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Investigation of antigen-presenting cells in the intestinal mesentery in normal and adhesive processes

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Abstract. The morphology and topography of dendritic cells in the mesentery of the small intestine, their quantity, and their presence under normal conditions and during progressive adhesive processes have been insufficiently studied, presenting an important issue in immunomorphology. This study aimed to identify and determine the functional activity of antigen-presenting cells using lectin histochemistry with peanut and lentil lectins under normal conditions and during adhesive processes. The methods employed included morphometric analysis, lectin histochemistry, and statistical analysis. For the first time, using lectin histochemistry with lentil and soy lectins, functionally active and immunologically immature antigen-presenting cells were found in the structure of lymphoid clusters of the small intestine mesentery. A correlation was established between the progression of adhesion processes and the number of antigen-presenting cells. Correlation between dendritic cells and the quantity of immunologically immature lymphocytes and B-lymphocytes was identified, enhancing the understanding of the functional mechanisms of the local arm of innate immunity. An increasing trend in immunologically immature lymphocytes and B-lymphocytes was observed alongside an increase in antigen-presenting cells. The results indicated that the activation of dendritic cells in mesenteric tissues induced an increase in immunologically immature lymphocytes, from which B-lymphocytes subsequently developed, initiating a local immune response. The increased frequency of PNA+- and LCA+- antigen-presenting cells pointed to an elevated immune reactivity of lymphoid clusters. This study on the distribution of antigen-presenting cells contributes to a deeper understanding of the structure of lymphoid tissue associated with serous membranes, as well as fat-associated lymphoid aggregates, and underscores the connection between innate and adaptive immunity in the abdominal cavity

Keywords: peritoneum; dendritic cells; immunity; lectins; rats; lymphocyte; histological changes

INTRODUCTION

A.S. Kashyap *et al.* [1] demonstrated in their study that the serous membrane of the abdominal cavity has a large total surface area, and therefore, reactive changes in its lymphoid component have both local and systemic implications. A detailed study of the structure and reactive changes of the lymphoid tissue will help to understand the local mechanisms of innate and acquired mucosal immunity. Research by D. Repáraz *et al.* [2] indicates that the peritoneal cavity contains various lineages of dendritic cells with different origins, however, their morphological and functional characteristics remain incompletely understood.

T.J. Yun *et al.* [3] have confirmed in their research that dendritic cells originate from haematopoietic stem cells, except follicular dendritic cells which have a mesenchymal origin. Antigen-presenting cells develop from progenitor cells of both the myeloid and lymphoid lineages. Dendritic

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cells are one of the most important factors in the processes of proliferation, differentiation, and selection of lymphocytes.

M.K. Jawanda *et al.* [4] investigated that lentil lectin is a marker that can be used to detect the carbohydrate residue α-D-mannose, and is used to identify dendritic cells as it is found in the structure of the cytoplasmic membrane and cytoplasm receptors. To date, dendritic cells in individual structures of the peritoneum remain incompletely studied. In the mesentery of the small intestine, the detection and role of dendritic cells have not yet been investigated, which is a current issue in immunomorphology. M. Simplicien *et al.* [5] in their study confirm that dendritic cells express receptors that help adsorb exogenous antigens – C-type mannose lectin receptors (concanavalin and lentil lectin receptors). During functional maturation, dendritic cells form numerous processes (5 to 7) that acquire an elongated, thickened form, and present antigenic material, thereby inducing both T-cell and B-cell arms of the immune system.

M. Liu *et al.* [6] described serosa-associated lymphoid clusters (SALC) and fat-associated lymphoid clusters (FALC) as important centres providing the first line of defence in the structure of mucosal membranes through both innate and adaptive immunity. L.H. Jackson-Jones *et al.* [7] characterised fat-associated lymphocyte aggregates, or milky spot-like structures, present in the adipose reservoirs of the peritoneum, pericardium, mediastinum, and pleura. These structures are characterised by structural similarity, contain various subpopulations of lymphocytes, and perform functions akin to those of SALC. D. van Uden *et al.* [8] found that the composition of these aggregates plays a crucial role in the microenvironment of lymphoid clusters. This issue requires further detailed investigation. Dendritic cells within the lymphoid clusters serve as a tissue barrier between the intestine and the abdominal cavity, operating at the interface of innate and adaptive immunity [9].

