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Methods for Determining the Effect of Acute Radiation on the Indicators of the Immune System and the Effectiveness of Bio Correction

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Abstract: Acute radiation-depends on the frequency and duration of ionizing radiation and develops to varying degrees depending on the radiation sensitivity of the members. In acute radiation, the most sensitive organs are organs of the immune system, mucous membranes of the gastrointestinal tract, EXO-and endocrine glands, sex glands. Members with low radiation sensitivity include the heart, kidneys, liver, head and spinal cord, bone tissue, joints [2.4].

The purpose of the research work was to determine the effect of acute radiation on the immune status of experimental animals, as well as to show the degree of influence of biocorrection on this process.

Material and methods. To accomplish this goal,60 adult,160-180 grams in weight, white non-breeding bats of the male sex were involved in the research. Laboratory animals were kept in plastic cages under standard vivarium conditions with relative humidity (50-60%), temperature (19-220C), 12 hours of darkness and 12 hours of light mode. Laboratory Animal Care Nuraliev N.A. and hammual. [6] was implemented on the basis of recommendations. Biological safety rules [1.3.5.7] and ethical principles of working with laboratory animals were strictly observed when working with laboratory animals.

All laboratory animals were divided into the following groups:

the main group are white non-breeding bats (n=30), which are in the standard vivarium ration, receiving a single acute radiation of 5 Greys;

the control group is intact white non-breeding bats (n=30), which are in the standard vivarium ration, not receiving acute radiation.

The main group, in turn, was divided into 2 subgroups: white non - breeding bats (n=15) with the addition of the biologically active additive "Lactopolis-AWL" as a biocorrection to the standard vivarium ration, which received one - time acute radiation in the amount of Group 1a-5 Grey; Non-biocorrected white non-breeding bats (n=15).

In the experiment, the irradiation of laboratory animals was carried out using the gamma-therapeutic apparatus agat-R1 (Estonia), in which the source of radiation became so-60. Research related to animal irradiation was carried out at the Bukhara branch of the Republican specialized scientific and practical center of oncology and radiology of the OSR SSV.

The drug" Lactopropolis-AWL " was given every morning, due to the weight of all laboratory animals. Those who received acute radiation were given the drug for 20 days, irradiated on the last day, and then inanimated on the 5th day and immunological studies were carried out.The biologically active additive" Lactopropolis-AWL "consists of the extract of Lactobacillus rhamnosus 925, probiotic bacteria Enterococcus durans, and biologically active compounds propolis, and has antimicrobial, immunostimulating, anti-inflammatory properties (product of the ozr FA Institute of Microbiology and" allwelllab " LLC).

Laboratory animal immune system status was evaluated on CD-differentiating and activating antigen expression. The following markers of immunocompetent cells were identified: CD3+-, CD4+-, CD8+-, CD16+-, CD20+-, CD95+-lymphocytes. Expression of SD receptors is found in garib F.Yu. and hammual. (1995) method "sorbent" was conducted in a rosette formation reaction using lt series monoclonal antibodies produced by LLC (RF). The immunoregulatory index (iri, SD4+/CD8+) was calculated.

Materials were statistically processed using traditional variational statistical methods. To do this, a software package for medico-biological research was used on the personal computer based on the" Pentium IV " processors. The principles of evidence-based medicine were used to organize and conduct research.

The results obtained and their discussion. To study the effects of acute radiation, the main indicators of the immune system of intact white-breed male rats that did not have this effect were studied first and the results were analyzed, a total of 9 indicators were interpreted and analyzed.

The results obtained showed that the quantitative indicator of leukocytes in the main and control groups of laboratory animals did not differ significantly from each other (R0,05). In our opinion, this condition is explained by the shortness of the period after irradiation (5 days).

Lymphocytes are quantitative and relativistic quantifiably studied, we witnessed a completely different picture. It was recognized that their relative index decreased convincingly to 1.41 times compared to the control group (intakt) in experimental animals that received acute radiation(R0,05).

Even when the absolute parameters of this cell were compared, a trend similar in practical terms to birbiri was observed,the decrease was 1.44 times(R0, 05). The decrease in the relative and absolute amounts of lymphocytes is explained by the effect of acute radiation on the proliferation and differentiation of these cells, on the decrease in their activity.

As for immunocompetent cells of the body's immune system being analyzed, changes in T-lymphocytes (SD3+-cells) as well as their major subpopulations (SD4+and SD8+-cells) have varied. There was a convincing level decline in SD3+-cell relative and quantitative parameters compared to control group indicators.

Given the number cross section,it was found that SD3+-cell depletion was 1.58 times (R0, 001), the relative amount of SD4+-cells decreased to 1.43 times(R0, 05). SD8 + -we witnessed the reverse picture in terms of the relative amount of cells-it was recognized that these cells increased convincingly compared to control in the main group-by 1.40 times (R0,05). Both lymphocytes responded to the same effects with different changes.

In a group of white-breed rats that received acute radiation of the relative amounts of SD3+-and SD4+-cells, the proportion of intact to laboratory animals was explained by the decrease in the total amount of lymphocytes, immunodeficiency in the T-lymphocyte system, as well as the quality of the effect of acute radiation, since other factors affecting laboratory animals had been eliminated. If we take into account that one of the main functions of SD8+-cells is to reduce the strength of the immune response, then the increase in these cells compared to other cells is one of the reasons for the development of secondary immunodeficiency [1.3.5.7.9.11.13].

