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FEATURES OF CELLULAR REACTIONS IN HELMINTISES

Annotation. Cellular reactions during helminthiasis have a certain typification, characterized by infiltration by resident cells.

Key words: helminthiasis, infiltration, eosinophilia, proliferation, echinuriosis, lymphocytic and histocytic elements.

RELEVANCE OF THE TOPIC

Many helminths have a damaging effect on the tissues of the host through the inflammatory changes they provoke that are not associated with immune mechanisms. Helminths do not secrete special substances that have a toxic effect on tissue, but some products of their metabolism (for example, helminth secretions, which ensure their penetration into tissue; sex hormones of parasites; excrement, etc.) are antigens and contribute to the development of inflammatory reactions. At the same time, the permeability of capillaries increases and cells accumulate in the lesion, which can cause an inflammatory process. In turn, the host cells die as a result of the physical effects of parasites or due to the activation of immune mechanisms.

In the host body, helminths cause a wide range of immune reactions, the nature and mechanism of which are specific, since parasitic worms can be a source of numerous antigenic stimuli. The host's response to the release of antigens by parasites is manifested by the appearance of connective tissue cells. Of these, resident cells (fibrocytes, fibroblasts, macrophages, mast and plasma cells) and immigrant cells (lymphocytes, eosinophils, neutrophils), which perform protective functions, including immunological ones, are of particular importance.

The types of immune reactions are determined primarily by the nature and amount of the antigen. The characteristics of immune reactions in various helminthiases have not been sufficiently studied.

PURPOSE OF THE RESEARCH

Identify the features of cellular reactions during helminthiasis.

MATERIALS AND METHODS OF RESEARCH

The study was carried out in the vivarium and the central research laboratory (CRL) at ASMI (Andijan State Medical Institute). The following animals with various parasitic diseases were selected for the study: waterfowl (ducks and geese) with echinuriosis - 5, dogs and rabbits with trematodiasis - 2. Histochemical, microscopic, biochemical studies of the mucous membranes, submucous membranes, muscular membranes of the stomach, intestines, and pancreatic walls were carried out ducts and the liver itself of animals.

RESULTS OBTAINED

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The cells covering the helminth larvae are of great importance in the development of the immune response during helminthiasis. These cells are of several types, which have the ability, in the presence of antibodies, to attach to the larvae of schistosomes, microfilariae, and hookworms. Most often, these are eosinophils, although under some conditions macrophages and lymphocytes can attach to the parasites. Among the attached lymphocytes there may also be nonspecific K-cells. In this case, the surface of the helminth is damaged by lysosomal enzymes, which are secreted by the attached cells, which can be fatal to the parasite.

Some types of helminths are characterized by the deposition of eggs in individual organs, sometimes in huge quantities. But in any case, the release of helminth eggs occurs in the host's body, that is, outside the parasite itself. The influence of the release of helminth eggs into the endostasis can play both a positive and negative role. In the first case, helminth eggs can be used by the parasites themselves to maintain trophism, especially if the helminth is encapsulated, as is the case with paragonimiasis. In the second option, helminth eggs secrete their own antigens, which contributes to the development of host responses in the form of atypical inflammation.

With many helminthiasis, structural and functional disorders of different parts of the digestive tract of humans and animals are observed. In the early stages of the development of helminthiasis, cellular reactions are characterized by the formation of cellular infiltrates from leukocyte elements, which are detected in the mucous, submucosal and muscular membranes of the stomach, intestines and ducts of the glands of the digestive tract. Extensive infiltrates in the mucous membrane consist predominantly of neutrophils with significant inclusion of eosinophils. Clusters of giant cells appear around dead parasites. An increase in zones of cellular infiltrates in the mucous membrane itself and in intermuscular tissue with a predominance of eosinophils and many round cell forms was noted when studying echinuriosis in geese on the 14th day of invasion. After 21 days, diffuse infiltration of intermuscular tissue with eosinophils and lymphoid cells was noted, forming extensive clusters. On the 34th day after infection, the development of diffuse infiltrates with a predominance of lymphoid cells and lymph-like formations was established in the area of the deep glands. With echinuriosis in geese, a predominance of proliferative-productive changes was revealed with an increase in lymphoid cells, an allergic reaction characterized by intense local tissue and general eosinophilia. In experimental tetramerosis, desquamative catarrhal inflammation of the deep glands is noted, and as helminths grow and develop in them, degeneration and atrophy of the glandular tissue occurs. In the mucous membrane of the glandular tissue of the stomach, the development of moderate catarrh was observed, and in the periglandular tissue, slight edema and cellular infiltrates of lymphoid and histiocytic elements were observed.

An inflammatory reaction in the form of hyperemia of the vessels of the mucous membrane with the formation around them of round cell infiltration by lymphoid and histiocytic cells with the presence of eosinophilic leukocytes was observed during polymorphosis of ducks. The development of pseudotumor infiltrative-ulcerative gastroduodenitis was indicated at the early stage of opisthorchiasis in humans, which developed suddenly in the 3rd month of the disease. This form of gastritis is based on infiltrative or infiltrative-ulcerative changes of allergic origin. Studies have shown that invasion stimulates the migration of T lymphocytes and dividing progenitor cells from the lymphatic ducts, which then settle in the mucosa along the entire length of the intestine, causing an immune response upon local antigenic stimulation.

