



MICROORGANISMS WITH TRANSLOCATION FROM THE COLON TO THE INTERNAL ORGANS UNDER THE INFLUENCE OF ACUTE IRRADIATION ARE INDICATORS OF OVEREATING

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Abstract

The aim of the research was to experimentally study the degree of germination of microorganisms with translocation from the large intestine to internal organs under the influence of acute radiation. It was found that the percentage of microorganisms that passed through the large intestine from the mesenteric lymph nodes of irradiated laboratory animals increased and reached 100.0% on the 9th day after irradiation. In biocorrected, irradiated laboratory animals, the percentage of germination of these strains was also high, but in the dynamics of observation, their percentage decreased and decreased to 56.25% on the last 9 days after irradiation. In laboratory animals in the non-irradiated control group, there were no patterns associated with the translocation of microorganisms. This tendency of varying intensity was preserved in connection with the germination of microorganisms translocated from the liver, spleen, lungs and peripheral blood of laboratory animals.

Key words: acute radiation, organs of laboratory animals, experimental research, microorganism translocation, germination percentage.

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Introduction

Throughout its life, macroorganism lives in symbiosis with microorganisms located in its biotopes. The benefit to this one is that living in a mutually intertwined relationship is formed in Phylogenesis and is formed individually in ontogenesis [8, 9, 18].

A person is involved in the formation and functioning of the immune system of a normal microflora organism, located in various biotopes (gastrointestinal tract, respiratory system, skin and mucous membranes, urinary-venous system), providing constant antigen stimulation, providing an active immune response to antigens. In turn, the immune system also plays an important role in the quantitative and qualitative regurgitation of

representatives of normal microflora in various biotopes[3, 11, 14, 17].

As a result of various external and internal influences, when the balance of normal representatives of the microflora of the colon (indigenes and facultative microflora) is disturbed, when the permeability of the intestinal mucosa is increased, the transfer (translocation) of viable microorganisms to different internal organs [7, 13, 15]. In this case there are also reported changes in the state of transitory bacteriemia observed in healthy people, and there are data on the incidence of this process [11, 19].

As a result of various external and internal influences, the mechanism of translocation of microorganisms to internal organs, the variability in them, which produces the pathology in the body, has



received, and although a lot of work has been done on pathological cases [1, 7, 9, 13, 15], but the role of the immune system in this process has not been sufficiently revealed. Therefore, it is worthwhile to continue experimental research to assess the location of the immune system in the process of translocation of micro organism to internal organs.

Purpose of the study. The effect of acute irradiation was an experimental research of the percentage of microorganisms with translocation from the colon to the internal organs in dynamics.

Material and methods

A total of 162 white non-breed mice were involved in the research. Their weight was not less than 25 g, the age was 3 months.

All laboratory animals were divided into 3 groups:

1-group - white non-bred mice receiving acute radiation (n=54);

2-group-mice without white offspring who received acute radiation and underwent prophylactic biocorrection (n=54);

3-group-mice without intact white offspring who did not receive acute radiation (n=54).

Care, feeding, grouping of laboratory animals was carried out using traditional methods [10]. Ethical principles and biological safety rules of working with laboratory animals were strictly observed [2, 4, 10]. Until the experiment, all laboratory animals were kept in quarantine for 10 days.

Acute irradiation of laboratory animals was carried out with the help of agate-R1 (Estonia, 1991) γ -therapeutic apparati, the source of this irradiation was so-60. Research on acute irradiation of laboratory animals was carried out at the branch of the Republican specialized cancer

and oncology scientific and practical Center of Bukhara.

Mice without white breeds receiving acute irradiation were caught in the general vivarium ration for 5 days, from the day of irradiation to 2-Group laboratory animals, profilactic biocorrection with Lactopropolis-AWL, produced in our homeland. Animals of the 1 - and 3-th group were caught only in the vivarium ration.

The biologically active supplement "Lactopropolis-AWL" was given every morning, due to the weight of all laboratory animals. For those who received acute irradiation, the drug was given for 20 days, irradiated on its last day, and then on 5-th day it was neutralized and researches were conducted.