The morphology, topography, and quantity of dendritic cells in the small intestine mesentery, both in normal conditions and during progressive adhesion formation, remain insufficiently studied. This study aimed to identify antigen-presenting cells, determine their functional activity using lectin histochemistry with peanut and lentil lectins, and investigate the ratio of antigen-presenting cells to the total number of lymphocytes, immunologically immature PNA^+-lymphocytes, and SBA^+-B-lymphocytes in both normal and adhesion conditions.

MATERIALS AND METHODS

The study was conducted over a period of six months in 2023 (from May to October) and involved sexually mature male white rats at the laboratory of the Department of Physiology, Immunology, and Biochemistry with a course in Civil Defence and Medicine at Zaporizhzhia National University. The study model is presented in Table 1.

Table 1. Study model of experimental adhesion formation

Group	Number of animals (n)	Housing conditions	Injection
Intact (I)	5	Relative humidity of (55 ± 5)% at t = 22°C, 12-hour light cycle, unrestricted access to water; standard diet of complete granulated compound feed	No injection
Experimental (II)	15		A single injection of 0.5 mL of 20% talc suspension into the abdominal cavity
Control (III)	5		Physiological saline

Source: compiled by the authors

Animals were euthanised on the 7th, 14th, and 21st days after injection, using chloroform. Autopsy and sample collection were performed following the European Convention for the Protection of Vertebrate Animals used for Experimental and Other Scientific Purposes, general ethical principles of animal experimentation adopted by the First National Congress of Ukraine on Bioethics [10].

For histological analysis, 15×15 mm tissue fragments of the small intestine mesentery were used to create thin-film preparations. To prevent distortion of the thin film fragments, the materials were placed on a foam base, after which they were fixed in 10% formalin solution.

Visualisation of lymphoid clusters SALC and FALC was performed by washing off the mesothelial layer after treating the mesenteric tissue of the small intestine with a trypsin enzyme solution. Histochemical identification of lectin receptors on thin-film preparations was conducted according to the method of O. Lutsyk [11]. Prepared lectin solutions were applied to the treated mesenteric samples and incubated for 45 minutes at 37°C. The reaction results were visualised using diaminobenzidine. To study the distribution of dendritic cells in the small intestine mesentery that carry receptors for β-D-galactose, peanut agglutinin (PNA) was used, while *Lens culinaris* agglutinin (LCA) was applied to identify dendritic cells with the ability to present antigens via α-D-mannose receptors, using the standard RPC "Lectinotest" kit (Lviv, Ukraine). A positive histochemical reaction was identified by the presence of a benzidine marker on the surface of cytoplasmic membranes and in the cytoplasm. The functional activity of dendritic cells was determined by analysing their morphological characteristics, such as size, staining intensity, and the number and length of projections. The preparations were studied using light microscopy, accompanied by microphotography of samples from each group using the MICROmed Evolution LUM LS-8530 microscope (Ukraine). The number of antigen-presenting cells was counted using a morphometric grid over a standard area of 10,000 μm^2. For statistical processing, previously obtained and published data on the total number of lymphocytes, PNA^+ immunologically immature lymphocytes, and SBA^+ B-lymphocytes were utilised [12, 13]. Statistical analysis was conducted using Student's t-test with Microsoft Excel, and results were considered significant at $p \leq 0.05$.

