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EXPOSURE LEVEL OF MICROORGANISMS INVOLVED IN BACTERIAL TRANSLOCATION UNDER THE EFFECT OF ACUTE RADIATION

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Annotation. The aim of the study was to experimentally study the degree of occurrence of microorganisms that provide the phenomenon of bacterial translocation in the dynamics of observation under the influence of acute irradiation. The main objective of this research work was to determine the percentage of germination of microorganisms translocated from the large intestine to the internal organs. The percentage of microorganisms that passed through the large intestine from the peripheral blood of irradiated laboratory animals increased as the observation period increased. Analysis of the results showed that irradiation increases the permeability of the colon mucosa against the background of general immunodeficiency. In prophylactically biocorrected, irradiated animals, the percentage of germination of microorganisms decreased over time. In both groups, its values were significantly higher than in the control group.

Keywords. Microorganism, immune system, translocation, bacteriological examination, biocorrection, parameter, microflora, laboratory animals, immunodeficiency.

УРОВЕНЬ ВОЗДЕЙСТВИЯ МИКРООРГАНИЗМОВ, УЧАСТВУЮЩИХ В БАКТЕРИАЛЬНОЙ ТРАНСЛОКАЦИИ ПОД ВОЗДЕЙСТВИЕМ ОСТРОЙ РАДИАЦИИ

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Аннотация. Целью исследования было экспериментальное изучение степени встречаемости микроорганизмов, обеспечивающих явление бактериальной транслокации, в динамике наблюдения под действием острого облучения. Основной целью данной исследовательской работы было определение процента прорастания микроорганизмов, транслоцированных из толстого кишечника во внутренние органы. Процент микроорганизмов, прошедших через толстую кишку из периферической крови облученных лабораторных животных, увеличивался по мере увеличения срока наблюдения. Анализ результатов показал, что облучение повышает проницаемость слизистой оболочки толстой кишки на фоне общего иммунодефицита. У профилактически биокорректированных, облученных животных процент прорастания микроорганизмов со временем снижался. В обеих группах ее значения были достоверно выше, чем в контрольной группе.

Ключевые слова. Микроорганизм, иммунная система, транслокация, бактериологическое исследование, биокоррекция, показатель, микрофлора, лабораторные животные, иммунодефицит.

Introduction: The purpose of the study was to experimentally study the degree of encounter of microorganisms that provide the phenomenon of bacterial translocation in the observation dynamics under the influence of acute radiation. The main task of this research work was to determine the percentage of germination of microorganisms translocated from the large intestine to internal organs. Since the main task in this research work is to determine the percentage of microorganisms translocated from the large intestine to internal organs, only the genera of microorganisms capable of translocation were identified - *Escherichia* spp, *Proteus* spp, *Staphylococcus* spp, *Enterococcus* spp, *Bacteroides* spp. Acute irradiation of laboratory animals was carried out using the γ -therapeutic apparatus AGAT-R1 (Estonia, 1991), where the radiation source was So-60.

White mice that received acute radiation were kept on a common vivarium diet until the 5th day, group 2 laboratory animals were treated prophylactically with "Lactopropolis-AWL" produced in our country from the day of irradiation. Group 1 and 3 animals were kept only on vivarium

diet. In the experiment, the percentage of microorganisms translocated from the large intestine to the mesenteric lymph nodes of laboratory animals was different from each other in all three groups (table 1).

Table 1

The percentage of microorganisms translocated from the large intestine to the mesenteric lymph nodes after acute radiation in the experiment

Groups	Period after acute radiation	Results	
		Absolutely	%
First group, n=54	Day 5, n=18	16	88.89±7.41
	Day 7, n=16	15	93.75±6.05
	Day 9, n=12	12	100.0
The second group, n=54	Day 5, n=18	15	83.33±8.78
	Day 7, n=17	13	76.47±10.29
	Day 9, n=16	9	56.25±12.40
The third group, n=54	Day 5, n=18	1	5.56±5.40
	Day 7, n=18	0	0
	Day 9, n=18	1	5.56±5.40

If in the first group, on the 5th day after irradiation, the percentage of microorganisms translocated from the large intestine was 88.89±7.41%, by the 7th day, this indicator increased to 93.75±6.05%. On the 9th day after irradiation, translocation reached a maximum level - 100.0%. It can be seen that the percentage of translocated microorganisms increased dynamically after irradiation.