The composition of the biologically active additive "Lactopropolis-AWL" consists of an extract of *Lactobacillus rhamnosus* 925, probiotic bacteria of *Enterococcus durans* and biologically active compounds of propolis, which have antimicrobial, immunostimulating, anti-inflammatory properties (the product of the Institute of Microbiology of UZR FA and "AllWellLab" LLC).

After irradiation, on the 5th, 7th and 9th days of the experiment, laboratory animals were de-energized and bacteriological researches were continued, taking samples from internal organs according to "print - grease" and by Gold.

Extended bacteriological researches were conducted with respect to flour microorganisms of biological substances derived from mesenteric lymph nodes, jig, spleen, lungs and peripheral blood of laboratory animals. Identification was carried out according to Bergys Manual systematic Bacteriology (1997). For bacteriological examination, the firm HiMedia (India) used food environments.



Since the main task in this research work was to determine the percentage of germination of microorganisms from the colon to internal organs, only descendants of microorganisms capable of translocation were identified-Escherichia spp, Proteus spp, Staphylococcus spp, Enterococcus spp, Bacteroides spp [5, 6, 12]. Since the importance of the species in the transition of microorganisms from the colon to the internal organs is low, they have only been identified to their offspring.

For statistical performance of the results, traditional methods of data analysis were used. There is an average arithmetic quantity (M), the average quantity error (m) and the reliability criterion (t) was determined. All checks were carried out using the program “Exsel” on the personal computers with the processor “Pentium-IV”. Evidence-based medical principles were

used in the organization and conduct of the research.

Results and discussion

In the experiment, three percent of the microorganisms in which laboratory animals were translocated from the colon to the mesenteric lymph nodes were different in each of the three groups in the dynamics of observation (Table 1).

If, on the 5th day after irradiation in the 1st Group, the percentage of microorganisms with translocation from the colon was $88,89 \pm 7,41\%$ (on the 18th in the 16th), then by the 7th day this figure increased to $93,75 \pm 6,05\%$ (on the 16th in the 15th). On the 9th day after irradiation, translocation became the maximum-100,0% (in 12 units of 12 units).

Apparently, the percentage of microorganisms with translocation after irradiation increased in dynamics.

Table 1. In the experiment, the dynamics indicators of the percentage of occurrence of microorganisms with translocation from the colon to the mesenteric lymph nodes after acute irradiation

Groups	Period after irradiation	Results	
		Total	%
1-group (receiving acute radiation), n=54	5-day, n=18	16	$88,89 \pm 7,41$
	7-day, n=16	15	$93,75 \pm 6,05$
	9-day, n=12	12	100,0
2-Group (acute irradiation + prophylactic biocorrection), n=54	5-day, n=18	15	$83,33 \pm 8,78$
	7-day, n=17	13	$76,47 \pm 10,29$
	9-day, n=16	9	$56,25 \pm 12,40$
3-group(did not receive acute radiation, controlled), n=54	5-day, n=18	1	$5,56 \pm 5,40$
	7-day, n=18	0	0
	9-day, n=18	1	$5,56 \pm 5,40$



If in the 2-TH group of laboratory animals (acute irradiation + profilactic biocorrection), then we observed the opposite. Over time, microorganisms from the mesenteric lymph nodes decreased by a percentage of flour - $83,33 \pm 8,78\%$ (from 18 to 15 percent) on 5 days, respectively; $76,47 \pm 10,29\%$ (from 17 to 13 percent) on 7 days and $56,25 \pm 12,40\%$ (from 18 to 16 percent) on 9 days.

However, in the 3-th group (intact), no changes were observed during the observation period. Microorganisms with translocation did not exceed $5,56 \pm 5,40\%$

(18 in 1 Test), there was no tendency to increase or decrease in them.

Results analysis showed that acute irradiation increased sharply, convincing ($R < 0,001$) percent of microorganisms (receiving acute radiation) in other groups compared to the control group (who did not receive acute radiation) because the permeability property of the colon mucosa increased. At the end of the period, there was an increase of three percent in the group 1 and reached the maximum level (100%) by the end of the observation period (Figure 1).

