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Biology

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Metallurgical Laboratory

The University of Chicago

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BLOOD CHANGES IN HUMANS FOLLOWING TOTAL BODY IRRADIATION

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To be added as 2nd paragraph, page 5, under "Material":

The people used in groups I and II were individuals to whom the medical profession could offer no treatment that was at all specific or known to be helpful. The x-ray exposures that were given had as reasonable a chance as, or even a more reasonable chance than any other known type of treatment of doing the patients some good. Since this manuscript is concerned only with the effects on the blood, the clinical condition of the patients is not discussed at any length.

RESULTS

Three general groups are used for the persons who were subjected to radiation during this study. The first group consisted of eight persons who had neoplasms which could not be cured but still were not extensive enough to influence general health. This group was given total body irradiation in single exposures, with doses of 27, 60, and 120. The second group consisted of three persons who had illnesses which were generalized and chronic in nature. They were given total body irradiation in multiple exposures, with total doses of 100, 300, and 500. The third group consisted of three normal volunteers from the personnel of the Metallurgical Laboratory. Insofar as is known, they had no abnormalities. This group was given total body irradiation in three divided doses to a total of 21 r.

Methods

Laboratory Examinations. The changes in the peripheral blood cells were studied. The tests included determination of the hemoglobin in g%; hematocrit in cc per 100 cc; numbers of red blood cells, white blood cells and platelets per mm³; and estimation of the number and percentage of the various elements of the white blood cells. The differential was commonly based on 500 cells. The normal values for this laboratory are given in Chapter IV of this volume.

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produce diagnostic changes in the elements of the peripheral blood which were studied.

From the practical point of view, these studies should have been extended to include the examination of individuals subjected to from 0.1 to 1 r per day x-ray exposure for long periods of time. For obvious reasons these studies were not undertaken with humans. Since, however, the data discussed above checks in a general way with experimental data on animals with comparable rates and amounts of exposure⁽¹⁴⁾ it is perhaps reasonable to assume that the animal data obtained at low levels of exposure for protracted periods of time are applicable, at least approximately, to the effects which might be seen in humans. These data are presented in Volumes 22-A and B of this series and summarized in a paper in this volume.

Summary

1) Results of examinations of elements of the peripheral blood in fourteen individuals following exposure to total body radiation are presented. The individuals are divided into three groups: Group I consists of eight individuals who were irradiated with x-rays at one sitting; Group II consists of three individuals who were irradiated with x-rays in divided doses; and Group III consists of three normal individuals who were irradiated with x-rays by 3 doses of 7 r each.

2) In Group I the most persistent abnormality noted was a diminution in the number of lymphocytes shortly after the completion of the treatment.

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3) In Group II depression in the lymphocytic count was also the most marked single change.

4) In Group III no alterations were noted in the elements of the peripheral blood which were studied.

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