RESULTS

Morphologically, PNA^+- antigen-presenting cells are characterised by a star-shaped form both under normal conditions and during the modelling of the adhesion process. In the intact group of animals, these cells

appear more rounded, with almost no visible projections (Fig. 1a). In both the PNA⁺-antigen-presenting cells of the intact group (Group I) and the experimental group (Group II), brown benzidine granules were observed on the surface of the cell's cytoplasmic membrane. The number of PNA⁺-antigen-presenting cells in the intact group was 2.74 ± 0.04 per 10,000 μm², which served as a reference point for comparison with animals at various stages of experimental adhesion formation. On the 7th day, the cells in the experimental group (Group II) displayed a star-shaped morphology. Their petal-shaped nuclei and projections were clearly visualised against the background. The cytoplasm contained light-brown benzidine granules, while the plasma membrane was dark brown. The number of cells increased compared to the intact group, reaching 3.1 ± 0.08 per unit area. By the 14th day, the PNA⁺-antigen-presenting cells in Group II became more elongated with numerous projections. Benzidine granules imparted a brown hue to the cytoplasmic membrane and cytoplasm. The petal-shaped nuclei and dotted projections were well visualised (Fig. 1b). The somas of the PNA⁺-antigen-presenting cells were spaced up to 11 μm apart, with their projections appearing to connect, forming a network of intercellular contacts. The number of cells during this stage of adhesion formation slightly increased compared to the 7th day and the intact group, reaching 3.3 ± 0.07 per unit area.

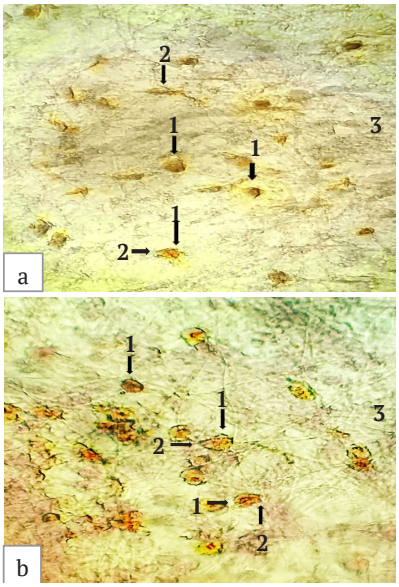

Figure 1. Film preparation of rat mesentery
Notes: a) PNA+-antigen-presenting cells under normal conditions; b) PNA+-antigen-presenting cells on day 14 of the adhesion modelling process: 1. soma and fragments of antigen-presenting cells; 2. sites of process emergence and processes; 3. submesothelial layer. Lectin histochemistry with Mayers haematoxylin nuclear counterstaining following mesothelium desquamation by trypsin. Magnification x100
Source: authors' material

On the 21st day of the study, similar cell morphologies were observed in the experimental group as seen on the 14th day of adhesion process modelling. The PNA⁺-antigen-presenting cells displayed an elongated, slightly flattened shape with numerous winding projections. The increased length of cytoplasmic projections indicates activation of PNA⁺-antigen-presenting cells, reflecting the reactive changes in the lymphoid component of the small intestinal mesentery. The benzidine granules accumulated maximally on the cells' cytoplasmic membrane and were also present in the cytoplasm, giving the cells a dark-brown hue against the generally light background of the submesothelial layer of the small intestinal mesentery. It was determined that the number of PNA⁺ antigen-presenting cells at this stage of the study reached 3.5 ± 0.02 per unit area.

As a result of the lectin histochemical study, it was found that in the intact group, under normal conditions, LCA⁺-antigen-presenting cells measuring 10-15 μm with an irregular elongated shape and several (3-4) angles were identified (Fig. 2a). Petal-shaped nuclei and sites of projection emergence were clearly visible. Benzidine granules accumulated on the surface of the plasma membrane and within the cytoplasm, appearing as brown-coloured granules. In the mesentery of the small intestine in the intact group (Group I), there were 2.05 ± 0.02 LCA⁺-antigen-presenting cells per unit area. On the 7th day of adhesion process modelling in the experimental group (Group II), the LCA⁺ antigen-presenting cells became more distinct and prominent, as the cells acquired a dark brown hue. They were characterised by a more rounded or elongated shape, with wavy projections being visible. Cells bearing receptors for lentil lectin (LCA⁺) were observed to cluster around the vascular lumen (Fig. 2b). The number of these cells at this stage of the adhesion process increased compared to the intact group, reaching 2.68 ± 0.02 cells per unit area.

