

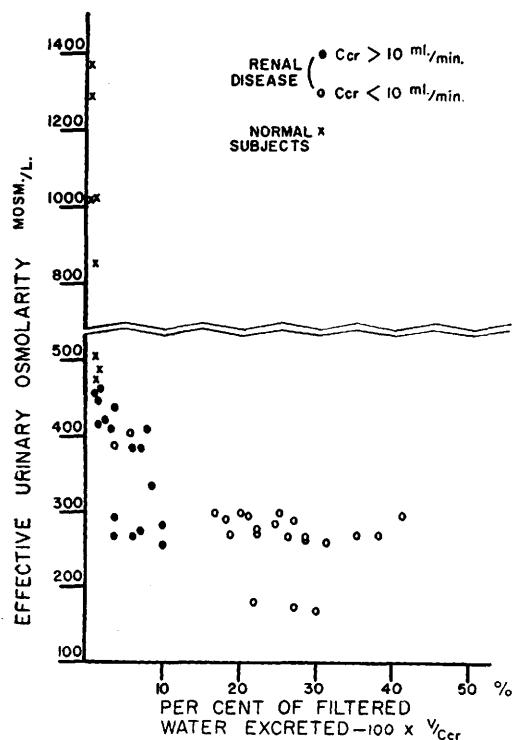


FIG. 8. Relation of effective urinary osmolarity (mOsm/l) to $\frac{V \times 100}{C_{Cr}}$. There is an apparent heterogeneity of populations, depending upon whether C_{Cr} exceeds or is less than 10 ml/min.

rate, approximately 10 ml/min., at which: a) C_K/C_{Cr} exceeds 100%; b) V/C_{Cr} exceeds 15%; c) the antidiuretic response to single intravenous injections of pitressin in physiological dosage (0.57 mU/Kg) is markedly diminished; d) there is an alteration in the relationship between V/C_{Cr} and the urinary concentrations of sodium, potassium and total solute.

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Effect of Total Body Irradiation on Rabbit Pituitary as Measured by Gonadotropin Response in Chicks.* (21004)

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Certain lines of evidence have suggested that endocrine imbalances occur following total body irradiation. Botkin(1) found in the rat thyroid following irradiation an initial 24-hour upsurge of activity followed by a progressive decline until the 6th day. Response after that time was not reported. Monroe(2)

reported an initial increase under the same conditions but that on the 7- and 30-day analyses the response was the same as in the controls. Both investigators used as an index of "activity" the ability of the rat thyroid to incorporate I^{131} into its protein bound fractions. Patt(3) reported a progressive increase in adrenal activity which was measured by an increase in gland weight. Early reports in the literature by Witschi(4) showed that male rats could be sterilized by exposing the scro-

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tum to X-rays. It was also found that the histologic response of the pituitary to X-ray sterilization was similar to that shown by castrated animals. The delicate interplay between the adrenotropin, thyrotropin and gonadotropin principles of the pituitary and the target glands is well known. It is therefore reasonable to assume that any demonstrated responses of these glands to ionizing radiations may be, in whole or in part, reflections of pituitary sensitivity to radiations.

Since a bio-assay of the pituitary gonadotropins from irradiated animals has never been reported so far as is known, it was the purpose of the present investigation to determine the effect of total body, cobalt-60 irradiation on the rabbit pituitary as measured by the chick gonad method.

Method. Female rabbits of mixed breeds, 1-2 years of age, were irradiated with Co-60 gamma rays on the multicurie irradiation site as described by Wilding(5). The radiation flux was 47 r/hr. Two groups of rabbits were exposed. One group of 40 animals received 750 r of total body irradiation and were sacrificed at 1, 8, 15 and 28 days post-irradiation. A second group of 40 rabbits was exposed to 1100 r and sacrificed at 1, 7, 12, 17 and 30 days post-irradiation. A third group of 10 normal nonirradiated rabbits was sacrificed at random during these intervals. Immediately after sacrifice the pituitaries were removed and kept frozen until all of the animals had been sacrificed. Each group of pituitaries was homogenized and diluted with distilled water so that each volume contained one pituitary per 2.5 ml of suspension. The following procedure for assay has been described in detail by Lane and Paysinger(6). One-day-old White Leghorn cockerels, obtained from a commercial hatchery were placed in an electrically heated brooder and maintained on a corn-cob meal ration during the test period.

