the hormonal background9–11. In the present study the vascular sensitivity to the drug was determined in terms of the dose per 200 g body weight required to raise the blood pressure by 10 mm Hg. In normal males 0.8–1.2 mU/200 g proved adequate. In the hypertensive animals of group I 1.4–3 mU/200 g was required to produce the standard response. In the remaining groups a smaller dose than normal (0.01–0.8 mU/200 g) was adequate. These changes in sensitivity were rarely associated with prolongation of the pressor response.

Normal female rats required 0.25–0.5 mU/200 g for the 10 mm Hg rise in pressure. In group I larger doses were needed (0.75–2 mU/200 g) whereas in group II smaller amounts were adequate (0.025–0.2 mU/200 g). After 4 weeks, however, the female rats again required larger doses of vasopressin, the amounts being 0.6–1.5 mU/200 g in group III and 0.7–1.4 mU/200 g in group IV.

In all groups of both sexes a preliminary fall in pressure after the injection of vasopressin preceded the pressor effect. This diphasic pattern was most common in group I, in which it was observed in each of the 12 males and in 8 of the 12 females. In every instance DHE failed to delete the depressor phase and occasionally enhanced it. Atropine given before or after DHE regularly abolished the depressor phase but bilateral vagotomy did not interfere with it. It was concluded that the depressor component was not mediated by sympathetic vasoconstrictor fibres and was similar to that induced by noradrenaline, being dependent upon some peripheral cholinergic mechanism. The pressor component was always enhanced by DHE but was enhanced, unaffected or even depressed by atropine.

Oxytocin: Like vasopressin, oxytocin exhibits vascular effects in the rat depending upon its hormonal status9–11. In the normal male and normal dioestrous female 100 mU oxytocin has no effect on the blood pressure trace although mesenteric vascular dilatation can be observed under direct vision. In the oestrous female the same dose of oxytocin produces a transient rise in blood pressure, while any interference with the sympathetic system converts oxytocin into a pressor substance10.

In the present experiments the responses to 100 mU oxytocin were observed. Three patterns were obtained: (1) monophasic depressor; (2) monophasic pressor and (3) diphasic (pressor-depressor). In males, there was a predominance of the depressor response in group I (8 of 12 rats), of the pressor response in group III (7 of 8 rats) and again of the depressor response in group IV (7 of 9 rats). In females, the reaction was more variable. In groups III (8 of 9 rats) and IV (5 of 8 rats) oxytocin was predominantly pressor.

The monophasic depression and the preliminary depression in the diphasic pattern were not abolished by DHE or by bilateral vagotomy but were always suppressed by atropine. The depressor response to oxytocin, like those induced by vasopressin and by noradrenaline, was dependent upon a peripheral cholinergic mechanism. As in normal males and females, DHE enhanced the pressor component if already present or led to its appearance. Atropine caused further enhancement. The phase of the sexual cycle at the time of the experiment did not alter the response of the female hypertensive rat to oxytocin. No potentiation of the pressor response to oxytocin in the oestrous rat was seen.

Conclusions. During the development of adrenal-regeneration hypertension the pattern of vascular response to noradrenaline, adrenaline, vasopressin and oxytocin is changed but the response to hypertensin and to acetylcholine is unaltered. The change in pattern differs at different phases of the hypertensive state. With the exception of vasopressin, there is no increase in pressor reaction. The altered responses are presumably mediated by the endocrine disorder accompanying this form of experimental hypertension.

Résumé. La forme d’hypertension qui accompagne la régénération de la glande surrenale entraînée à été étudiée chez les rats. Au cours de l’évolution de l’hypertension, la réaction vasculaire à la noradrénaline, l’adrénaline, la vasopressine et l’ocitocine est modifiée de manière qualitative, mais les effets vasculaires de l’hypertensine et de l’acétylcholine restent inchangés. Ces modifications diffèrent selon la phase de développement de l’hypertension. Hormis la vasopressine, les agents hypertenseurs ne sont pas plus actifs. Ces changements reflètent en toute probabilité le déséquilibre hormonal lié à ce type d’hypertension.

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The Effect of Nandrolone Decanoate upon the Alkaline Phosphatase of the Adrenal Cortex of the Mouse

The sexual dimorphism in the distribution of alkaline phosphatase in the adrenal cortex of the adult mouse has been previously reported9. This enzyme occurs in a marked concentration in the cells of the fascicular and reticular zones of the adrenal cortex of the male mouse. It is absent, or present only in traces, in the female. Castration abolishes activity of alkaline phosphatase in the male; and the treatment with testosterone results in the reappearance of the activity after castration.

It has been considered that testosterone has two main effects on the living body: the virilising and the anabolic. Many other steroids possess both of these effects too, though they are proportionally very different in various compounds. Thus, the virilising effect of nandrolone decanoate is very weak, but it is, on the other hand, regarded as an extraordinarily powerful anabolic agent.

The purpose of this study was to analyse the mode of action of testosterone on the mouse adrenal cortex: whether the effect produced by it is due to the virilising or to the anabolic ‘factor’. It was performed by comparing the effect of testosterone propionate and nandrolone decanoate on adrenocortical alkaline phosphatase of the mouse.

1 H. Elftman, Endocrinology 41, 85 (1947).
Material and Method. The material consisted of 40 male and 30 female adult mice. 30 of the males were castrated. A group of 10 castrated males and 10 females were treated with subcutaneous testosterone propionate (Testosterone forte, Orion) injection once a week. A similar group was injected with nandrolone decanoate (Deca-Durabolin, Organon) also once a week. The injection dose was 5 mg of both compounds. The test period was 8 weeks.

For the histochemical demonstration of alkaline phosphatase Gomori's method was used as described by Lillie. Incubation times were 1 to 24 h.

Results. The adrenal cortex of the females and the castrated males did not give the reaction for alkaline phosphatase (Figure 1). In the untreated normal males, and in the castrated animals and in the females treated with testosterone, a distinct reaction was present in the fascicular and reticular zone (Figure 2). In the females and in the castrated males, administration of nandrolone decanoate resulted in the appearance of the activity of this enzyme. However, this activity was clearly weaker than that after testosterone propionate administration (Figure 3).

Discussion. It may be concluded that both testosterone propionate and nandrolone decanoate have the ability to reactivate the adrenocortical alkaline phosphatase in the males after castration. Both compounds have also the ability to provoke this activity in the females. The

Fig. 1. Castrated male. No reaction for alkaline phosphatase in the adrenal cortex. 128 x.

Fig. 2. Castrated male treated with testosterone propionate. The distribution of alkaline phosphatase similar to that of the normal male. 128 x.

Fig. 3. Castrated male treated with nandrolone decanoate. A weak reaction for alkaline phosphatase in the fascicular and reticular zone. 128 x.