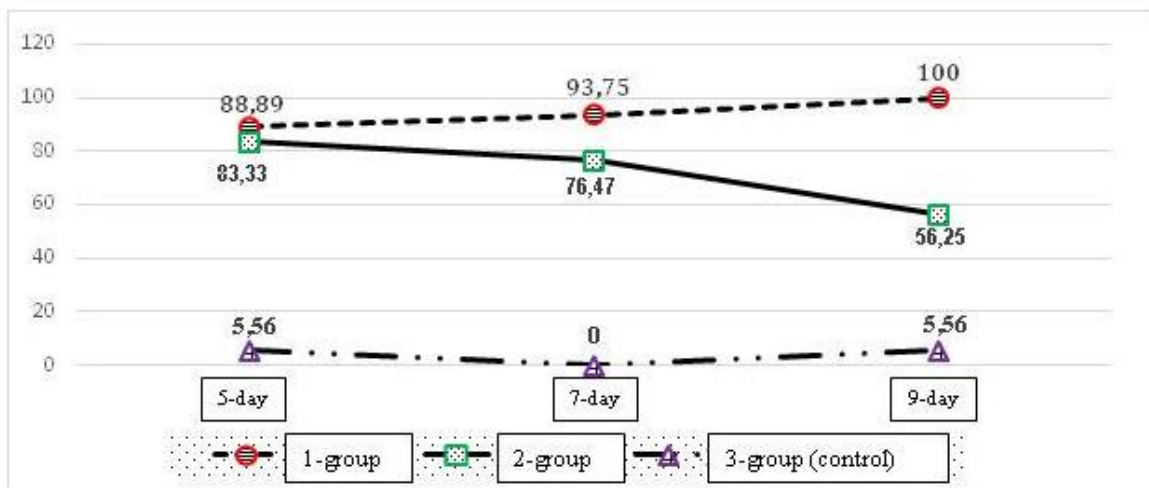


Figure 1. Indicators of flour percentage of microorganisms with translocation from the colon to the mesenteric lymph nodes of laboratory animals, %

The positive effect of per os biocorrection on laboratory animals up to 5-days was determined when the 1 - and 2-groups were compared. Hence, acute irradiation has led to a decrease in indigenes, an increase in elective strains, leading to the development of symptoms of dysbiosis in the colon. When trying to restore the same balance with the help of prophylactic biocorrection, a decrease in translocation was detected as a result of a decrease in microorganisms during the observation period by three percent.

Another aspect is that on the 7th day of the experiment in the 1st Group, the

mortality of laboratory animals was 11,11% ($n=2$), in the 2nd group it was 5,56% ($n=1$), with the passage of time (9 days), in the 1st Group the mortality rate was 33,33% ($n=6$), in the 2nd Group the mortality rate was 11,11% ($n=2$). Comparative analysis has allowed us to interpret that a decrease in the state of death has a positive effect on biocorrection. The percentage of death was not observed in the control group.

Thus, after acute irradiation in laboratory animals, in the dynamics of observation, the incidence of microorganisms passing through the colon to the mesenteric lymph nodes increased



by a percentage and reached 100,0% on the 9th day after irradiation. In biocorrected, irradiated laboratory animals, too, the percentage of micro-organisms was higher, but in the dynamics of observation, they decreased by a percentage and decreased by 56,25% in the last 9 days from irradiation. In the control group, these legalities were not observed, while the percentage of yields did not exceed 5,56%. It is noteworthy that during the observation period, when all the animals of the control group (not irradiated) remained alive, irradiated mice died over time, and by 9-day mortality rate reached 33,33% in the 1st group, 11,11% in the 2nd group.

Similar to the above, experimental and microbiological researches were also conducted with laboratory animal pigeons.

From the liver of laboratory animals, the degree of germination was similar to the parameters of the mesenteric lymph nodes - it was correlated with the growth trend and intensity of the percentage of germination during the observation period.

