SUMMARY

The present study deals with radiation induced cytogenetical and histochemical changes in one of the most radiosensitive tissues in mammalian body which is the haematopoietic system of albino rats. Bone marrow were selected as major haematopoietic organs.

The study comprised two main parts: -

- **The first part** deal with the effect of whole body gamma irradiation at the exposure dose level of 6 Gy on the cytogenetical components of the bone marrow cells.
- **The second part** deal with the histochemical changes in the rat bone marrow following the whole body exposure to the sublethal dose of 6 Gy of gamma rays, since this dose has an optimal effect on the body organs while allowing for the recovery of the rat.

Effect of 6 Gy of gamma irradiation on chromosomal aberrations and micronucleus test:

36 healthy mature male rats were classified as follow:

Group 1: 6 male rats kept as control groups.

Group 2: 30 rats, subdivided into 5 equal subgroups.

Chromosomal aberrations and micronuclei polychromatic erythrocytes were estimated from bone marrow cells post-treatment with 6 Gy of gamma radiation after 1, 3, 7, 15 and 30 day, respectively.

Effect of 6 Gy of gamma irradiation on histochemical component of bone marrow:

12 mature male rats were classified as follow:

Group 1: 2 male rats kept as control group.

Group 2: 10 male rats, subdivided into 5 equal subgroups and recorded the change which caused by irradiation in the carbohydrate and proteins of bone marrow.

The results obtained from this investigation are classified into three categories.

- **Chromosomal aberrations: -**

Exposure of whole body to dose of 6 Gy of gamma radiation have cytogentical and biological effects.

Radiation induced different types of structural aberrations such as dicentric, ring, exchange figures, acentric fragments and induced numerical aberration which observed in the form of Aneuploidy and Polyploidy.

The significant frequency for the numerical chromosomal aberrations was found to be sign highly after 1^{st}, 3^{rd}, 7^{th}, 15^{th}, and 30^{th} day.

The structural aberrations were very highly significant after 1^{st}, 3^{rd}, 7^{th}, 15^{th} and highly significant after 30^{th} day.

Very highly significant of total chromosomal aberrations for all time of exposure to 6 Gy gamma irradiation was recorded.

High percentage of numerical chromosomal aberrations was noted after 1^{st} day (68.3%) & 3^{rd} day (41.7%) of exposure to gamma irradiation.

High percentage of structural chromosomal aberrations was noted after 1^{st} day (23.3%) & 3^{rd} day (26%) post exposure to gamma irradiation.

- **Micronucleus test: -**

Whole body exposure to 6 Gy of gamma irradiation elevated the frequency of MN relative to the control value. The highest response was observed after 1^{st} day (29.78%).

The highest values were observed after 1st , 3rd and 7th day of exposure , while there is no effect after 15th and 30th day of exposure.

The bone marrow activity reach 0.029, 0.023, 0.017, 0.044 and 0.0425 after 1st, 3rd, 7th, 15th and 30th day of irradiation.

- **Histochemical results:**

*** General carbohydrates:**

The carbohydrate content of the marrow cells of rats irradiated with 6 Gy, recorded a gradual and progressive decrease after one day post-irradiation. This decreased was presested for the 3rd , 7th and 15th days post irradiation and followed by gradual increase in carbohydrate material of bone marrow cells on day 30 post-irradiation. Moreover, this increase remain less than that of the control values .

*** Total proteins:**

Whole body gamma irradiation of rats markedly affected the proteinic content of the marrow after the sublethal (6 Gy) dose. This decrease in the total protein content reached its maximum after three days reflecting an active catabolic process of proteins in marrow cells. This is followed by a period of recovery and a gradual restoration of the normal proteinic level observed after 7th , 15th and 30th day after irradiation.