



RADIOPROTECTIVE EFFECT OF CO(II) INOSINATE ON THE BLOOD SYSTEM CELLS OF C57BL/6 MICE AFTER ACUTE SINGLE EXPOSURE γ -RADIATION

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Introduction.

The search and study of new radioprotective compounds capable of modifying the damaging effects of ionizing radiation is important issue of radiobiology. In recent years, the synthesis of metal complexes with more effective chelating ligands is in progress. Inosine, as a purine nucleoside, is a precursor of adenosine triphosphate, with metal ions forms low-toxic and membrane-permeable complexes.

The aim of this research was to study of the anti-radiation properties of inosine and inosinate cobalt (II) after acute single exposure γ -radiation.

Methods.

The experiment was performed in C57Bl/6 mice of both sexes aged 2-2.5 months.

The whole body single radiation exposure of animals was carried out using a closed source of γ -radiation - ¹³⁷Cs radionuclide, dose rate 0.62 Gy/min.

To assess the effect of the test compound on the recovery of peripheral blood parameters, the animals were irradiated at a dose of 5 Gy, the observation was carried out for 30 days. To assess the effect of the test compound on the level of micronuclei in polychromatophilic erythrocytes of the bone marrow and the level of cell death of peripheral blood lymphocytes, the animals were irradiated at a dose of 1.5 Gy, the animals were removed from the experiment on the 2nd day after irradiation.

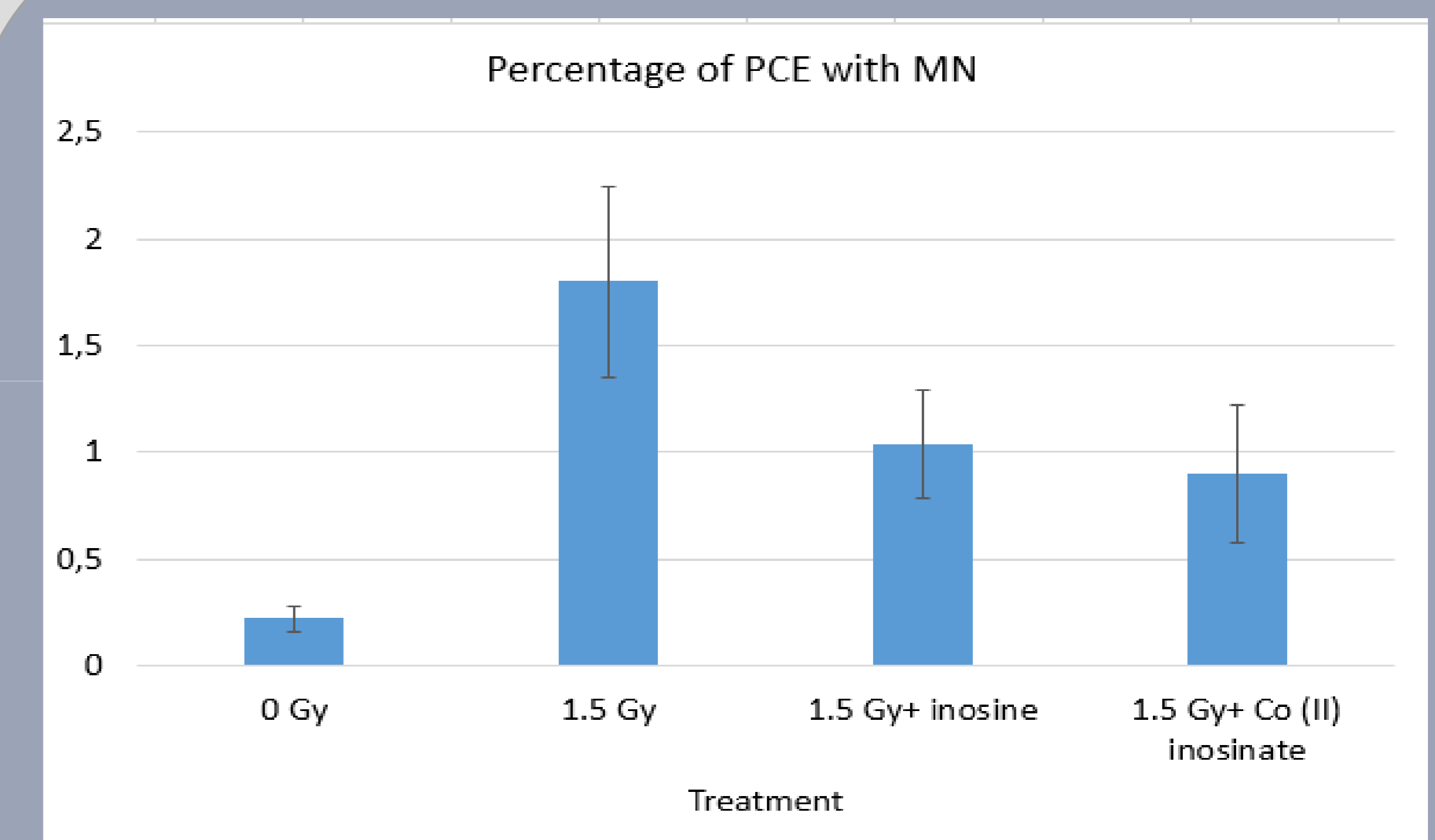
Solutions of inosine and Co(II) inosinate were administered intraperitoneally to animals of the experimental groups at a dose of 45 mg/kg 15 minutes after irradiation.