Further histological and histochemical studies made it possible to establish that mechanical damage to the organs of the digestive tract is subsequently accompanied by inflammatory reactions with intense proliferation of cells of the reticuloendothelial system. It has been established that with helminthiases, predominantly lymphoid inflammatory infiltrates are formed, and dystrophic,

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necrobiotic and necrotic processes develop, which are a consequence of the toxic effects of helminth waste products.

It has been established that the localization of eosinophilocytes near parasites and the enhancement of their antiparasitic functions are ensured by immunoglobulin (Ig)E-dependent reactions of mast cells, which cause degranulation of eosinophils, i.e., the fusion of granules with the cytoplasmic membrane containing various substances, including neurotoxin, peroxidase, histaminase, phospholipase D, hydrolytic enzymes, acid phosphatase, collagenase, Zn, cathepsin, and release of their contents into the extracellular environment. When studying hypereosinophilia, it was revealed that it decreased, and also possibly disappeared under the influence of corticosteroid therapy, which is associated with inhibition of eosinophilopoiesis. The decrease in the number of eosinophils occurs due to cells with normal density, while cells with low density remain little changed.

CONCLUSION

It was revealed that eosinophilocytes in the walls of the pancreatic ducts and liver are larger in size (18.4–20 μm) compared to blood eosinophils (11.5–12.5 μm). When stained with Mallory, eosinophil granules of different sizes are stained bright orange, which may indicate the presence of lipoids. The nucleus can be rod-shaped, horseshoe-shaped, segmented, depending on the degree of maturity of the cell. Activation of mature eosinophils is ensured by many factors, of which substances secreted by T lymphocytes and macrophages are noted. It was revealed that eosinophilia during trematodes in the host tissues is accompanied by the accumulation of T-lymphocytes and macrophages with their predominance among other cellular elements. It is noted that infiltration by eosinophilocytes is the same for all trematodes and the eosinophilic reaction occurs regardless of the level of organization of the host (warm-blooded or cold-blooded animals), providing protection for the host from the damaging effects of helminths.

During intensive invasion by trematodes, eosinophils enhance their effect on the parasite, destroying helminths by releasing special substances present in granules, providing mechanisms for the formation of homeoresis of the parasitic system at this level of organization.

Thus, cellular reactions during helminthiasis have a certain typification, characterized by infiltration by resident cells, among which there are fibrocytes, fibroblasts, macrophages, mast and plasma cells, and immigrant cells, mainly eosinophils and lymphocytes, which perform protective functions, including immunological reactions of the host.

REFERENCES USED:

1. Astafiev B.A. Parasitism and parasitosis. Infestations and diseases. // Sat. slave. "Experimental models of parasitosis in biology and medicine." – M.: Nauka, 1989. – P. 8.
2. Bryleva A.V., Frolov A.V., Dodonov M.V. Morphofunctional mechanisms of eosinophilia in trematodes // Medicine in Kuzbass. – 2008. – Issue. 2. – P. 28.
3. Vorobyova E.I. Ecological and morphological studies of “parasite-host” systems during parasitism of trematodes in different endostacies in mammals: Abstract of thesis. dis. ...cand. biol. Sci. – Kemerovo, 1992. – 25 p.
4. Dodonov M.V. Micromorphological features of the triad – liver, pancreas, duodenum – as a xenoparasitic barrier in the “parasite-host” system in opisthorchiasis: Abstract of thesis. dis. Ph.D. biol. Sci. – M., 2007. – 23 p.
5. Dodonov M.V., Bryleva A.V., Dodonova G.X. Eosinophilia in opisthorchiasis // Medicine in Kuzbass. – 2009. – Issue. 3. – P. 53.

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6. Zabello E.M. Features of the pathomorphology of polymorphosis, tetramerosis and echinuriosis in ducks // Tr. 2nd All. conf. on animal pathology. – M: MBA Publishing House, 1964. – T. 46. – P. 25–27.
7. Melnikov V.I., Nalobin A.V. Allergic pseudotumor gastritis in the early phase of opisthorchiasis // Med. parasitol. and parasite. bol. – 1977. – No. 6. – P. 700–703.
8. Nacheva L.V., Vorobyova E.I. Morphofunctional features of the relationship between the parasite and the host in paragonimiasis. – Kemerovo, 1996. – 125 p.
9. 11. Kazheniauskas E. Histochemical study of mucopolysaccharides in the small intestine of chickens with experimental ascaridiosis // Mater. na-uch. conf. All islands helminthol. – M., 1961. – Part 1. – P. 53–55.
10. 12. Kazheniauskas E., Danelius I. Materials on the study of alkaline phosphatase and histochemical changes in experimental ascaridiosis in chickens // Proc. report VII All. conf. on the natural focality of diseases and general issues of animal parasitology. – Alma-Ata – Samarkand, 1969. – pp. 59–64.