules (Peyer's patches) of the small intestine play an exceptional role. They, like the thymus, amygdala, mammalian appendix, belong to the lymphoepithelial organs, in which lymphopoiesis occurs and are in close interaction with the reticular tissue, epithelium [2,4,5]. In birds, the thymus and bursa are the primary organs of lymphopoiesis, in which T and B lymphocytes differentiate, respectively.

An analogue of the bursa has not been found in mammals, although some authors consider the appendix and Peyer's patch as such. The basis for such assumptions may be the topographic location of their digestive tract, as well as the location on the antimesenteric side, in contact with the epithelium [9,10,11].

Recently, the gastrointestinal tract has been considered as an essential component of the general immune defense - [13,15,17]. The lymphoid accumulations of the colon are of great importance in the immune status of the body. Therefore, without exact knowledge of the peculiarities of the location of these formations, it is impossible to understand the degree of their participation in the immune functions of the body [22,24,26].

The topographic feature of the lymphoid component in the intestinal wall, one of the protective barriers in the path of antigens, makes it possible to assess the effect of influencing factors. The importance of Paneth cells in some studies, as well as plasmacytic infiltration of the own layer of the mucous membrane, which determine the resistant nature of the reaction of the small intestine, has been noted [7,8,9]. Thus, lymphoid cells are an operational subsystem, the biological essence of which is tissue variability and its adaptation to environmental conditions [1,3].

Immunocompetent cells of lymphoid nodules of the gastrointestinal tract, in contrast to similar other organs of immunity that are not associated with the gastrointestinal tract, are distinguished by the highest, ten times greater

than in other organs, ability to migrate. The antigen from the intestinal lumen is transported through the M cells to the zone of the dome of the Peyer's patch. There, with the help of a macrophage, it is presented to T- and B-lymphocytes [11,12]. Activated, they are delivered through the lymphatic pathways to the mesenteric lymph nodes, the spleen. Subsequently, T- and B-lymphocytes enter the lamina propria of the mucous membranes of the gastrointestinal tract, respiratory and genitourinary systems, lacrimal, salivary, mammary glands. T-lymphocytes predominantly find themselves between epithelial cells, B-lymphocytes differentiate mainly (80%) JgA - secreting plasmacids. On this basis, grouped lymph nodules should be considered as the main activator of the immune properties of both the gastrointestinal tract and the lung, urogenital tract [22,23].

Stimulation of the immune system of the small intestine by normal microflora leads to an increase in the level of sJgA in the secretions of the bronchopulmonary tract, cervix, elimination of bacterial vaginosis, remission of bronchopulmonary diseases [1,2].

The state of the internal environment of the body depends on environmental factors. Considering the fact that most toxic substances enter the body through the digestive tract, the role of lymphoid formations and the lymphatic channel among the immune organs in the mechanisms of defense and adaptation increases. According to a number of researchers, the hollow organs of the digestive tract are the gateway between the internal and external environment, therefore they are considered as a component of the exoecological environment [5,6].

So, in rats, when exposed to sodium bichromate in the stomach and small intestine of white rats, reactive and compensatory-adaptive changes are revealed: characterized by focal lesions of the stomach, focal simultaneous filling of blood vessels and perineural space, due to increased permeability of vascular walls, changes in the lymphomicrocirculatory bed of regional lymphatic nodes of white rats with acute chromium intoxication are expressed in an increase in the volume of sinuses as a result of an increase in lymph outflow in the early stages of the experiment (days 1 and 3), and later on the 7th day of the experiment - regional and general stagnation of lymph.

An increase in the number and volume of lymphoid plaques in all parts of the intestine, an increase in the specific area of lymphoid nodules, especially nodules with light centers, a significant decrease in the volume of the internodal zone, impaired recirculation of small lymphocytes [1,2,3].

Thus, an increase in lymph outflow and an increase in the volume of sinuses and lymphoid nodules, active manifestations of cellular transformation in acute chromium intoxication is the main link in the development of the immunological reaction of the gastrointestinal tract [2].

Long-term exposure of the body to even small concentrations of chemicals contributes to the emergence of latent, low-symptom forms of chronic intoxication, which makes it especially necessary to search for new ways to study their pathogenesis, as well as to develop new methods of diagnosis and prevention. For example, the effect of pesticides on the lymphoid formations of the colon was studied [3,7,9].

