3614

The Effect of Carbon Arc Radiation on the Blood of Dogs.

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As a preliminary to the investigation of the influence of radiation on anemia, three normal adult dogs (white, short haired) were exposed to known amounts of flaming carbon arc radiation. The first was irradiated abdominally for 45 minutes at 1 M (45 g. cal. per sq. cm.) and the dosage progressively increased to 1 hour at 60 cm. (166 g. cal. per sq. cm.) during a period of 13 daily exposures. The other 2 were given 4 massive abdominal irradiations (88 to 124 g. cal. per sq. cm.) at intervals of 2, 3 and 6 days, respectively. The results are of the same general nature in all.

The primary result of an individual exposure is to increase blood volume by about 30 per cent with recovery to normal by the afternoon of the same day, the increase being principally due to an increase in plasma volume. With subsequent exposures, red cell number and volume and hemoglobin increase approximately 10 per cent. Platelets show a consistent drop in number and volume during irradiation with recovery to normal after each exposure, and serve as an index of dilution. The increase in red cells was maintained in the first 2 experiments, the value in one dog being 15 per cent above normal 6 weeks after the last exposure. Hemoglobin shows a slight increase (3 per cent) during the post-irradiation period in experiment 2, but decreases 11 and 7 per cent, respectively, in the others. The average hematocrit value for the post-irradiation period in the first dog is about 12 per cent higher than the pre-irradiation level; it is 9 and 5 per cent lower, respectively, in the last 2 experiments. A consideration of the color, volume and saturation indices shows that the new red cells being formed in this period are smaller in size than normal, saturation in experiments 2 and 3 being normal, in experiment 1 only 84 per cent. In experiments 1 and 3 there is a post-irradiation rise in platelets of 4 and 15 per cent, respectively, persisting for about 10 days. The leucocytes fluctuate during the irradiation period, but ultimately decrease to markedly lower levels, the values in the first 2 experiments being only 50 per cent normal 1 week and 4 weeks, respectively, after the last exposure.

This is a preliminary report.