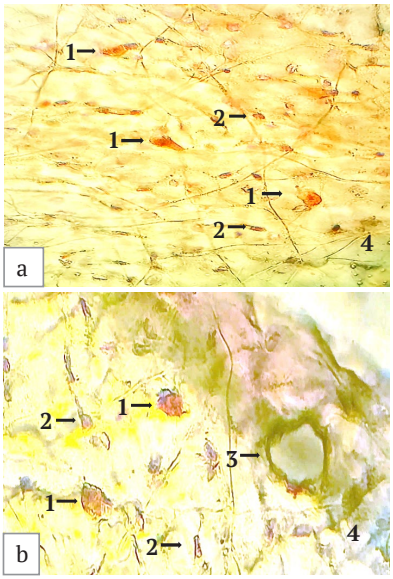

Figure 2. Small intestine mesentery. Film preparation
Notes: a) under normal conditions; b) on the 7th day of adhesion process modelling. Lectin histochemistry with Mayers haematoxylin nuclear counterstaining following mesothelium desquamation by trypsin: 1. somas of LCA⁺-antigen-presenting cells; 2. fragments of LCA⁺-antigen-presenting cells; 3. vascular lumen; 4. submesothelial layer. Magnification x100
Source: authors' material

During the study, on the 14th day in Group II (experimental group), LCA+-antigen-presenting cells of typical morphology were identified, comparable to the previous stage of the adhesion process. Mannose receptors were detected on the surface of the cytoplasmic membrane and within the cytoplasm. Isolated LCA+-antigen-presenting cell somas were observed, with nearby wavy, dotted projections. The intensity of benzidine granule accumulation on the cell membrane and in the cytoplasm, as well as the density of LCA+-antigen-presenting cells, increased (+++) compared to the intact group (+) and the 7th day of the study (++). The number of LCA+-antigen-presenting cells at this stage of adhesion process modelling reached 4.35 ± 0.01 cells per unit area.

On the 21st day of the study, in the animals from Group II (experimental group), clusters of LCA+-antigen-presenting cells (3-4 cells) were detected around the branching blood capillaries of the small intestine mesentery. Cells were identified with crescent-shaped or polygonal morphology, featuring 4-6 projections extending from the cell body. A visible increase in the number and thickness of dendritic cell projections was noted. At this stage of the adhesion process, a progressive rise in the number of polygonal LCA+-antigen-presenting cells was observed, with their quantity reaching 5.8 ± 0.03 cells per unit area. Based on the statistical data obtained, a correlation was established between the numbers of PNA+-antigen-presenting cells and LCA+-antigen-presenting cells, counted per standard area of 10,000 μm² (Fig. 3).

