



Gamma Ray Effects on White Blood Cells of Male Mice

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Abstract

Background: This paper we appear the light on the effect a weak gamma radiation with chronic irradiation on White blood cells defend.

Object: Exposure with ionizing wave has various effect on the several hematological parameter and tissue of biological. Our paper were scoped to detecting the soft dose radiation rate of gamma wave effect on several blood parameter of white mice.

Material and Method: In this paper a mice with white color were employed in this work which scale about (two to three) age months and 26 to 35 weight gm. These mice with healthy were produced from the veterinary collage in University of Mosul. Keeping these mice were obtained in cages of plastic equipped with metal lids with dimensions (21x31x31 cm) states were put to ensure good hygiene.

Results: Decline of total mean value of WBC count was obtained in the, neutrophil monocyte, lymphocyte, basophil and eosinophil, with a weak dose rate of irradiation 110 mGy/h and 310 mGy/h of irradiation part at 3 days and increased with declining arraival to irradiation time at 41 days .However rebuilding and recovery were happened at 61 days of time of irradiation.

Conclusion: Undetected impact of weak dose rate gave from gamma wave of 241Am on WBC count of total value were happened repair and recovery outcome from cells after exposure with 61 days. Gamma wave impact lead to significant decrease in WBCs count in a dose – dependent manner, which was lead to risk of healthy effort through exposure to irradiation. Moreover studies are recommended to show the other Troubles of gamma wave can refer to the workers in radiation department as medical and biophysics field.

Key Words: White Blood Cell Parameter, Hematological, White mice, Radiation Dose Rate, Gamma Wave.

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Introduction

In numerous scales of animals and humans efficiency gamma radiation is used upper and lower and lower positive radiation impact on the organism roles. Reasonable the other side of impacts as passive effects accomplish in irradiation disease in brides and mammals at critical levels of radiation dose [1]. The cancer represent one of the risks respect to increased soft radiation dose for along time.

The blood index are often used to prove the health case in mice, fish and rats but blood cell count is a chief index to enhance the body support power.

The radiation disease are burdensome and long scale with diagnosis and therapy. The clear change of index to the tissue are marginal magnitude of blood and change downy at received soft level of radiation dose [2]. Other side, waves of radiation have several indirect effects one of them geotaxis change.

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Therefore, upper x-ray dose agree with the soft gamma radiation dose in effects and lead to disturbance of chromosomal in marginal blood in the cells of lymphocytes has been obtained at administrated dose upper than 6 Gy of x-radiation [3].

The increased in deposition of energy lead to increased the effects on the biological tissue with gamma wave and next obtain. Change in chemical band and structure respect to the cell. At the point represent the energy of gamma radiation is higher than energy of molecular band in most molecules lead to hemolytic ligament division and secondary electron producing [4]. The effect of ionizing radiation on the cells lead to damage molecules directly from one hit, but in the other side at indirectly effect on the molecules lead to obtain free radical such as hydrogen peroxide in the body water[5]. Higher risk of radiation result to the higher dose rate [6].

White blood cell has a chief roles are come to disaster pollution, protect the body against aggression with outsider organisms and cause at least move and distribution antibodies in immune response [7]. The cell count of white blood cell reduce Imation single at pollution riskiness. The low count of white blood cell known as Leucopenia [8].

Both Material and Methods

In this study thirty male mice of white color were employed with scale near (2-3) age months and (26-35) weight gm. These mice were get from Veterinary College in Mosul University .In plastic cages mice were put at the dimensions (21*31*31 cm) cases were obtained to undertaking a excellent health . The control group (without exposure) and the gamma wave exposure groups temperature of environment as well as at all time of the experiment were remain respectively at $27\text{ C}^{\circ} \pm 2.5$ and 34 percentage. Weekly the sawdust was replacing and animals feeding have been involved protein, soybeam, com, wheat with 10%, 20%, 34%, 35% respectively. The percentage of dried milk with 1 % also administrated with the mixture orally. We were provide at all the experiment time by water.[9].

System of Work

Am-241 represent radioactive source administrate gamma radiation .The activity of radiation of radiation source 50 micro Curie and take various

radiation dose rate as two doses 110 and 310 m Gy/h at the time of exposure interval 3,21,41 and 61 days . The source fixed from top at several centimeter from cages of white mice as shown in Figure 1.

