temporarily, lymphoid tumors. In selecting the high-leukemia AKR strain, consideration was given to the fact that in this case precancerous or early cancer changes would not have to be detected since leukemia at a relatively uniform age is an almost constant occurrence. The method of treating the animals periodically was chosen in an attempt to minimize the possible selection of cortisone resistant cell types as therapy proceeded. Preliminary tests indicated that 1 mg/day for 3 days was the maximum which could be used monthly with adequate survival. Prolongation of life with a decrease in the incidence of spontaneous leukemia has previously been reported as the result of (a) drastic caloric restriction in AK mice where the mean length of life was prolonged from 9.6 months to 14.0 months(14) and (b) total thymectomy at early ages in AK, RIL, and C58 strains where the mean length of life was prolonged from 7.6 to 12.7 months, 9.5 to 13.6, and 10.6 to 15.5 months respectively(15,16). The possible reasons for increase in longevity and reduction in occurrence of acute leukemia at early ages in the present study will be discussed in a later report.

Summary. Periodic administration of cortisone throughout life to high-leukemia AKR mice significantly prolonged their mean length of life from 9.3 months to 14.3 months. Prolongation of life resulted from prevention of spontaneous leukemia deaths at the early age expected in this strain.

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Life Span of the Red Blood Cell in the Hypophysectomized Rat.* (20095)

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The fundamental defect leading to any anemia must be either a decrease in rate of production of red cells or a decreased life span of red cells in the circulation or a combination of the two. Evidence in favor of each of these possibilities has been given to explain the anemia which characteristically follows hypophysectomy. Hypoplasia of the bone marrow(1) and a decrease in reticulocytes in the peripheral blood after hypophysectomy (2) are strong, but not conclusive, evidence that the post-hypophysectomy anemia results from a decreased activity of the bone marrow in producing erythrocytes. Hemosiderosis of the spleen of hypophysectomized rats(3) and a normal reticulocyte response after bleeding hypophysectomized rats(4) have been given as evidence that the pituitary is concerned with the control of blood destruction rather

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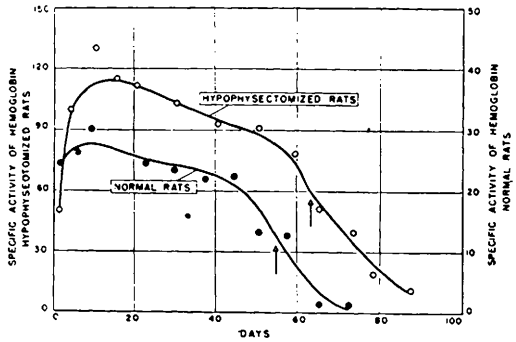

FIG. 1. Specific activity of the hemoglobin of hypophysectomized and normal rats in dis./min./mg $BaCO_3$.

than with blood formation. For this reason the present study using glycine-2-C^{14} to determine the life span of erythrocytes(5) in hypophysectomized rats was undertaken.

Method. Two groups of male rats of the Long-Evans strain were used in the experiment. One group was hypophysectomized at 40 days of age and given glycine-2-C^{14}, 48 days later. A group of normal controls of the same age was given labeled glycine at the same time. All animals were given 20 microcuries of glycine-2-C^{14} intraperitoneally. At frequent intervals blood samples were taken from a tail vein. In order to avoid excessive blood loss the animals were divided into groups of five, the samples of a given group being taken at two-week intervals. The specific activity of the hemoglobin was determined by methods previously published (6). The rats were weighed at weekly intervals and, since the normal group continued to gain weight, a correction for the increase in total red cell volume was applied (based upon evidence that, at this age, the total red cell volume per kg body weight remains constant(7)). Correction was not necessary for the hypophysectomized rats since their weight did not change during the experiment.

Results. Fig. 1 shows the average C^{14} specific activity of the hemoglobin from both the normal and hypophysectomized rats as a function of time. Since the specific activity of the hemoglobin of the hypophysectomized rats was approximately three times that of the normal rat and the normal rats were approximately three times as heavy as the hypophysectomized rats, both groups of animals incorporated glycine-2-C^{14} into hemoglobin to approximately the same degree. Exact interpretation of the type of curve obtained from the plotted data is difficult. However, if the point of inflection of the curve is assumed to indicate the mean life span(5), then the mean life span of the red cell in hypophysectomized rats (64 days) is, if anything, somewhat longer than in the normal controls (57 days). The points of inflection were obtained by graphical differentiation of the two curves and are indicated by arrows in Fig. 1.

Discussion. It is evident from the results that the mechanism for the development of anemia following hypophysectomy does not involve a decrease in the life span of the red blood cell, but rather that there must be decrease in the production rate of red blood cells. If after hypophysectomy the life span of the erythrocyte is not decreased and yet the number of cells circulating is reduced to 55% of normal(8), then it follows that the rate of production of red cells by the marrow after hypophysectomy is at most, only 55% of normal.

Conclusions. The life span of the red blood cell of the hypophysectomized rat is not less than that of the normal rat as measured by the use of glycine-2-C^{14}. Since the circulating red cell volume drops to 55% of normal after hypophysectomy, it must be assumed that the marrow of the hypophysectomized rat is producing, at most, only 55% of the normal number of erythrocytes.

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