Immediately after the birth of rat pups, daily female rats of the experimental group (25%) were injected cypermethrin with a thin metal tube into the stomach, the daily dose was 5 MDU (0.05 mg). The study of the cellular composition of lymphoid formations showed that in the control the largest number of large and medium lymphocytes is observed in the early periods, small lymphocytes - in the late periods of postnatal ontogenesis. In the experiment, compared with the control, the content of large and medium lymphocytes increases, the number of small lymphocytes decreases [3,4].

Thus, the study has shown that lymphoid formations along the colon and at each age have their own characteristic features. During the experiment, a change in the shape of lymphoid accumulations and an acceleration of the formation of their zones were revealed, infiltration of lymphocytes around the vascular zone and subepithelial layer was noted. Cypermethrin, passed through the mother's milk, by the 11th day causes an increase in lymphocytic infiltration of the epithelium, contributes to an increase in the proportion of large and medium lymphocytes in lymphoid nodules [3].

The quantitative content of lymphocytes in the epithelial cover of the villi of the small intestine of rat pups up to 3 months of age was also studied in normal conditions and in case of poisoning with cotoran. The results of the study showed that under the influence of which in the early stages of the experiment, the infiltration of the epithelial cover of the villi of the small intestine by lymphocytes increases, and in the later periods it gradually approaches the

control group. With age, in both groups, there is a tendency to an increase in the percentage of small lymphocytes against the background of a decrease in medium and large ones, which indicates an increase in the proportion of mature lymphocytes in the epithelial cover [4,5].

The lymphoid organs of the immune system play an important role in immunogenesis [1,2,3]. Cytolysis, inhibition of proliferation, mobilization and redistribution of lymphocytes in lymphoid organs are one of the manifestations of radiation exposure [5,6,]. Under the action of large doses of radiation in the near future, immunosuppression is noted in various parts of the immune system [9,6], leading to an immune-deficient state [21,26], while in the long-term period after sublethal gamma radiation changes in the central and peripheral lymphoid organs of the immune the system is of great interest.

In the long-term period after the sublethal action of gamma radiation in the bone marrow and spleen normalization of the number of lymphoid cells is noted. In the thymus and lymph nodes of the small intestine, the number of lymphoid cells is reduced [27]. In the thymus and spleen, atrophy is determined, in the lymph nodes of the small intestine - a reduced lymphoid index. It is possible that the mechanisms of the development of stress reactions depend on adaptation and inadequacy of physiological protective measures of the organism.

Normalization of bone marrow hematopoiesis and an increase in lymphoid cells in the spleen, and a decrease in the number of lymphoid cells in the lymph nodes of the small intestine will expand the adaptive capabilities of the body, which will increase the body's resistance to radiation factors [5,6].

The mucous membrane and submucosa of the ileal wall are the zone where the main structural and cellular transformations unfold under experimental toxic (selenium) exposure; the mechanism of development and the degree of manifestation of which depends on the method of administration of sodium selenite (orally or intraperitoneally) and the duration of its action [24,25].

A single use of a toxic dose of sodium selenite leads to a decrease in the area of interstitial spaces in the intestinal wall, a reduction in the area of the marginal and cerebral sinuses of the mesenteric lymph node, hypoplasia of the Peyer's plaque and mesenteric lymph node, causing a violation of the drainage and detoxification functions of the lymphatic region of the ileum [16, 17].

The severity of changes is greater with the intraperitoneal route of administration. After the cancellation of the administration of sodium selenite (on the 9th day), the values of the morphological and functional indicators of the main links of the lymphatic region and the membranes of the ileal wall decrease again, while a large degree of changes is characteristic: with the oral route of administration - for the structural components of the intestinal wall, and with the intraperitoneal route - for the mesenteric lymphatic node. [16, 17].

The experimental data presented in the review indicate the important role of lymphoid tissue under conditions of exposure to various extreme factors on the body and it can be argued that all concomitant rearrangements occurred at the level of interaction of lymphocytes with the target tissue and are associated with the nature of intracellular changes in lymphocytes that determine the path to controlled change. pathogenesis of diseases.

The polyfunctionality of the small intestine determines its participation in many processes accompanied by immune responses that induce recovery. Taking into account the migratory abilities of lymphoid cells, their capabilities in receiving information and interacting with other organs are expanded. They are able to provide a quick change from the program of the normal development of the body to the reserve and vice versa.

