of concentrations in Table I, row C, that the macro- and micronuclei are very much alike in nucleoprotein composition. It follows, then, that insofar as their chemical composition is indicative of their function, both nuclei are performing similar roles in the vegetative individual. Thus, the organism's dependence on the macronucleus and its apparent independence of the micronucleus during these stages[2] simply becomes a matter of the preponderance of the physiological-genetic material in the large macronucleus. There is a marked resemblance between these protozoan nuclei and highly metabolic nuclei of metazoa, as typified by the mammalian liver nucleus, which is strong evidence for the active participation of both macro- and micronucleus in metabolic functions of the cell. Any chemical differences which may serve to be correlated with the capacity of the micronucleus to differentiate into a special reproductive structure must be looked for at some other time in the organism's history. Presumably this is during the reproductive processes of conjugation and autogamy, when the behavior and morphology of the two nuclei are most markedly dissimilar.

Summary. Quantitative cytological chemical analyses of the nucleoprotein composition of the macro- and micronuclei of a clone of *P. caudatum* show that both nuclei contain protein, RNA and DNA in the ratio of 20:2:1. Twice as much RNA as DNA was found. From their resemblances to the nucleoprotein contents of metabolic metazoan nuclei, it is concluded that in the vegetative stage, both nuclei of *P. caudatum* are actively metabolic.

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17248. Influence of Level of Adrenal Cortical Steroids on Sensitivity of Mice to X Irradiation.

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We reported previously that X radiation appeared to result in an increased demand for the adrenal cortical hormone.[1] Subsequent studies indicated that the adrenal changes noted after total-body X irradiation of rats (decreased cholesterol content and increased weight) were mediated by the pituitary.[2] The adrenal response could be prevented, in part, by suitable administration of adrenal cortical extract. However, such treatment failed to alter survival.[3] Since Ellinger[4] reported earlier that the daily injection of desoxycorticosterone increased survival of irradiated mice, it seemed desirable to extend these observations in order to clarify the role of the adrenal in the acute radiation syndrome. In these experiments we have determined the radiosensitivity of intact mice with and without whole adrenal cortical extract or desoxycorticosterone. Data on the sensitivity of adrenalectomized mice which were obtained as part of another study have been included for comparison.

Materials and Methods. Male and female CFI mice, weighing 18 to 28 g each, were the experimental animals. Mice of the same sex were used in individual experiments. For the irradiation, the animals were placed in individual cellulose acetate exposure cells and were given total-body exposures in groups of 16. The cells were rotated slowly on an electrically-driven turntable to insure equivalent irradiation of all the animals. Equal numbers of control and experimental mice

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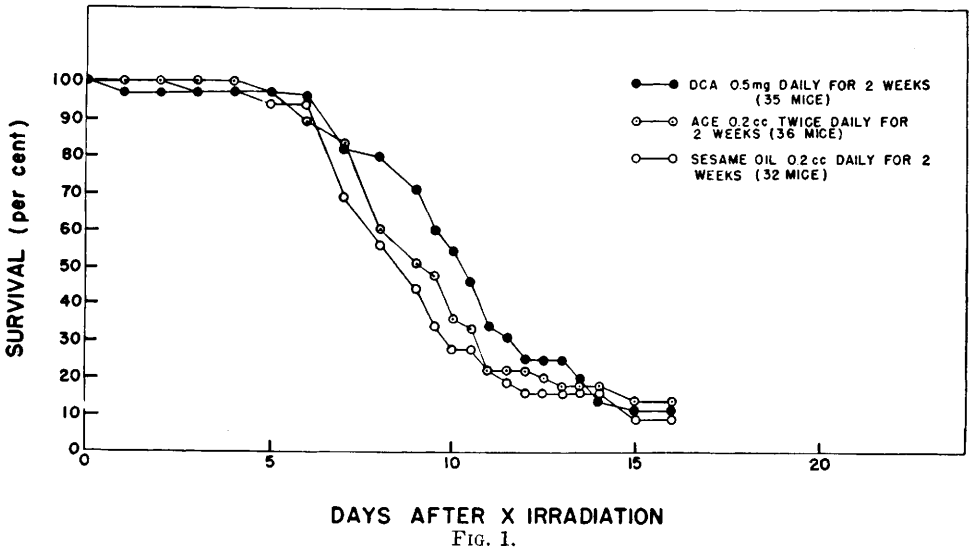

FIG. 1.

Effect of desoxycorticosterone (DCA) and whole adrenal cortical extract (ACE) on radiation mortality in mice (CF1 males, 500 r).

