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CELLULAR COMPOSITION AND MITOTIC ACTIVITY OF LYMPHOCYTES IN THE LYMPH NODES OF PEYER'S PATCHES OF THE SMALL INTESTINE

Abstract. The small intestine is constantly in contact with natural antigens, first of all with highly immunogenic microorganisms, and undergoes drastic structural and functional reconstructions. They are manifested by changes in the linear parameters of villi and crypts, acceleration of enterocyte renewal, increased infiltration of interepithelial lymphocytes, enrichment of the private plate with immunocompetent cells, clear separation of structural and functional zones of Peyer's cells.
Keywords: lymphoid follicle, Peyer's cell, mitotic activity of lymphocytes, interepithelial lymphocytes.

INTRODUCTION

Peyer's patches (PP) of the small intestine arise at later stages of development of the immune system of the gastrointestinal tract. In the embryonic period, PP are not regarded as a functioning organ, but only a complex of structures stimulating organogenesis and immunogenesis. In the 4th month of embryonic development, PP first appear as clusters of mesenchymal cells under the epithelium, from which the reticular stroma is formed, and then lymphocytes and their precursors from the vascular bed populate it [1, 4].

MATERIALS AND METHODS

The work was performed on 120 white male rats of the Fisher line aged 1, 3, 7, 14, 21 days and 4-6 months.

Pieces of tissue from the ileum and Peyer's patches in intact animals aged 1, 3, 7, 14, 21 days and 4-6 months after birth were studied using light and electron microscopy.

Light-optical examination was carried out after fixation in a mixture of Carnoy, FSU, 12% neutral formalin on paraffin (4-5 μm) and semi-thin (1 μm) sections, stained with hematoxylin and eosin and pyronin G-methylene blue, respectively. For electron microscopic studies, pieces of small intestine tissue and Peyer's patch were fixed in a buffered 2.5% glutaraldehyde solution (20 min), 1% OsO4 solution (1.5 h) at pH 7.2-7.3. After dehydration in alcohols of increasing concentration, the pieces were embedded in araldite and epon-812 using the generally accepted method. Sections obtained on a 1 KV-4800 ultratome after contrasting in a solution of uranyl acetate and lead citrate were examined in JEM-7 and JEM-100B electron microscopes [2].

RESULTS AND DISCUSSION

In Peyer's patches of intact rats, the following structural and functional zones are clearly defined: follicular, parafollicular, and dome. Between each follicle, there is a parafollicular zone, which without sharp boundaries passes into the surrounding loose connective tissue of the stroma of the mucous and submucosa. Adjacent to the follicle from above is a dome, bulging into the intestinal lumen in the form of a hemisphere. Its surface is smooth, lined with one layer of prismatic epithelium. Along the periphery, the PP is surrounded by crypts and villi.

A layered arrangement of cells is revealed in each PP zone. Separation of one zone from another is carried out by reticular cells. In the light center, the cells are loosely arranged. The follicular

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zone surrounding the light center is dense due to the dense arrangement of cells. The follicular and parafollicular zones, as well as the dome, consist mainly of small lymphocytes. In the light center of the follicle, there are lymphoblasts that contact each other by means of shallow invaginations. In this zone, mitotically dividing lymphoid cells, single differentiating plasma cells, macrophages are often detected, in the cytoplasm of which polymorphic inclusions are determined. The dome of the PF differs significantly in ultrastructure from other zones [3].

Macrophages are relatively frequently detected in this zone, while plasma, mast and eosinophilic cells are single. Lymphocytes are located in groups, surrounded on the periphery by reticular cells. Lymphoblasts are occasionally found among them. Plasma cells are large, can be located near the epithelial layer, capillaries, on the border with the follicular zone. Everywhere they are in contact with lymphocytes and macrophages. Macrophages are more common, have a characteristic structure: in the cytoplasm of some of them, lysosomes of various sizes and shapes are detected, inside which digested cells or their fragments are visible, resembling phagocytized lymphocytes in structure. Reticular cells are surrounded on the periphery by a group of 20-30 small lymphocytes (Fig. 1).

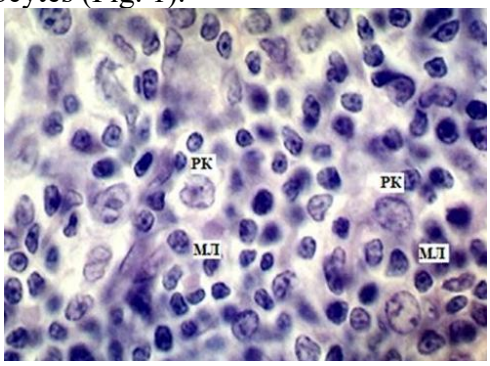

Fig. 1. Ileum. 14-21 days after birth. Peyer's patch. Reticular (RC) cells are surrounded by a group of small lymphocytes (SL). Staining: G-E. Magnification 600

The plasmalemma of small lymphocytes does not form deep invaginations with neighboring cells. Organelles are poorly expressed. Lymphoblasts differ from the surrounding small lymphocytes by their large size, light cytoplasm and nucleus, there are few organelles, mitotically dividing cells are occasionally encountered. The epithelial layer of the vault of the LB is formed by uniform cells, they have fewer interepithelial lymphocytes than conventional animals. Only single lymphoid follicles can have a small-diameter germinal center. Small lymphocytes are homogeneous in structure, almost the same size, closely adjacent to each other.

CONCLUSION

1. Peyer's patches are an effective tool for protection against pathogen penetration through the gastrointestinal tract. The interdependence of the structural and functional development of the small intestine and its lymphoid apparatus in the early postnatal period of life is believed to be carried out under the direct influence of natural antigenic stimuli, which are representatives of normal microflora and food.

2. The small intestine, constantly interacting with natural antigens, primarily with microorganisms that have pronounced immunogenicity, undergoes significant structural and functional restructuring.

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