

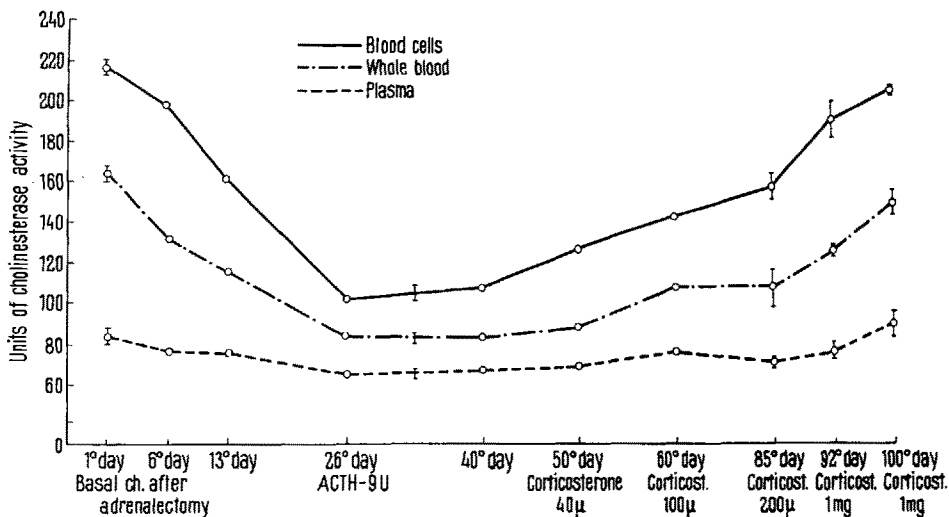
### Blood Cholinesterase in Adrenalectomized Rats

Earlier investigations<sup>1</sup> carried out on normal subjects, asthmatic patients, and experimental animals<sup>2</sup>, showed that ACTH possessed a stimulating effect on the cholinesterase levels in blood. Later, we studied the effect of corticosterone<sup>3</sup> on rats, and found this to have the same stimulating effect.

For our present paper we decided to complete the study of the influence of suprarenal hormones on cholinesterase activity, by using adrenalectomized experimental animals, to which later corticosterone was administered.

With this end in view we used 10 Wistar rats, each weighing 250 g, and extracted blood under basal conditions by puncturing the jugular vein. The suprarenal glands were then removed and, on 10 different occasions during the following 100 days, blood was extracted and cholinesterase activity in plasma, whole blood, and blood cells determined with Biggs' et al.<sup>4</sup> colorimetric method.

(a) The first blood extraction was effected under basal conditions immediately before adrenalectomy and the following averages for plasma, whole blood and blood cells respectively were found, expressed in units of cholinesterase activity:  $84 \pm 3.2$ ,  $164 \pm 3.1$ , and  $217 \pm 6.3$ .



Cholinesterase activity under basal conditions, after adrenalectomy, and after administration of corticosterone.

(b) Six days after adrenalectomy, these means tended to descend: 78, 132, and 196 respectively. (c) At 13 days, the figures were still lower: 75, 116, and 162. (d) At 26 days, 4 U of ACTH gel were injected intramuscularly and 5 U intraperitoneally. In an earlier study, this same dosage caused an increase in cholinesterase, but in this study, with adrenalectomized rats, there was no increase. On the contrary, the cholinesterase activity continued to decrease. The means found were 64, 83 and 103 for plasma, whole blood, and cells respectively. (e) At 40 days, the results observed were similar to the previous ones, being 66, 83, and 108 respectively, which would appear to show that the depressor effect of the adrenalectomy on cholinesterase activity had reached its peak in these determinations. (f) At 50 days, a single dose of 40 µg of corticosterone was injected and blood extracted 30 and 85 min later. The averages found under these conditions showed a rise: 68, 87, and 126 for plasma, whole blood and blood cells respectively. (g) At 60 days, corticosterone was again injected by the same route, but this time 100 µg were administered. The averages continued to rise, being 74, 106, and 141 respectively. (h) 85 days after adrenalectomy,

200 µg of corticosterone were injected and the averages were  $70 \pm 1.1$ ,  $105 \pm 8.4$ , and  $156 \pm 6.0$ . (i) At 92 days, 1 mg of corticosterone was injected subcutaneously and the figures were  $74 \pm 3.7$ ,  $123 \pm 2.4$ , and  $189 \pm 8.4$ . (j) 100 days after adrenalectomy had been performed, 1 mg of corticosterone was again injected intramuscularly, the values rising to  $89 \pm 6.1$ ,  $147 \pm 5.5$ , and  $202 \pm 0.7$  for plasma, whole blood, and blood cells respectively, these figures being very similar to those obtained before adrenalectomy.

The statistics were analysed, the values found under basal conditions being compared with those obtained at 24 and 40 days after adrenalectomy. The difference was highly significant in the three fractions ( $P < 0.001$ ). Nevertheless, the variations were more noticeable in whole blood and, more especially, in the blood cells. The figures obtained at 26 and 40 days were compared statistically with those obtained at 85, 92, and 100 days under the substitutive action of corticosterone. The increase here was also highly significant ( $P < 0.001$ ) in whole blood and blood cells, but was not so significant in plasma. In this latter fraction, the increase was significant ( $P < 0.01$ ) compared exclusively with the values found after the final administration of corticosterone.

**Résumé.** Il a été démontré que l'adrénalectomie produit une intense et progressive diminution de l'activité cholinestérasique, spécialement dans les cellules sanguines et le sang total ( $P < 0,001$ ). L'administration de corticostérone à des doses progressives rétablit peu à peu l'activité cholinestérasique ( $P < 0,001$ ). On considère que la glande surrénale joue un rôle important dans la régulation de l'activité cholinestérasique.

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<sup>1</sup> J. R. VACCAREZZA and L. PELTZ, *Presse Méd.* 68, 723 (1960).

<sup>2</sup> J. R. VACCAREZZA and J. A. WILLSON, *Exper.* 20, 23 (1964).

<sup>3</sup> J. R. VACCAREZZA and J. A. WILLSON, *Exper.* 20, 425 (1964).

<sup>4</sup> H. G. BIGGS, S. CAREY, and D. B. MORRISON, *Am. J. clin. Path.* 30, 181 (1958).