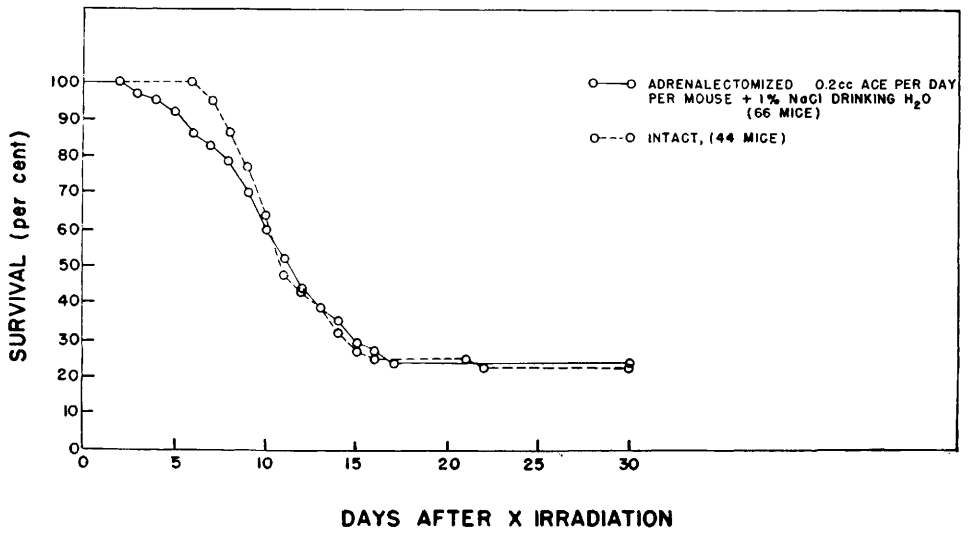

FIG. 2.

Effect of whole adrenal cortical extract (ACE) on radiation mortality in adrenalectomized mice (CF1 males, 500 r).

were used for each exposure. The radiation factors were: 200 kv, 15 ma, 0.5-mm Cu and 3.0-mm Bakelite filters, HVL-1.20-mm Cu, target distance, 10.8 cm, and dose rate, 20 r per minute. Male mice received 500 r and females, 550 r (measured in air).

Single stage bilateral adrenalectomies were performed under nembutal anesthesia 15 to 17 days prior to irradiation. All animals received a postoperative injection of 0.2 cc whole adrenal cortical extract (Wilson).

Survival of irradiated mice was compared under the following 4 experimental conditions:

1) Mice injected intramuscularly with desoxycorticosterone acetate (Schering, 0.5 mg daily) for 2 weeks after irradiation. The irradiated control group received equivalent amounts of sesame oil.

2) Mice injected subcutaneously with whole

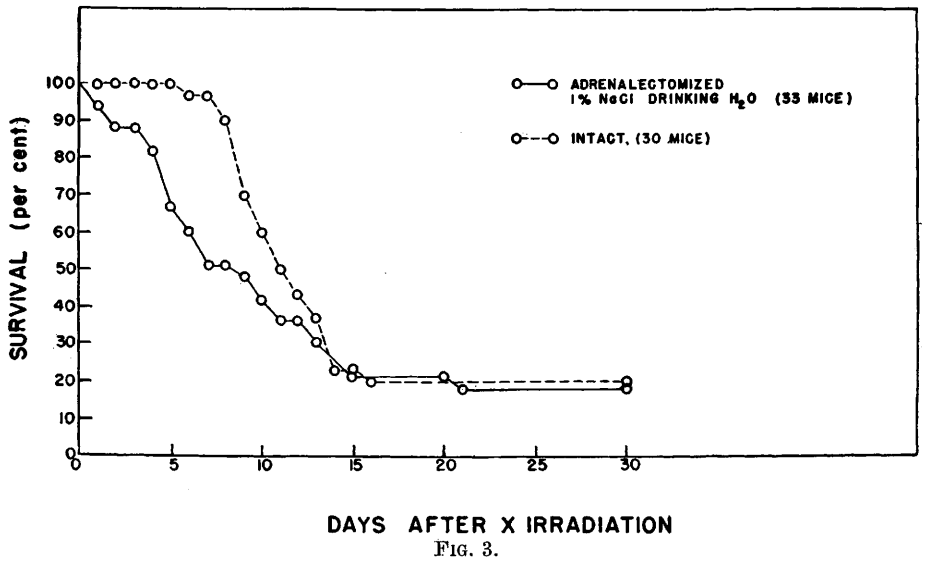

FIG. 3.
Effect of adrenalectomy on radiation mortality in mice (CFl females, 550 r).

adrenal cortical extract, 0.2 cc, twice daily, for 2 weeks following X irradiation. The control group in this instance was identical with that of 1) above.

3) Bilaterally adrenalectomized mice maintained on salted drinking water (1 per cent NaCl) and daily injections of 0.2 cc whole adrenal cortical extract. Intact irradiated mice were used as controls.

4) Bilaterally adrenalectomized mice maintained on salted drinking water alone, plus an intact irradiated control group.

Results and Discussion. As may be noted in Fig. 1 and 2, mice that received desoxycorticosterone acetate or whole adrenal cortical extract, as well as those that were adrenalectomized and maintained on whole adrenal cortical extract plus salt exhibited a final radiation mortality identical with that of intact irradiated controls. Although there was a decreased mean survival time ($p << 0.001$), those adrenalectomized animals maintained on salted drinking water alone (Fig. 3) also show a final mortality similar to that of the normal irradiated controls and the 3 experimental groups noted above.

The schedule of treatment used in administering desoxycorticosterone is that reported by Ellinger to yield maximal protection in terms of survival.[4] We are unable to account for the failure of desoxycorticosterone to modify survival in our studies. This disparity in results may reside in the different strain of mice used. It is of interest to note that both larger and smaller doses of desoxycorticosterone were ineffectual according to Ellinger.

From these data we may conclude that the survival of X-irradiated mice appears to be independent, at least within certain limits, of the amount of adrenal cortical steroids present. The adrenals are apparently involved only secondarily as part of the organism's buffer response to the stress of irradiation. The rationale of employing adrenal corticoids to alter radiation mortality is therefore open to question.

Summary. The experiments cited indicate that the radiosensitivity of intact or adrenalectomized mice, with or without exogenous adrenal cortical steroids, is similar.

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