

Relationship of the Effects of Adrenal Cortical Secretion on Lymphoid Tissue and on Antibody Titer.*

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Recent support for the hypothesis that antibodies are produced in lymphoid tissue has been obtained by Ehrich and Harris.¹ Since the injection of pituitary adrenotrophic hormone, or adrenal cortical extract, produces lymphoid tissue dissolution concomitant with serum protein increases,² a study was made of the effect of adrenal cortical extract on antibody titers.

Experimental and Results. Twelve rabbits (3 months old) received daily intravenous injections of sheep erythrocytes. Four of these animals also received daily subcutaneous injections of 2 ml of aqueous adrenal cortical extract (Wilson). Agglutinin titers were done periodically throughout the experiment. This experiment was terminated when injection of antigen alone did not result in further titer increases. These data are presented in Fig. 1.

All rabbits receiving adrenal cortical extract with antigen show higher final agglutinin titers than rabbits injected with antigen alone. Adrenal cortical extract produced augmentation of titer late in the experimental period.

Nine rabbits with maximum titers were used to study the effect of single injections of hormone. The experimental procedures, together with the data, are presented in Table I. A single injection of antigen alone did not increase the titer within 25 hrs. Animals injected with 5 ml aqueous adrenal cortical extract, with or without antigen, showed definite increases in titer in 6 hours. Rabbits receiving

10 ml aqueous extract, or 5 ml of adrenal cortical steroids in oil,[‡] showed similar augmentation. The titers were lower at 11 hours, and at 25 hours were almost at pre-injection level.

Two rabbits (A 40 and A 41) were injected daily with 1 ml of cortical steroids in oil; no further antigen was administered. After 2 weeks, titers done approximately 15 hours following the last injection were higher than those before hormone treatment.

Comment. A definite time relationship exists among changes in lymphoid tissue structure,² in blood lymphocyte levels,³ in serum protein concentration,² and in antibody titers following a single injection of adrenotrophic hormone or of adrenal cortical extract. Chronic adrenotrophic hormone treatment diminishes lymphoid tissue,⁴ produces a consistent lymphopenia³ and increases serum protein levels.² Data presented here show that one of the augmented serum protein fractions is that containing antibodies. These interrelationships are normally under pituitary adrenotrophic hormone influence and may be altered by a variety of stimuli affecting pituitary-adrenal cortical activity.

Summary. Agglutinin titers to sheep erythrocytes are enhanced as a result of adrenal cortical extract injection. Titers were increased within 6 hours after a single injection of adrenal cortical extract into hyper-immunized rabbits. Increased titers produced by a single injection of adrenal cortical

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¹ Ehrich, W. E., and Harris, T. N., *J. Exp. Med.*, 1942, **76**, 335.

² White, A., and Dougherty, T. F., *Proc. Soc. Exp. Biol. and Med.*, 1944, **56**, 26.

[‡] Grateful acknowledgment is made to Dr. E. Gifford Upjohn of the Upjohn Company for supplying the preparation of adrenal cortical steroids in oil.

³ Dougherty, T. F., and White, A., *Science*, 1943, **98**, 367.

⁴ Dougherty, T. F., and White, A., *Proc. Soc. Exp. Biol. and Med.*, 1943, **53**, 132.

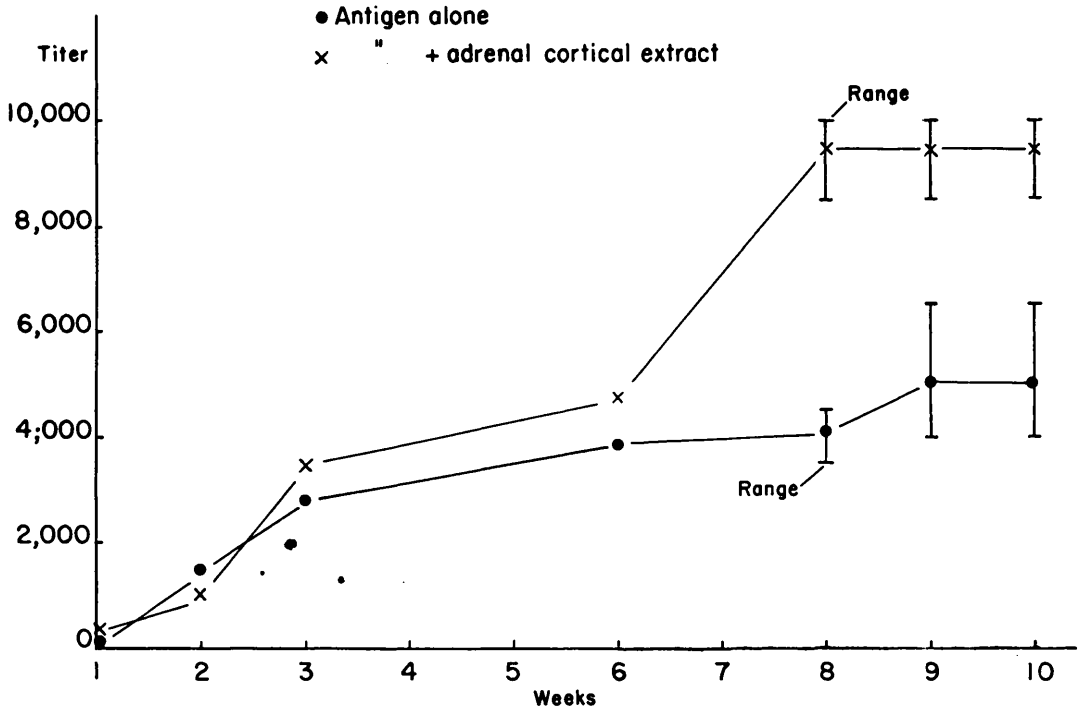


FIG. 1.
Average agglutinin titers of 8 rabbits receiving, daily, intravenous injections of sheep erythrocytes alone, and of 4 animals injected with antigen and adrenal cortical extract.

TABLE I.
Effect of Single Injection of Adrenal Cortical Extract on Sheep Erythrocyte Titers in Rabbits.

Rabbit No.	Treatment	Agglutinin titers, time after injection					
		0 hr	6 hrs	11 hrs	25 hrs	1 wk	2 wks
A 39	10 ml 10% erythrocyte suspension	1-6500	1-6500	1-6500	1-6500	1-8000	1-7500
A 38	5 " aqueous cortical extr.	1-5000	1-8000	1-6000	1-6000	1-5000	1-4500
A 34	5 " " " "	1-4500	1-9000	1-7000	1-5500	1-5000	1-5000
A 33	5 " " " " + 10 ml 10% erythrocyte susp.	1-3500	1-6000	1-6000	1-5000	1-4000	1-3500
A 36	5 ml aqueous cortical extr. + 10 ml 10% erythrocyte susp.	1-5000	1-8500	1-6500	1-5000	1-5000	1-4500
A 42	10 ml aqueous cortical extr.	1-8000	1-12,000	1-10,000	1-8500	1-7500	1-7500
A 31	10 " " " "	1-10,000	1-15,000	1-12,000	1-10,000	1-10,000	1-10,000
A 40	5 ml cortical steroids in oil; then 1 ml daily for 16 days	1-8500	1-15,000	1-15,000	1-11,500	1-10,000	1-11,500
A 41	5 ml cortical steroids in oil; then 1 ml daily for 16 days	1-9500	1-17,000	1-17,000	1-15,000	1-11,500	1-13,000

hormone return in 24 hours almost to levels existing before hormone administration. Con-

tinued hormone injection maintained elevated titers for 2 weeks.