Microorganisms with translocation from the colon to the liver flour indicators increased in dynamics during the observation period-83,33±8,78% on the 5th day, respectively, in the 1st group; 93,75±6,05% on the 7th day and 100,0% on the 9th day (Table 2).

Table 2. In the experiment, the dynamics indicators of the percentage of occurrence of microorganisms passing from the colon to the liver after acute irradiation

Groups	Period after irradiation	Results	
		Total	%
1-group (receiving acute radiation), n=54	5-day, n=18	15	83,33±8,78
	7-day, n=16	15	93,75±6,05
	9-day, n=12	12	100,0
2-Group (acute irradiation + prophylactic biocorrection), n=54	5-day, n=18	14	77,78±9,80
	7-day, n=17	13	70,59±11,05
	9-day, n=16	8	50,0±12,50
3-group(did not receive acute radiation, controlled), n=54	5-day, n=18	0	0
	7-day, n=18	0	0
	9-day, n=18	1	5,56±5,40

The trend and intensity of changes in laboratory animals of the 2-Group, in which biocorrection was used, were practically identical with mesenteric lymph nodes - 77,78±9,80% on 5-day, respectively (from 18 to 14); 70,59±11,05% on 7-day (from 17 to 12) and 50,0±12,50% on 9-day (from 12 to 6). The positive effect of biocorrection can also be seen from the inverse correlation of 1 - and 2-Group parameters to each other (Figure 2).

Thus, the analysis of the yield indicators in the pigar of microorganisms passing through the colon of laboratory animals irradiated in the experiment showed that, after irradiation, over time, the percentage of yields has a tendency to increase, but the intensity of reproduction was lower than the parameters of the mesenteric lymph nodes. The results obtained in laboratory animals undergoing irradiation, biocorrection were reversed.



This is due to the fact that biocorrection reduces the negative effect of radiation on the normal microflora of the colon. The parameters of both groups of irradiated laboratory animals sharply differ from the

parameters of the control group was associated with a negative effect of radiation on the immune system, through it the normal microflora of the colon.

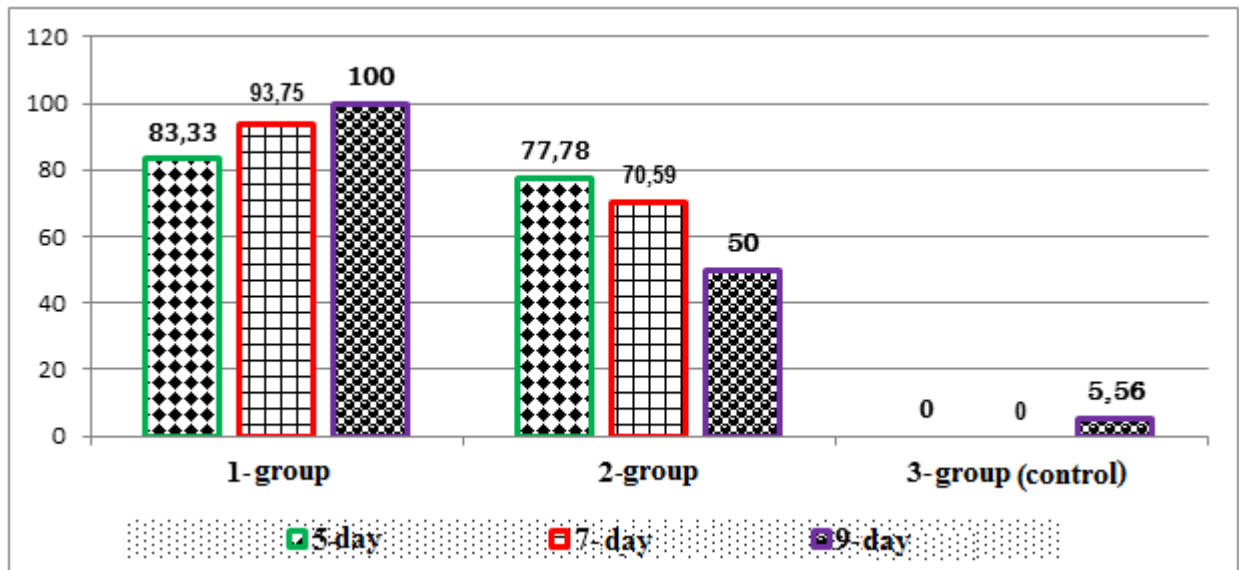


Figure 2. Laboratory animals in the experiment showed that micro organism passing through the colon they germinate from the liver, %