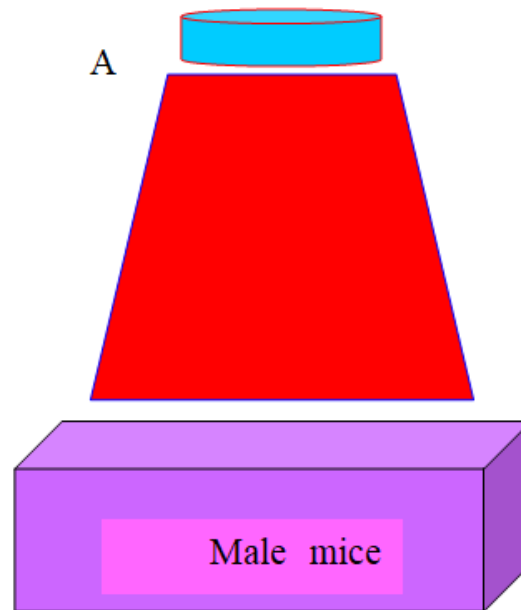


Figure 1. Set up of worker

Design of Experimental

In this paper white mice have been employed with thirty number. The male mice distributed into 3 groups were even group contain 10 white mice and administrated the required doses as next:

- 1- The control group as first group contain 10 white male mice as similar as in group 2 and group3.Group 1remained whit out irradiation with gamma waves.
- 2- The next group named second group were exposed to 110 mGy/h with gamma waves.
- 3- The final group named third group were exposed to 310 mGy/h with gamma waves.

Collection of Blood Sample

In EDTA tube blood sample of any mouse selected at 0.6 ml with capillary. The collected of sample of blood have been obtained at interval of exposure (3,21,41,61 days) with initial dose 110 m Gy/h of irradiation group. The time of the blood sample collected of irradiation group similar to the time of the blood sample collected of control group (without irradiation). In any experiment the capillary tube replaced at each processing. The white blood cells were computed by the method of hemocytometer with counting chamber of Neuhayer. The using of this method return to available and simple.



Analysis of Statistical

Several factors of hematological parameters like white blood cell have been computed the count of white blood cells with total mean value of control and irradiation groups by ANOVA of analysis

variance. The significant value of (p) have been found (p≤0.05) and also standard division [10].

Results

Overall outcomes put in table (1).

Table 1. Several Blood Factors Adverse with the Various in White Male Mice Irradiation Dose Rate

Control group						Irradiation group at 110 mGy/h				
Factors	0 days	3days	21 days	41 days	61 days	0 days	3days	21 days	41 days	61 days
WBC count	92.66 ±2.11	107.9 ± 2.18	103.06 ±2.15	99.49 ±2.14	98.40±2.13	99.49±2.14	98.60±2.13	102.16±2.15	103.95±2.16	105.53±2.17
Lymphocyte	72.27±1.61	87.12±1.08	83.16±1.32	80.19±1.23	79.20±1.12	78.90±1.82	72.27±1.61	84.15±1.43	87.12±1.13	88.11±1.521
Neutrophil	6.53±0.421	6.13±0.321	6.13±0.312	5.44±0.12	5.44±0.11	6.53±0.53	2.87±0.72	1.68±0.44	0.49±0.14	0.19±0.12
Monocyte	9.39±1.51	8.21±1.43	8.21±1.42	8.31±1.22	8.31±1.32	8.415±1.13	20.79±1.14	14.85±1.11	15.84±0.97	16.83±1.711
Basophil	2.7±0.752	2.27±0.553	2.17±0.456	2.27±0.13	2.27±0.12	2.27±0.77	0.89±0.44	0.39±0.21	0.1±0.12	0.09±0.11
Eosinphil	3.26±0.51	3.26±0.44	3.26±0.444	3.26±0.542	3.16±0.232	3.36±0.44	1.78±0.48	1.09±0.31	0.39±0.21	0.29±0.20
Control group						Irradiation group at 310mGy/h				
Factors	0 days	3 days	21 days	41 days	61 days	0 days	3 days	21 days	41 days	61 days
WBC count	92.66±2.11	107.02±2.18	102.96±2.15	99.49±2.14	98.4 ±2.13	100.2 ±2.14	98.3 ±2.13	103.06 ±.16	104.24 ±2.16	108.60 ±2.18
Lymphocyte	72.27±1.32	87.12±1.36	83.16±1.32	80.19±1.23	79.2±1.110	79.89±1.780	71.28±1.51	83.16±1.32	88.11±1.10	90.1±1.510
Neutrophil	6.53±0.412	6.13±0.321	6.13±0.310	5.44±0.13	5.44±0.11	6.63±0.41	3.07±0.62	1.78±0.34	0.69±0.12	0.29±0.121
Monocyte	8.31±1.22	8.21±1.12	8.21±1.44	8.31±1.25	8.31±1.32	87.12±1.13	21.78±1.102	16.83±1.100	14.85±0.796	17.82±1.622
Basophi	2.27±0.721	2.27±0.554	2.17±0.455	2.27±0.13	2.27±0.11	2.47±0.85	0.79±0.22	0.29±0.19	0.09±0.07	0.09±0.08
Eosinphil	3.26±0.51	3.26±0.44	3.26±0.437	3.26±0.533	3.16±0.23	3.26±0.33	1.38±0.32	0.99±0.21	0.49±0.11	0.29±0.09

