

Effect of Pituitary Adrenotropic Hormone on Lymphoid Tissue.*

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Introduction. This is a preliminary report of organ weight changes observed in studies initiated to investigate influences of adrenal cortical secretion on lymphoid tissue.

The existence of a reciprocal relationship between the size of the adrenal cortex and the thymus has been shown by previous workers.¹⁻⁶ Thymic atrophy in the rat following treatment with pituitary adrenotropic hormone has been reported.⁷⁻¹⁰ It is also known that deficient adrenal secretion results in hypertrophy of the thymus.

Recently, pure adrenotropic hormone has been prepared,¹¹ making possible the study of effects of normal physiological stimulation of the adrenal cortex on the thymus. The paucity of data concerning the effects of adrenal cortical secretion on the mass of

lymphoid tissue suggested careful studies of lymph nodes, spleens and thymi. The purpose in these researches was to investigate the normal mechanism of physiological control of lymphoid tissue.

Experimental. Mice of both sexes, 45 to 55 days old (CBA strain, Strong), were used in all experiments. One group of 5 animals were given daily subcutaneous injections of 0.5 mg adrenotropic hormone[‡] in 0.5 ml aqueous solution. A second group of 18 animals were injected subcutaneously daily with 1.0 mg hormone in 0.5 ml.

In order to determine whether injection of protein *per se* influences lymphoid tissue, and to test effects of another pure anterior pituitary hormone, 6 mice were injected subcutaneously daily with an amount of prolactin¹² twice the highest dose of adrenotropic hormone used (2 mg prolactin in 0.5 ml solution).

In all experiments, mice were sacrificed at successive three-day intervals over a 15-day period.

A fourth group of 12 animals, litter-mates of the experimental ones, served as controls. These animals were sacrificed at various periods during the study.

The following tissues were dissected out carefully and weighed on a torsion balance: inguinal, axillary and mesenteric nodes, spleen and thymus. Other organs weighed were gonads, heart, adrenals and kidneys. Lymphoid tissues were saved for histological examination. Blood studies, bone marrow differentials and tissue histology will be presented at a later date.

Results. Data obtained for tissue weights are presented in Table I. Weights over the

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TABLE I.
Effect of Adrenotropic Hormone on Weight of Lymphoid Tissue of the Mouse.

Exper.*	No. of animals	Tissue wts as mg/100 g of initial body wt†					
		Paired inguinal nodes	Paired axillary nodes	Paired mesenteric nodes	Thymus	Paired adrenals	Spleen
Controls	12	70.9± 3.4‡	56.1± 2.6	131.4±11.8	166.5±11.0	20.6±1.8	329±22
Adrenotropic hormone injected	23	52.3± 2.5	46.3± 2.9	89.6± 6.2	67.6± 7.8	30.8±1.0	370±15
Prolactin injected	6	53.5±23	59.4±18	99.2±26	175.6±74	19.5±6.4	326±17

* All animals received Fox Chow and water *ad libitum*.

† Data are expressed in terms of body weights of the mice at the beginning of the injection period. Thus, alterations in body weight resulting from injection of hormone do not influence the results.

‡ Means and standard errors.

TABLE II.
Significance of Average Values for Lymphoid Tissue Weights.

Tissue	P values* for adrenotropic hormone inj. animals	P values* for prolactin inj. animals
Inguinal nodes	<.01	.03
Axillary nodes	<.01	.6
Mesenteric nodes	<.01	.1
Thymus	<.01	.7
Adrenals	<.01	.7
Spleen	.06	.9

* P values as compared to the same tissues in control group.

15-day injection period are grouped together. The statistical significance of the differences between weights of tissues from control and hormone-injected animals have been calculated by the method of Fisher¹³ for small series and are presented in Table II. It is evident from the tables that injection of adrenotropic hormone produced statistically significant decreases in weights of inguinal, axillary and mesenteric nodes, and in thymic mass. It can be calculated from Table I that the total weight of lymphoid tissue in the treated animals, exclusive of the spleen, is approximately half (2558 mg) that of similar tissue from control animals (4249 mg).

As expected, the adrenal weights of adrenotropic hormone injected animals are significantly greater than controls. Although the difference between the average weight of the

spleens in the animals injected with adrenotropic hormone and in the control mice is not clearly statistically significant, the trend of the data suggest that spleen weight is increased in mice injected with adrenotropic hormone. Other organs weighed in this study showed no significant differences.

In prolactin-injected mice, reduction in weight of inguinal nodes occurred which is of questionable statistical significance. Other tissues from these animals showed no significant weight changes.

Although the relation of the adrenal cortex to the thymus has been the subject of previous investigations, the behavior of other lymphoid tissue under the influence of pituitary adrenal cortical stimulation has not been carefully examined. It seems scarcely necessary to emphasize the importance of knowledge concerning the factors controlling variations in lymphoid structures.

The failure of the spleen to follow the same weight trends as other lymphoid tissue may be better interpreted when histological studies are completed.

The results which have been obtained strongly suggest that activity of the adrenal cortex may have a profound influence on normal maintenance of lymphoid tissue.

Summary. Injection of pure pituitary adrenotropic hormone into CBA strain mice produces a decrease in weight of the inguinal, axillary and mesenteric nodes, and of the thymus. The spleen did not show a weight decrease.

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