The next stage of the scientific work was the study of the percentage of germs in laboratory animals whose spleen they passed through the colon using Bacteriological Methods. After one-time (acute) irradiation, on Day 5, microorganisms from the spleen of animals of the 1 group recovered in 72,22±10,56% of cases (18 in 12 cases) (Table 3).

On the 7th and 9th days of the experiment, this indicator had a growth trend - respectively 81,25±9,76% (16 in 13 units) and 100% (in all).

In laboratory animals of the 2-TH Group, which received acute irradiation, profilactic biocorrection, there was also a germination of microorganisms in the spleen. This increase was characterized by a decrease in duration - 72,22±10,56% in 5 days, respectively (from 18 to 13 units); 7-64,71±11,59 per day (from 17 to 11 units) and 43,75±12,40% in 9 days (from 16 to 7 units). Micro organism in the spleen of intact laboratory animals included in the control group did not recover (0%).

Table 3. In the experiment, the dynamics indicators of the percentage of micro-organisms passing from the colon to the spleen after acute irradiation

Groups	Period after irradiation	Results	
		Total	%
1-group (receiving acute radiation), n=54	5-day, n=18	13	72,22±10,56
	7-day, n=16	13	81,25±9,76
	9-day, n=12	12	100,0



2-Group (acute irradiation + prophylactic biocorrection), n=54	5-day, n=18	13	72,22±10,56
	7-day, n=17	11	64,71±11,59
	9-day, n=16	7	43,75±12,40
3-group(did not receive acute radiation, controlled), n=54	5-day, n=18	0	0
	7-day, n=18	0	0
	9-day, n=18	0	0

The trend of changes was the same even if the percentage of microorganisms that sprouted from the lungs of irradiated and non-irradiated laboratory animals was characterized by a decrease in their intensity compared to other organs (mesenteric lymph nodes, liver, spleen) (Table 4).

It was found that during the observation period in Group 1 laboratory animals, the percentage of microorganisms

that sprouted in the lungs increased from 55,56±11,71% on the 5th day (in 10 of 18) to 91,67±7,98% on the 9th day (in 11 of 12).

Also, the percentage of detection in the lungs of laboratory animals with translocation of colon microorganisms in the 2nd group decreased with the passage of time - from 61,11±11,49% in the 5th day (from 18 to 11 units) to 37,5±12,10% in the 9th day (from 16 to 6 units). In the control group, no flour was observed.

Table 4. In the experiment, the dynamics indicators of the percentage of occurrence of microorganism passing from the colon to the lungs after acute irradiation

Groups	Period after irradiation	Results	
		Total	%
1-group (receiving acute radiation), n=54	5-day, n=18	10	55,56±11,71
	7-day, n=16	12	75,0±10,83
	9-day, n=12	11	91,67±7,98
2-Group (acute irradiation + prophylactic biocorrection), n=54	5-day, n=18	11	61,11±11,49
	7-day, n=17	9	52,94±12,11
	9-day, n=16	6	37,5±12,10
3-group(did not receive acute radiation, controlled), n=54	5-day, n=18	0	0
	7-day, n=18	0	0
	9-day, n=18	0	0

Thus, microorganisms with translocation from the colon to the spleen and lungs of laboratory animals accounted for parameters ranging from 37,5±12,10% to 100,0% in irradiated mice, if the flour percentage was not observed in unburned mice. In irradiated animals, the percentage of flour in irradiated, biocorrected animals decreased, while over time, the percentage

of flour in micro-organisms increased. Given that this trend is also observed in the mesenteric lymph nodes, liver and spleen, we can be sure that the dynamics of the percentage of germination of microorganisms with translocation in all organs is practically the same.