Similar results were obtained on the quantitative indicators of immunocompetent cells presented above (excluding SD8+cells). If a 2.27-fold plausible discrepancy among major vanazorate groups among SD3+-cell absolute quantities was found in favor of the control group (R0,001), the same trend remained with respect to SD4+ - cells(discrepancy 2.06 times, R0,001). However, in the case of SD8+-cells, it was noted that such a trend was not detected. In either group being compared, convincing differential results were not obtained from birbiri (R0,05). This difference between relative and quantitative indicators raises the question of which indicators should be relied on in obtaining a based conclusion based on interpretation and analysis. If we take into account that the quantitative indicator depends more on the quantitative parameters of leukocytes and lymphocytes, it becomes known that the trend of changes in relative indicators makes it possible to obtain truthful results as well as make reasonable conclusions. For this reason, in experimental studies, it is recommended to use relative indicators when assessing the functioning of the immune system, the state of immunocompetent cells.

Another of the evaluative parameters used to evaluate the T-system of the immune system is iri. This index shows the degree of ratio of the primary immunoregulatory cells of T-lymphocytes to one in the same case, the higher the iri, the less expressed immunodeficiency in the body, the less it is, the greater the degree of secondary immunodeficiency depth [7.8.10.12.14.16.18]. For this reason, it is recommended to always use IRI when assessing immune status. In studies,the iri was disparaged in the control group with a convincing high level compared to the main group-2.01 times (R0, 001).Both in terms of relative and absolute parameters, the uniform performance of this unit indicates that it can be applied to assess the degree of immunodeficiency pituitary.In order to assess the functioning of the immune system, we consider that it is enough to evaluate the relative indicators of immunocompetent cells as well as the comparative assessment of IRI.

Since we found that it is permissible to define the T-branch of the immune system as well as the V-branch, the relative and absolute amounts of SD20+-cells were also studied, analyzed. The results obtained showed that there were no convincing differences between the groups being compared on this immunocompetent cell (R0,05). It appears that the difference of 1.12 times was in favor of the main group.

Although the results are not convincingly disparate from birbiri, non-white rats that have received acute radiation have had a tendency to reproduce in SD20+ - cells compared to intact laboratory animals. This condition has shown that changes in the T-joint of the immune system develop relatively quickly compared to the V-system, with the V-Joint seeking to fill the deficit that occurs in the immune system. Note that results different from relative parameters in absolute indicators were obtained,the data in the control group was higher than the main group(R0,001).

SD16+-cells, which are part of non-immune system-specific defenses, function to detect and eliminate Allogenic and Xenogenic-natured cells, tumor cells that proliferate in the body independent of the antigen. Considering that they increase in quantity and increase in activity when there is a need to lose tumor cells formed by external influences (radiation), the true causes of quantitative and relative changes in SD16+-cells are known. In laboratory animals that received acute radiation in observations, it was observed that the relative parameter of these cells increased convincingly compared to the control group-1.35 times, (R0, 05). Among absolute indicators, a convincing difference was not detected (R0,05).

The next stage of the work was an assessment of the degree of influence of biocorrection on the cells of the immune system on experimental animals that received acute radiation.

Biocorrection was performed with the drug" Lactopropolis-AWL", which was given every morning due to the weight of laboratory animals. In this case, the same drug was given for 20 days, on the last day, acute Total radiation was carried out at a dose of 5 Gray once, on the 5th day after irradiation, laboratory animals were lifeless, their blood was taken and immunological studies were carried out.

It can be seen that the results obtained in relative and absolute indicators are different, in 4 of the relative indicators (8 parameters) (50%) the indicators have changed convincingly in the positive direction, and in the remaining 4 indicators (50.0%) the convincing changes have not been detected, so, there is a tendency to shift in the positive direction [7.9.13.15].

Convincing relative indicators were not observed in terms of total lymphocyte count (R0,05, growth 1.26 times), SD3+-cell count (R0,05, growth up to 1.25 times), iri (R0,05, growth up to 1.17 times), and SD95+-cell count (R0, 05, growth up to 1.31 times). Cells that were first exposed to acute radiation were observed to have a partial decrease in their susceptibility once biocorrection was performed.

Convincing changes were observed in absolute amounts (100%) of the 9 immunocompetent cells studied (R0,05-R0,001). The indicators of the group of laboratory animals, in which biocorrection was carried out until acute radiation, the positive shift of immune system cells in relation to non-white non-breeding rats, in which biocorrection was performed, ranged from 1.17 times to 2.03 times, while all changes were convincing.

Conclusions.

1. Male rats without a white breed who received and did not receive acute radiation received slightly different results in the relative and absolute indicators of immune system cells. These results were mainly observed in total lymphocyte counts, SD3+-, SD4+ -, and SD8+-cells, which were statistically reliably increased in laboratory animals receiving acute radiation by 1.41,1.58, and 1.43 times respectively (R0,05), while SD8+-cell counts were statistically reliably increased by a total of 1.40 times (R0, 05).

2. It was found that changes in the V-arm of the immune system (SD20+-cells) were not evident, there was no difference in persuasive levels, but there was a tendency for them to increase in the main group. SD16 + is a sign that cells have increased activity of the immune system against cells of an allogenic and Xenogenic nature, with a convincing increase of 1.35 times in the main group of laboratory animals. A convincing decrease in SD95+-cells by 1.51 times in the main group explained a decrease in lymphocyte readiness for apoptosis, an increase in the likelihood of tumor cell proliferation in the body.

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