The complex salt of inosine, Co(II) inosinate, was provided by the Institute of Radiation Problems of the National Academy of Sciences of Azerbaijan.

Results.

The effect of cobalt (II) inosinate administration on the recovery of the blood leukocyte count of mice on day 30 after irradiation at a dose of 5 Gy was not detected. The number of erythrocytes of mice, which after irradiation at a dose of 5 Gy were injected inosine, on the 30th day was reduced relative to the value in the control by 16.3%. At the same time, in mice that were administered cobalt (II) inosinate after irradiation, the number of erythrocytes corresponded to the level of control.

In the bone marrow of mice which were injected the solution of inosine, a decrease in erythrocytes with micronuclei was observed to 1.04% versus 1.8% in the irradiated control group. Similarly, a decrease in the number of cells with micronuclei was observed in groups of animals which were injected cobalt (II) inosinate to 0,90%.



Effect of inosine, Co (II) inosinate (~45 mg/kg) injected i.p. to mice 15 min after their irradiation with 1.5 Gy of γ -radiation on the formation of PCE with MN in the bone marrow of the animals.

Effect of inosine, Co (II) inosinate (~45 mg/kg) injected i.p. to mice 15 min after their irradiation with 1.5 Gy of γ -radiation on the level of cell death of peripheral blood lymphocytes of the animals.

Treatment	Healthy	Early Apoptotic	Late Apoptotic	Necrotic
0 Gy	90,37±0,72	4,775±1,33	3,975±0,92	0,875±0,39
1.5 Gy	79,9±2,79*	13,14±2,26*	5,26±1,09*	1,7±0,71
1.5 Gy+ inosine	83,64±3,13	10,78±3,90*	4,58±1,22	1,00±0,56
1.5 Gy+ Co (II) inosinate	85,00±2,22	8,94±2,74*	4,46±1,79	1,60±0,83

In the group whose animals received an intraperitoneal injection of inosine after irradiation a reduced number of lymphocytes at the stage of early and late apoptosis (10.78 % and 4.58%) compared with the group of irradiated animals (13.14% and 5.26%) was noted. In the group of animals treated with inosine also showed a decrease in level of early and late apoptosis to 8.94% and 4.46%, respectively.

Conclusion.

The effect of intraperitoneal administration of cobalt (II) inosinate complex and inosine on the blood cells of C57Bl mice under the action of ionizing radiation was evaluated. No significant effect was found on the restoration of the cellular composition of peripheral blood leukocytes in animals one month after irradiation at dose of 5 Gy. A decrease in the level of apoptosis of peripheral blood lymphocytes and polychromatophilic erythrocytes with micronuclei in the bone marrow in groups of animals treated with inosine and cobalt (II) inosinate after irradiation at a dose of 1.5Gy was observed.



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