In laboratory animals that were irradiated in all cases (regardless of whether



they were biocorrected or not), they observed the property of overeating microorganisms from the colon to the internal organs. In our opinion, this irradiation is a consequence not only of the occurrence of Total immunodeficiency, increased permeability of the mucous membrane of the colon, but also of the fact that deep dysbiotic changes occur in the microbiocenosis of the colon. This pathogenetic mechanism has been recognized as a contributing factor in the ability of microorganisms to penetrate into

the internal organs and cause its intensification.

In the experiment, we found that when the percentage of flour in the internal organs of microorganisms passing through the colon is studied and described in dynamics, it is necessary to research the indicators of flour in the peripheral blood of experimental animals of these strains.

In the peripheral blood of irradiated laboratory animals, their germination trends remained unchanged (Table 5).

Table 5. Indicators of the percentage of microorganisms that passed from the large intestine to the peripheral blood after acute radiation in the experiment

Groups	Period after irradiation	Results	
		Total	%
Group 1 (received acute radiation), n=54	5-day, n=18	11	61,11±11,49
	7-day, n=16	12	75,0±10,83
	9-day, n=12	10	83,33±10,76
Group 2 (acute radiation + prophylactic biocorrection), n=54	5-day, n=18	11	61,11±11,49
	7-day, n=17	10	58,82±11,94
	9-day, n=16	7	43,75±12,40
Group 3 (no acute irradiation, control), n=54	5-day, n=18	1	5,56±5,40
	7-day, n=18	2	11,11±7,41
	9-day, n=18	1	5,56±5,40

According to the previous results, after irradiation during the observation period in group 1, the percentage of germination of strains increased over time - 61.11±11.49% (in 11 out of 18) on the 5th day, respectively; 75.0±10.83% (12 out of 16) and 83.33±10.76% (10 out of 12) on day 7. In group 2, it was the opposite, i.e., the percentage of germination decreased with time.

A different feature from the researched internal organs is that in the non-irradiated animals of the control group, strain germination was observed during the

observation period - from 5.56±5.40% to 11.11±7.41% (in 1 or 2 of 18).

Thus, the percentage of microorganisms that passed through the colon from the peripheral blood of acutely irradiated laboratory animals increased as the observation period increased. In biocorrected, irradiated animals, the percentage of microorganism germination decreased over time. In both groups, the indicators of microorganism germination were significantly higher than the parameters in the control group.



Conclusions

1. The percentage of microorganisms in the mesenteric lymph nodes of white mice that received acute irradiation increased and reached 100.0% on the 9th day after irradiation.

2. In laboratory animals that underwent prophylactic biocorrection and received acute radiation, the percentage of translocation strains was also high, but in the dynamics of observation, their percentage decreased and decreased to 56.25% on the last 9 days after acute radiation

3. In laboratory animals in the control group that did not receive acute radiation, there were no laws related to the translocation of microorganisms, and the percentage of germination did not exceed 5.56%.

4. The lethality among irradiated mice increased, and by day 9 the mortality rate was 33.33% in group 1 and 11.11% in group 2, while all acutely irradiated animals survived during the follow-up period.

5. In laboratory animals that received acute radiation in the experiment, the indicators of germination of the strains of microorganisms translocated from the large intestine of the liver tended to increase over time, but the intensity of reproduction was lower than the parameters of the mesenteric lymph nodes. The results of laboratory animals that received acute radiation and underwent prophylactic biocorrection were inversely proportional to those of group 1. It was interpreted that this is due to the reduction of the negative effect of radiation on the normal microflora of the large intestine.

6. Germination percentages of microorganisms translocated from the large intestine in the spleen and lungs of irradiated laboratory animals ranged from

37.5±12.10% to 100.0%. Germination percentage decreased in irradiated, biocorrected animals. Taking into account that this trend was also observed in mesenteric lymph nodes, liver and spleen, the dynamics of the percentage of microorganisms with translocation in all organs was practically the same.

7. The percentage of microorganisms that passed through the colon from the peripheral blood of irradiated laboratory animals increased as the observation period increased. In 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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