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Table 1: Indicated white blood cell count with mean value rather than standard division with interval (3,21,41,61)days .The outcomes was showed reduce in overall mean value of WBC count at 3 days with irradiation at two doses 110 mGy/h and 310 m Gy/h . The decline was increased until to 41 days while most mean value of WBC were raised at (p≤0.05) significantly depending on the repair and recovery of the white blood cell and reaching to 61 days by the doses of irradiation as indicated in table 1respect to the control group. The dropping in monocytes mean value were found until to 3 days due to irradiation group. This dropping continuous arrival to 21 and 41 days. On the other hand, the recovery of monocyte have been noticed arrival to 61 days due to the two doses of irradiation of gamma waves. There was found simple reduce in count of lymphocyte with total mean value of white blood cell arrival to 3 days but a rise in reeducation until to 41 days due to two doses rate of irradiation. The repair and recovery have been noticed at continous of irradiation due to two doses rate

arrival to 61 days .like indicate in table 1. The Eosinphil count have been reduced in mean value respect to white male mice in two doses of irradiation groups arrival to 3 days by 110 and 310 mGy/h respectively. The decline have been raised reaching to irradiation of time 41 days. In same previous cases, simple recovery have been found in mean value of count of eosinphil happened arrival to 61 days respect to two doses of irradiation as showed in table 1. The agreement this result also with Basophil count of mean value. At last, the reduction was obtained in the neutrophil count respect to mean value arrival to the time of irradiation 3 days and continuous even to 41 days. The recovery and repair was happened at time of irradiation at last interval 61 days respect to neutrophil count in mean value at the irradiation group as happened in table 1.

Discussion

The hematological biological cell consider as radiosensitive to radiation dose therforewe have



been found declined in white blood cell count [4,11]. The irradiation with gamma wave lead to reduce in lymphocyte and leucopenia rather than monocyte and neutrophil count [12]. In the other hand, we noticed reduction in count of eosiphil as well as basophils count. The outcome of eosiphil and basophil agree with the outcome of the studies [13,14].

The repair and recovery has been obtained arrival to irradiation time 61 days respect to irradiation groups for two doses of irradiation. Despite the time of repair and recovery more the time of the damage [15]. Cell recovery based on level of repair of biological cell so that the lethal dose lead to damage of repair cell and cure their growth structure by produce healthy cell elements [14]. This paper also consistent with researchers who studied the detection of the effect of a weak dose of radiation for all of us on same blood paraneters in the same animals models and noted decrease in the initial legislation of white defensive blood cell and the damage of these cells at a critical dose at a 5 Gy and they generate immunity and cure against radiological effects after doses of irradiation. Finally, the number of white blood cells were reduced by the effect of all of gamma wave at dose of 7 Gy for 30 days as absorbed dose at [17]. During their studies. Also discovered at the last with [18] of white blood cell count effect by ionizing radiation.

Conclusion

The undetected effect of soft radiation dose gave from ^{241}Am can be a produced in this paper on the white blood cell mean value but in the other side, the rebuilding cell and recovery outcomes in the were indicated with post irradiation at 61 days. Significant reduce obtain in white blood cell count by gamma wave as a single manner accelerate to risk of healthy effort thought the exposure. Many articles are interested to show the most gamma wave problems need solve the workers in radiation department biophysics and, medical physics field.

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