References

[1]. Scottish Government Polypharmacy Model of Care Group. Polypharmacy guidance: realistic prescribing, 3rd edition. Edinburgh: Scottish Government Model of Care Polypharmacy Working Group; 2018

[2]. Polypharmacy: guidance for prescribing. Llandough: All Wales Medicines Strategy Group; 2014 Scottish Government Polypharmacy Model of Care Group. Polypharmacy guidance: realistic prescribing, 3rd edition. Edinburgh: Scottish Government Model of Care Polypharmacy Working Group; 2018

[3]. Guidelines for Residential Medication Management Review (RMMR) and Quality Use of Medicines (QUM) services. Deakin: Pharmaceutical Society of Australia; 2011 Multimorbidity and polypharmacy.

London: National Institute for Health and Care Excellence; 2019 (https://www.nice.org.uk/advice/ktt18; accessed 22 March 2019).

[4]. R. Mir, N. Singh, G. Vikram et al., "Structural and binding studies of C-terminal half (C-lobe) of lactoferrin protein with COX-2-specific non-steroidal anti-inflammatory drugs (Anti-inflammatory drugs)," *Archives of Biochemistry and Biophysics*, vol. 500, no. 2, pp. 196–202, 2010.

[5]. K. D. Rainsford, "Ibuprofen: from invention to an OTC therapeutic mainstay," *International Journal of Clinical Practice*, vol. 178, pp. 9–20, 2013.

[6]. L. M. Lichtenberger, Y. Zhou, V. Jayaraman et al., "Insight into NSAID-induced membrane alterations, pathogenesis and therapeutics: characterization of interaction of Anti-inflammatory drugs with phosphatidylcholine," *Biochimica et Biophysica Acta*, vol. 1821, no. 7, pp. 994–1002, 2012.

[7]. J. L. Santos, V. Moreira, M. L. Campos et al., "Pharmacological evaluation and preliminary pharmacokinetics studies of a new diclofenac prodrug without gastric ulceration effect," *International Journal of Molecular Sciences*, vol. 13, no. 11, pp. 15305–15320, 2012.

[8]. L. Liu, J. Cui, C. J. Song et al., "H(2)S-releasing aspirin protects against aspirin-induced gastric injury via reducing oxidative stress," *PLoS One*, vol. 7, no. 9, Article ID e46301, 2012.

[9]. Szlachcic, G. Krzysiek-Maczka, R. Pajdo et al., "The impact of asymmetric dimethylarginine (ADAMA), the endogenous nitric oxide (NO) synthase inhibitor, to the pathogenesis of gastric mucosal damage," *Current Pharmaceutical Design*, vol. 19, no. 1, pp. 90–97, 2013.

[10]. Насирова Сабина Зауровна, ТешаевШухратЖумаевич. Иммуннаязащитатонкойкишкиивоздействующиенанеехимическиефакторы// International journal of research in economics and social sciences (ijress). oc t o b e r 2020 - c. 158-172

[11]. Shin E.V., Nasirova S.Z. The efficaci of Mebavin in the treatmen of chronic glomerulonephitis mixed form // Ёшолимларкунлари 16 апрель 2014 г. - С. 92-93

[12]. Shin E.V., O.V.Skosireva, Khalmetova F.I., Nasirova S.Z.Experience Mebavin in patients with chronic glomerulonephitis // Ёш олимлар кунлари Тиббиётнинг долзарб масалалари 4-илмий амалий анжуман 16 апрель 2014 г.- С. 228-229

[13]. W. Fan, Y. Wu, X. K. Li et al., "Design, synthesis and biological evaluation of brain-specific glucosyl thiamine disulfide prodrugs of naproxen," *European Journal of Medicinal Chemistry*, vol. 46, no. 9, pp. 3651–3661, 2011.

[14]. S. C. Young, K. M. Fabio, M. T. Huang et al., "Investigation of anticholinergic and non-steroidal anti-inflammatory prodrugs which reduce chemically induced skin inflammation," *Journal of Applied Toxicology*, vol. 32, no. 2, pp. 135–141, 2012.

[15]. M. Qandil, "Prodrugs of nonsteroidal anti-inflammatory drugs (Anti-inflammatory drugs), more than meets the eye: a critical review," *International Journal of Molecular Sciences*, vol. 13, no. 12, pp. 17244–17274, 2012.

[16]. Yellow Card Scheme. Guidance on adverse drug reactions. London: Medicines and Healthcare Products Regulatory Agency; 2019

[17]. Abdullayeva M.A., Abdurakhmonov M.M. Congenital risk factors in uzbek population with nonspecific aortoarteriitis// European science review. Austria. - 2018. - №11-12. - P. 51-53.