The chicks received 5 daily injections into the axillary region with 0.25 ml of the homogenate to give a total of 1.25 ml which represented $\frac{1}{2}$ of a rabbit pituitary. The birds were sacrificed on the 6th day and the testes removed and weighed. The testes weight changes were considered as the index of gonadotropin activity. It should be noted,

TABLE I. Chick Testes Weight Response to Pituitaries of Rabbits Exposed to Cobalt-60 Gamma Radiation.

No. of chicks*	Dose	Days post irradiation	Mean testes wt (mg) $\pm$ stand. error
11	750 r	1	15.70 $\pm$ 1.05
10		8	12.20 $\pm$.48†
16		15	17.51 $\pm$.98
16		28	18.50 $\pm$ 1.60
18	Control	—	16.20 $\pm$.92
9		1	13.30 $\pm$.64‡
16		7	13.21 $\pm$.76‡
9		12	14.30 $\pm$.78
14		17	16.10 $\pm$ 1.18
9		30	16.30 $\pm$.70

* Each pituitary assayed in 2 chicks.

† $P < 0.01$.

‡ $P < 0.05$.

however, that the estimate of potency was measured on a fractional gland basis rather than on a constant weight of pituitary tissue.

Results. The response of the chick testes to the gonadotropin principle from the pituitaries of the normal and irradiated rabbits is shown in Table I.

The pituitaries from the 750 r treated group reflected a significantly lowered gonadotropin activity on the eighth (8th) day post irradiation (t test $P < .01$). On the other days (1, 15 and 28) no significant change from the normal level was observed.

In the 1100 r treated animals the suppression was evident as early as day one and persisted through day 7, ($P < .05$). The 12th day indicated a continued suppression but was not substantiated by statistics. The 17th and 30th day values were within the control range.

The experiment herein described presents preliminary evidence that there is a suppression of gonadotropin principle within the pituitary following total body irradiation. Although only one-tropic activity was measured, its suppression at one day following irradiation (1100 r group) is in marked contrast to the increased tropin activity of the thyroid and adrenal gland as previously mentioned. The activity of these principles within these target organs is no certain indication of the status of these stimuli within the pituitary. However, the early transgressions from the norm of these various tropins are probably

an indication of an initial stress reaction of the animal to ionizing radiations.

Storer(7) found that the testes weight of rats exposed to 500 r total body X-rays was decreased to approximately 74% of the control weights 4 weeks after irradiation. In both experimental groups reported here the gonadotropin activity of the pituitary at 4 weeks was not significantly different from the controls. It seems therefore that the testes damage observed 30 days after irradiation may be due to damage *in situ* and not the result of any continued alteration of gonadotropin activity within the pituitary. Neither can one exclusively reconcile the gonadotropin activity with histologic changes in the pituitary (e.g. castration cells) for in all probability the cellular changes observed are the result of a severe imbalance of several endocrine principles.

Summary. Rabbit pituitaries from animals exposed to 750 and 1100 r of total body Cobalt-60 gamma irradiation showed an early

suppression of gonadotropin principles as measured by the chick gonad response. The 750 r group showed the depression on the 8th day after irradiation while in the 1100 r group the suppression was evident by day one and was sustained through day 7. After this time the gonadotropin activity in both groups returned to the normal level.

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A Hemagglutination Inhibition Test for Infectious Sinusitis of Turkeys.* (21005)

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Infectious sinusitis (IS) of turkeys is prevalent and of considerable economic importance in the United States and Canada. The cause of this disease is now generally considered to be a pleuropneumonia-like organism (PPLO) (1,2). Egg transmission of the infectious sinusitis agent has been shown to occur and this means of spread appears to play a major role in the dissemination of the disease(2-5). Efforts to devise a serological test, employing *in ovo* neutralization and cold hemagglutination, for use in the study of this disease, have not succeeded(6).

It has been shown that PPLO derived from chickens cause agglutination of chicken red

blood cells and that sera of chickens infected with these organisms possess the ability of inhibiting this reaction(7,8). In this paper are presented the results of testing the sera of 4 turkey flocks for the presence of hemagglutination inhibition (HI) antibodies.

Materials and methods. The methods of isolation of the PPLO used in this study are essentially the same as outlined for the isolation of PPLO from chickens(9), except that the organisms were isolated from sinus exudate of infected turkeys. The blood samples were obtained at commercial killing plants in Ontario from turkeys which were from 26-50 weeks of age. In principle the test was performed in the same way as the HI test for Newcastle disease(10). The technic of performing this test has been described in detail

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