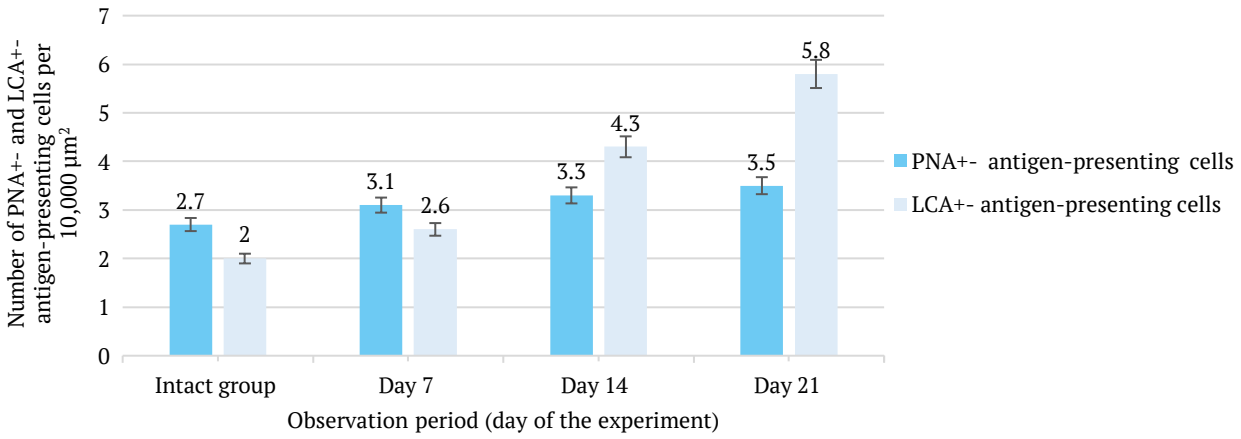

Figure 3. The ratio of PNA+- and LCA+-antigen-presenting cells in the small intestine mesentery under normal conditions and at different time points of adhesion process observation
Source: compiled by the authors

Thus, the number of PNA+-antigen-presenting cells in the small intestine mesentery of animals in both the intact group and those undergoing the experimental adhesion process did not show statistically significant changes. Under normal conditions in the intact group (Group I), the ratio of PNA+- to LCA+-antigen-presenting cells was observed to be 1:1. However, in the experimental group (Group II), the number of LCA+-antigen-presenting cells increased, with ratios of PNA+- to LCA+-antigen-presenting cells observed at 1:2 on day 14 and 1:3 on day 21 of the study, respectively. Upon analysing the number of LCA+-antigen-presenting cells, it can be concluded that these cells become functionally more active during the experiment. Their activity in presenting antigens to lymphocytes increases, which enhances their visualisation and leads to an increase in their numbers compared to the baseline.

Based on previously obtained and published data regarding the total number of lymphocytes, the quantity of PNA+-immunologically immature lymphocytes, and SBA+-B-lymphocytes [13, 14], as well as the newly acquired data on the number of PNA+- and LCA+-antigen-presenting cells per unit area, a coefficient ratio between these immune components within the lymphoid clusters of the small intestine mesentery was analysed (Table 2). Comparing the ratios of antigen-presenting cells to PNA+-immunologically immature lymphocytes and SBA+-B-lymphocytes reveals a certain pattern. On average, in both the intact and experimental groups, there are two PNA+-immunologically immature lymphocytes and two SBA+-B-lymphocytes for every identified antigen-presenting cell. By day 7 of the experiment, an increase in the number of SBA+-B-lymphocytes per LCA+-antigen-presenting cell is observed in the experimental group.

Table 2. The ratio of PNA+-antigen-presenting cells and LCA+-antigen-presenting cells to the total number of lymphocytes, PNA+-immunologically immature lymphocytes, and SBA+-B-lymphocytes

		PNA+- antigen-presenting cells	LCA+- antigen-presenting cells
Group I (intact)	Total number of lymphocytes	1:3	1:4
	PNA+-lymphocytes	1:2	1:2
	SBA+-lymphocytes	1:2	1:2

Table 2. Continued

			PNA⁺- antigen-presenting cells	LCA⁺- antigen-presenting cells
Group II (experimental)	Day 7	Total number of lymphocytes	1:3	1:3
		PNA+-lymphocytes	1:2	1:2
		SBA+-lymphocytes	1:2	1:3
	Day 14	Total number of lymphocytes	1:3	1:4
		PNA+-lymphocytes	1:2	1:2
		SBA+-lymphocytes	1:3	1:2
	Day 21	Total number of lymphocytes	1:2	1:4
		PNA+-lymphocytes	1:2	1:1
		SBA+-lymphocytes	1:2	1:2

Source: compiled by the authors

It is also noted that by day 14 in group II, the number of SBA⁺-lymphocytes increased, with three SBA⁺-B-lymphocytes corresponding to one PNA⁺-antigen-presenting cell. By day 21 of the study, the number of PNA⁺-immunologically immature lymphocytes and SBA⁺-B-lymphocytes remains consistent with the previous stages of adhesion formation. The increase in the number of identified PNA⁺- and LCA⁺-antigen-presenting cells during adhesion processes indicates heightened immunoreactivity of immune tissue associated with SALC and FALC.