In the second group of laboratory animals, we observed the opposite. Over time, the percentage of microorganisms from the mesenteric lymph nodes decreased - 83.33±8.78% on the 5th day, respectively; 76.47±10.29% on day 7 and 56.25±12.40% on day 9. However, no changes were observed in the third group during the observation period. Microorganisms with translocation did not exceed 5.56±5.40%, their increase or decrease trend was not observed.

The analysis of the results showed that the irradiation increased the permeability of the colonic mucosa together with the total immunodeficiency, because the percentage of microorganisms in the other groups was significantly increased compared to the control group (R<0.001). Over time, the percentage of encounters in the first group increased and reached the maximum level (100.0%) by the end of the observation period.

The normal microflora located in different biotopes of a person (gastrointestinal system, respiratory system, skin and mucous membranes, urogenital system) participates in the formation and maintenance of the body's immune system, provides constant antigen stimulus, and ensures

an active immune response against antigens. In turn, the immune system plays an important role in the quantitative and qualitative regulation of representatives of the normal microflora in different biotopes. We studied the degree of meeting of microorganisms that ensured the phenomenon of bacterial translocation in the observation dynamics under the influence of acute radiation.

In this article, after studying and describing the dynamics of the percentage of microorganisms that passed through the large intestine in the internal organs, we considered that it is necessary to study the indicators of germination of these strains in the peripheral blood of experimental animals. A total of 162 male white mice were included in the research. Their weight was not less than 25 g, and their age was 3 months.

All laboratory animals were divided into 3 groups:

The first (main) group (n=54) - white mice without acute radiation;

The second (comparison) group (n=54) - white mice without acute radiation and preventive biocorrection;

The third (control) group (n=54) is mice without acute radiation.

In the peripheral blood of irradiated laboratory animals, their germination tendencies remained unchanged (Fig. 1).

As with the previous results, after irradiation during the observation period in the first group, the percentage of germination of strains increased over time - $61.11 \pm 11.49\%$ on the 5th day, respectively; $75.0 \pm 10.83\%$ and $83.33 \pm 10.76\%$ on day 7. In the second group, the opposite was observed. A different feature from the studied internal organs is that in the non-irradiated animals of the control group, strain germination was observed during the observation period - from $5.56 \pm 5.40\%$ to $11.11 \pm 7.41\%$ (in 1 or 2 of 18).

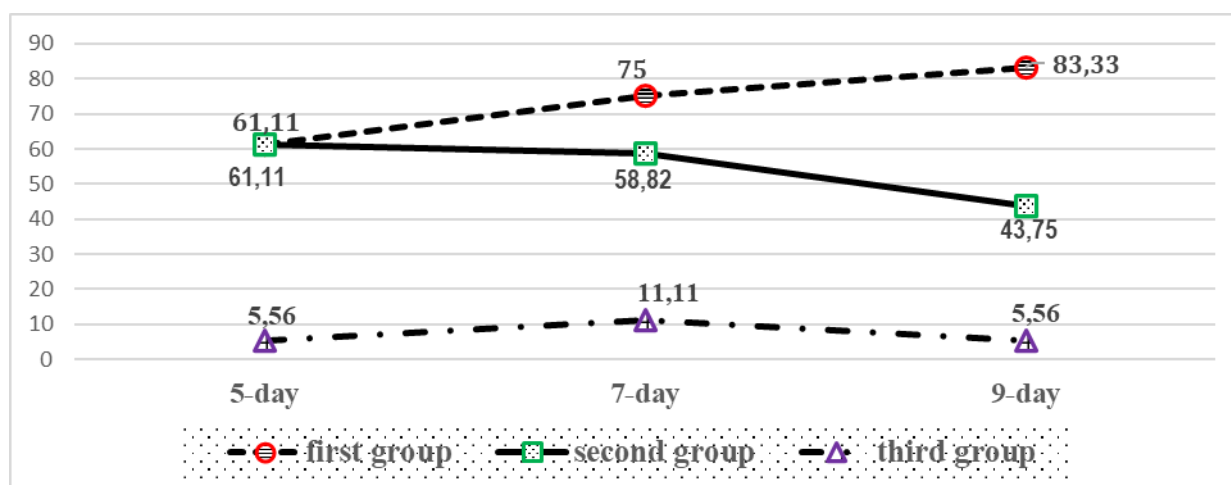


Figure 1. Indicators of the percentage of germination of microorganisms translocated from the colon to the peripheral blood, %

Thus, the percentage of microorganisms passing through the colon from the peripheral blood of irradiated laboratory animals increased as the observation period increased. In prophylactically biocorrected, irradiated animals, the percentage of microorganism germination decreased over time. In both groups, its values were significantly higher than those in the control group.

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