

thion over many weeks. Electrolytes of plasma, skeletal muscle and liver of the potassium deficient rats showed the effects of potassium depletion. Studies of cholinesterase disclosed reduction in activity of this enzyme in rats receiving cholinesterase inhibitors. No effects due to cholinesterase inhibition were found upon either concentrations or distributions of water, potassium, sodium or chloride in plasma, skeletal muscle and liver.

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Effects of Adrenalectomy on Specific Activity of Deoxyribonuclease in Rat Spleen After Total Body X-Irradiation.* (22141)

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In view of the fact that specific activity of deoxyribonuclease II (DNase II)(1) in rat spleen is more than doubled after total body x-irradiation(2), it has been of interest to determine the role of adrenal cortex in this phenomenon. Leblond and Segal(3) recorded involution of the spleen as a result of localized x-irradiation after adrenalectomy. Prolonged administration of corticotropin to rats decreases cellularity of the spleen, and therefore the amount of deoxyribonucleic acid (DNA) present(4). Reduction in tissue

mass of the organ has been attributed to lymphocytolysis and the inhibition of mitosis resulting from adrenocortical steroids(5).

We have measured the DNase II activity in spleens of control, x-irradiated intact, adrenalectomized and x-irradiated-adrenalectomized rats.

Methods. Twenty-four young adult male rats of the Sprague-Dawley strain were used. They were divided into 4 groups of 6 animals each. The groups were treated as follows: Group I—control, Group II—x-irradiated-intact, Group III—adrenalectomized, Group IV—x-irradiated-adrenalectomized. All were housed in metal cages in an air conditioned room at 80°F, and fed a diet of Purina Lab-

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TABLE I. Effect of Adrenalectomy and/or 200 r of Total Body X-Irradiation on Average DNase II Activities of Rat Spleen.

Group No.	Treatment	γ DNA hydrolyzed/mg tissue/hr at 37°C	Spleen wt / Body wt ratio	γ DNA hydrolyzed/spleen/g body wt
I	Control (6)	14.09 $\pm$.98*	2.35 $\pm$.12 $\times 10^{-3}$	32.96 $\pm$ 2.64
II	X-irradiated intact (6)	26.71 $\pm$ 1.15	1.52 $\pm$.07 $\times 10^{-3}$	40.83 $\pm$ 3.54
III	Adrenalectomized (6)	13.76 $\pm$ 1.08	3.26 $\pm$.17 $\times 10^{-3}$	44.29 $\pm$ 1.56
IV	X-irradiated and adrenalectomized (6)	28.24 $\pm$.69	1.97 $\pm$.11 $\times 10^{-3}$	55.74 $\pm$ 3.76

* Stand. error.

Numbers in parentheses refer to No. of animals used.

oratory chow. They were given food and water *ad libitum*. Animals from Groups II and IV were adrenalectomized by sterile technique. Adrenalectomized animals were allowed 2 weeks for recovery, maintained on physiological saline solution rather than water for drinking. Animals from Groups II and IV were irradiated, using the following physical factors: 220 KV, 15 ma, inherent filtration only, HVL 0.25 Cu, 32 inches to center of animal, field size covering entire animal and at 35.5 r per minute in air for 5.6 minutes (200 r). Twenty-four hours later, animals from all 4 groups were weighed, stunned and killed by decapitation. Spleens were quickly dissected out, rinsed in distilled water, blotted dry on filter paper, and weighed. They were then homogenized in distilled water with an all-glass homogenizer, and homogenates diluted to give tissue concentrations of 20%. One-ml aliquots of homogenates were added to 1 ml portions of substrate solution, which contained 5 mg/ml of highly polymerized DNA[†] in a 0.1 M acetate buffer, pH 5, and these reaction mixtures were incubated in a water bath at 37°C for one hour. The reaction was stopped by addition of 2 ml of cold 10% trichloroacetic acid. After centrifugation and filtration, 2-ml aliquots of supernatant were reacted with Dische's diphenylamine color reagent(6). The violet color formed was measured on the Klett-Summerson photoelectric colorimeter.

Results. Results of the experiment indicate that adrenal cortex has no influence on the specific activity of DNase II/mg of rat spleen; that is, there is no significant dif-

ference between amounts of this enzyme activity per mg of tissue in control (I) and adrenalectomized (III) rats; nor is there any significant difference between x-irradiated intact (II) and x-irradiated adrenalectomized (IV) rats. However, there is a significant difference in total units of activity per spleen. Application of the "t" test(7) yields a P value for the change in total activity in groups I and III of <.01, in groups II and IV of <.05, in groups III and IV of <.02.

Results also confirm the fact that secretions of adrenal cortex have specific effects on involution of the spleen, as indicated by significant variations in spleen wt/body wt ratios in groups I and III, and groups II and IV in Table I.

Summary. Adrenalectomy has been found to have no effect on increased specific activity of rat spleen DNase II following total-body x-irradiation, but size of spleen and therefore total quantity of enzyme changed in both irradiated and unirradiated animals.

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