DISCUSSION

For the first time, using lectin histochemistry, LCA⁺-antigen-presenting cells and PNA⁺-antigen-presenting cells were detected in the lymphoid tissue associated with serous membranes (FALC and SALC) of the small intestine mesentery. A correlation was established between the progression of adhesion formation and the number of LCA⁺- and PNA⁺-antigen-presenting cells.

The Poltava school of morphologists, led by Professor I. Ksyonz *et al.* [14], conducted studies of lymphoid clusters in the structures of the greater omentum, as one of the components of the peritoneum. Similar studies by Brazilian scientists A.W. Wang *et al.* [15] confirm that the omentum contains a large number of immunocompetent cells in its lymphoid clusters: macrophages, antigen-presenting cells, and lymphocytes of various subpopulations. J.L. Suen *et al*. [16] in their study substantiate that with a change in the reactivity of the lymphoid component of the tissues of the small intestine mesentery, activation of antigen-presenting cells is observed. Their visualisation and number per unit area increase, which is associated with the activation of receptors on the cell surface in response to an antigen.

Analysis of the number of PNA⁺-antigen-presenting cells and LCA⁺-antigen-presenting cells confirms that they become functionally more active under antigenic load. Their activity in presenting antigens to lymphocytes increases, resulting in improved visualisation and a rise in their numbers compared to normal levels. It has been established that PNA⁺-antigen-presenting cells exhibit a stellate shape in both normal conditions and during the modelling of adhesion processes. In the intact group of animals, these cells appear more rounded, with their processes barely visible. As the adhesion process progresses, PNA⁺-antigen-presenting cells adopt an elongated, slightly flattened form. The number of convoluted processes is visually observed to increase and thicken. By the 21st day of the study, the quantity of PNA⁺-antigen-presenting cells reaches 3.5 ± 0.02 per investigated unit area, while in the intact group, the figure stands at 2.74 ± 0.04 per unit area. In the intact group, LCA⁺-antigen-presenting cells are noted to be irregularly elongated and polygonal in shape, characterised by petal-like nuclei, with the sites of their processes clearly visible. During the adhesion process, the antigen-presenting cells assume a crescent shape and become polygonal. There is also an increase in both the quantity and thickness of their cytoplasmic processes. Localisation of 3-4 LCA⁺-antigen-presenting cells is observed around the branching points of blood capillaries within the mesentery of the small intestine. At this stage of adhesion formation, there is a noted increase in the number of identified LCA⁺-antigen-presenting cells, reaching 5.8 ± 0.03 per investigated unit area, compared to the intact group of animals, which shows 2.05 ± 0.02 cells per unit area. L. Lamendour *et al.* [17] explained in their research that an increase in the number of antigen-presenting cells in response to antigenic load indicates an upregulation of immunity and the recognition of changes in the antigenic profile of surrounding cells.

When analysing the coefficient ratio between immunocompetent cells that are part of the lymphoid clusters of the small intestine mesentery SALC and FALC, it was established that in both the intact and experimental groups of animals, for one defined antigen-presenting cell, there are two PNA⁺-immunologically immature lymphocytes and two SBA⁺-B-lymphocytes. There is a growth in the quantitative indicators of SBA⁺-B-lymphocytes per one LCA⁺-antigen-presenting cell (3:1) and one PNA⁺-antigen-presenting cell (3:1).

D. Sancho & C. Reis e Sousa [18] noted in their research that dendritic cells play a key role in binding and presenting antigens, and also express numerous receptors in the cytoplasm. These receptors belong to the Toll- and cytokine receptor families (TLR3, TLR7, TLR8, TLR10, Myd88, IL7R-α, IL10, etc.) and C-lectins. C-lectin family receptors exhibit specificity for carbohydrate residues of β-glucan, α-D-mannose, and N-acetyl-glucosamine, which allows the use of lectin histochemistry for the detection of dendritic cells. M. Binnewies *et al.* [19] emphasise that dendritic cells are one of the most important factors in the process of proliferation, differentiation, and selection of lymphocytes. As previously found by P.A. Laginha *et al.* [20], activation of antigen-presenting cells is accompanied by an increase in

the number of cytoplasmic processes and their thickness, allowing them to connect with lymphocytes, forming intercellular contacts, thereby activating immunologically immature lymphocytes and B-lymphocytes.

The results of the study confirm this statement. On the 21st day of the study in the experimental group, PNA+-antigen-presenting cells with numerous winding processes were detected. LCA+-antigen-presenting cells were found with 4-6 processes extending from the soma. Visually, an increase in the number and thickness of the processes of both types of dendritic cells was noted. The increase in the length of cytoplasmic processes indicates the activation of antigen-presenting cells, which is expressed by reactive changes in the lymphoid component of the small intestine mesentery.

Z. Qiaomei *et al.* [21] note that the activation of dendritic cells in tissues leads to an increase in the number of immunologically immature lymphocytes, from which B-lymphocytes subsequently develop, triggering a local immune response. According to the obtained data, there is a growth in the quantitative indicators of PNA+-lymphocytes and SBA+-lymphocytes against the background of an increase in antigen-presenting cells. Thus, on the 7th day of the study, there is an increase in the number of SBA+-B-lymphocytes per one LCA+-antigen-presenting cell. On the 14th day, there are already three SBA+-B-lymphocytes per one PNA+-antigen-presenting cell. On the 21st day of the study, the number of PNA+-immunologically immature lymphocytes and SBA+-B-lymphocytes remains the same as in the previous terms of modelling the adhesion process. Thus, the opinion of A. Gardner *et al.* [22] confirmed that the increase in the number of immunologically immature lymphocytes, which subsequently become B-lymphocytes and initiate a local immune response, leads to the activation of dendritic cells in tissues. Analysis of the studied indicators made it possible to identify a relationship between the number of dendritic cells and PNA+- and SBA+-lymphocytes, which also complemented the understanding of the mechanism of functioning of the local link of innate immunity.

The study of the distribution of antigen-presenting cells has expanded our understanding of the structure of lymphoid tissue associated with SALC and FALC, highlighting the connection between the innate and adaptive immune systems within the abdominal cavity. The increased frequency of detection of PNA+- and LCA+-antigen-presenting cells during adhesion formation indicates an increase in the immunoreactivity of immune tissue associated with the serous membranes SALC and adipose tissue FALC. Based on the structural characteristics of the lymphoid clusters of SALC and FALC, mesothelial surroundings, and the presence of SBA+-B lymphocytes, PNA+- and LCA+-antigen-presenting cells, the intestinal mesentery can be classified as a primary lymphoid organ, thereby enriching the understanding of the immune system's organisation within the body.

CONCLUSIONS

Using peanut and lentil lectins, antigen-presenting cells in the small intestine mesentery of rats were detected for the first time using a lectin histochemistry method. Their functional activity was determined, and the ratio of antigen-presenting cells to the total number of lymphocytes, immunologically immature PNA+-lymphocytes, and SBA+-B-lymphocytes was studied under normal conditions and during the modelling of the adhesion process.

In the intact group of animals, PNA+-antigen-presenting cells in the mesentery of the small intestine are characterised by a star-shaped, elongated form, with projections that are nearly imperceptible. The number of identified cells was 2.74 ± 0.04 per 10,000 μm² of the studied area. LCA+-antigen-presenting cells, on the other hand, exhibit a more rounded shape, occasionally displaying three to four angles. Their petal-shaped nuclei and the sites of projection emergence are clearly visible. Under normal conditions, 2.05 ± 0.02 LCA+-antigen-presenting cells were found per unit area.

As adhesion processes progressed, the morphology of PNA+-antigen-presenting cells changed: becoming elongated, and slightly flattened with numerous winding processes, the length of which visually increased at each observation time point. The number of PNA+-antigen-presenting cells on the 21st day of the study increased to 3.5 ± 0.02 cells per unit area studied. LCA+-antigen-presenting cells acquired a crescent shape, polygonal with numerous punctate processes extending from the soma. On the 21st day of adhesion formation, their progressive increase to 5.8 ± 0.03 cells per unit area studied was observed. The topography of PNA+- and LCA+-antigen-presenting cells remained constant both in the norm and in the experiment.

The increase in the number of PNA+- and LCA+-antigen-presenting cells during adhesion formation indicates an increase in the immunoreactivity of lymphoid clusters associated with the serous membranes SALC and adipose tissue FALC. Against the background of the activation of antigen-presenting cells in the experiment, the total number of lymphocytes increases (ratio 1:4). The ratio of PNA+-immunologically immature lymphocytes and SBA+-lymphocytes also increases on the 21st day of observation, indicating the activation of the humoral link of lymphoid tissue associated with the serous membranes SALC and with adipose tissue FALC. There is a growth in the quantitative indicators of PNA+-lymphocytes and SBA+-lymphocytes against the background of an increase in antigen-presenting cells in the experiment. Analysis of the studied indicators made it possible to identify a relationship between the number of dendritic cells and PNA+- and SBA+-lymphocytes, which also complements the understanding of the mechanism of functioning of the local link of innate immunity. Prospects for further research include studying the features of the morphology and variation in the number of lymphocytes in the small intestine mesentery, as well as the features of different types of collagen fibres using a lectin histochemistry method.

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CONFLICT OF INTEREST

None.

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Дослідження антигенпрезентуючих клітин в брижі кишки в нормі і при спайковому процесі

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Анотація. Питання морфології і топографії дендритних клітин брижі тонкої кишки, їх кількість, наявність у нормі та при прогресуючих спайкових процесах вивчені недостатньо і постають актуальним питанням імуноморфології. Метою роботи було виявлення і визначення функціональної активності антигенпрезентуючих клітин методом лектинової гістохімії за допомогою лектинів арахісу та сочевиці у нормі та при спайкових процесах. Перелік використаних методів: морфометричний, лектингістохімічний, статистичний. Вперше за допомогою лектинової гістохімії із використанням лектинів сочевиці і сої виявлено функціонально активні та імунологічно незрілі антигенпрезентуючі клітини в структурі лімфоїдних кластерів брижі тонкої кишки. Встановлено закономірність між прогресуванням процесів спайкоутворення та кількістю антигенпрезентуючих клітин. Виявлено кореляційні зв'язки між дендритними клітинами та кількістю імунологічно незрілих лімфоцитів і В-лімфоцитів, що поглибило уявлення про функціональні механізми локальної ланки вродженого імунітету. Проаналізовано тенденцію зростання імунологічно незрілих лімфоцитів і В-лімфоцитів на тлі збільшення антигенпрезентуючих клітин. Результати показали, що активація дендритних клітин в тканинах брижі викликає збільшення імунологічно незрілих лімфоцитів, з яких в подальшому походять В-лімфоцити і ініціюють місцеву імунну відповідь. Підвищення частоти виявлення PNA+- і LCA+- антигенпрезентуючих клітин вказує на підвищену імунореактивність лімфоїдних кластерів. Дане дослідження розподілу антигенпрезентуючих клітин доповнює розуміння структури лімфоїдої тканини, пов'язаної з серозними оболонками, а також жироасоційованих лімфоїдних скупчень, і підкреслює зв'язок між вродженим і адаптивним імунітетом в черевній порожнині

Ключові слова: очеревина; дендритні клітини; імунітет; лектини; щури; лімфоцит; гістологічні зміни