RESPONSES OF THE PREPUTIAL GLAND AND PERINEAL COMPLEX† OF NEONATALLY CASTRATED AND ANDROGENIZED RATS TO TESTOSTERONE DURING ADULT LIFE IN PRESENCE AND ABSENCE OF PITUITARY

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Rats were castrated on day 2 of birth, given one injection of testosterone propionate (TP), just after operation, hypophysectomized at day 75 of age and were treated with TP during 80–90 days of age. Preputial, levator ani, penile weight and size and nucleic acid contents were the parameters used to study the action of testosterone propionate. The growth and nucleic acid contents of the organs were significantly increased ($P<0.01$) in non-hypophysectomized animals when chalanged with TP in adulthood, this action was inhibited in absence of hypophysis.

INTRODUCTION

The activity of the preputial gland of experimental animals has so far been assessed by histo-morphological criteria (Lorincz 1963; Ebling 1963). There is little information about the induction of nucleic acid synthesis.

The present experiments assay the responsiveness of preputial and perineal complex of neonatally castrated and androgenized animals treated with testosterone propionate (TP) during their adulthood both in presence and absence of pituitary gland. The results are compared with that of the seminal vesicle, which is relatively uncontaminated instance of biochemical priming (Bronson *et al.* 1972).

MATERIALS AND METHODS

A total of 48 male wistar rats from the randomly mated closed colony maintained in the Anatomy Department, were used.

Design of Experiments

Group 1. *Neo. Castr.* (2.5 *mg TP*) + *Oil in adulthood*—Males castrated on day 2 of birth, received only one injection of TP (2.5 mg TP in 0.1 ml of arachis oil) just after the operation. These animals received oil in adulthood.

Group 2. *Neo. Castr.* (2.5 *mg TP*) + *TP in adulthood*—Rats of group 1 received TP at 80–90 days of age (TP 1 mg/day for ten days).

Group 3. *Neo. Castr.* (2.5 *mg TP*) + *Hypophysectomy* + *TP*—Rats of group 1 were hypophysectomized at 75 days of age, received TP at 80–90 days of age (TP 1 mg/day for ten days).

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†The term perineal complex included penes and its bulb, and levator ani muscle.

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TABLE I

*Changes in body weight, the weights of the penis, levator ani muscle, preputial gland and seminal vesicle in rats castrated and injected with testosterone propionate (TP) on day 2 after birth; hypophysectomized on day 75 and treated subsequently with TP in adulthood**

Group Treatment	Body wt (g)	Penile dimension in mm			Penile wt (mg/g body wt)	Levator ani muscle (mg/g body wt)	Preputial gland (mg/g body wt)	Seminal vesicle (mg/g body wt)
		glans	shaft	Total length				
1. Neo-castrated (2.5 mg TP) + Oil	283±16	5.5± 0.5	12.5± 0.9	18.0± 1.0	0.327±0.03	0.183±0.02	0.217±0.02	0.044±0.01
2. Neo-castrated (2.5 mg TP) + TP	223±8	9.3± 0.5	15.5± 0.6	24.7± 0.02	0 906±0.01†	1.610±0.34‡	0.743±0.09‡	1.317±0.34‡
3. Neo-castrated (2.5 mg TP) +Hypophysectomy + TP	181±10	5.6± 0.5	12.6± 0.9	18.3± 0.9	0.414±0.02#	0.513±0.08†	0.321±0.03#	0.147±0.10†

Body weight and weights of penis, levator ani muscle, preputial gland and seminal vesicle : means of ten determinations. All figures ± S.E.M. *1 mg/day for ten days.

†$p<0.01$ compared with group I; ‡ $p<0.001$ compared with group I; #Not significant compared with group I

TABLE II

RNA and DNA concentration of the preputial gland, levator ani muscle and seminal vesicle of rat

Group	Treatment	Levator ani muscle		Preputial gland		Seminal vesicle	
		µg RNA/mg tissue	µg DNA/mg issue	µg RNA/mg tissue	µg DNA/mg tissue	µg RNA/mg tissue	µg DNA/mg tissue
1.	Neo-castrated (2.5mg TP)+Oil	1.48±0.06	1.18±0.06	3.72±0.23	3.25±0.22	6.78±0.05	3.41±0.54
2.	Neo-castrated (2.5mg TP)+TP	3.29±0.13†	2.79±0.36†	7.34±0.41†	5.75±0.13†	9.34±0.54†	5.02±0.29†
3.	Neo-castrated (2.5mg TP) + Hypophysectomy + TP	1.32±0.04#	1.090±0.10#	3.45±0.14#	3.11±0.08#	4.39±0.01#	3.09±0.11#

RNA and DNA estimations : means of six determinations All figures ± S.E.M. 1 mg TP/day for ten days.
†$p<0.01$ compared with group 1; #Not significant compared with group 1

Hypophysectomy—Rats were hypophysectomized by the paratracheal route. Completeness of the hypophysectomy was judged from continuing loss of body weight and microscopic examination of sella turcica during autopsy.

At the time of autopsy, the rats were killed by decapitation, preputial, levator ani, penes and its bulb were taken out, weighed and frozen for total DNA and RNA estimation (Burton 1955; Munro and Fleck 1966).

Results

Table I summarizes the changes in weight as follows :

(*i*) Testosterone propionate brings about a significant increase in the weight of the preputial gland, levator ani muscle, penes and seminal-vesicles of non-hypophysectomised animals when chalanged with TP during adulthood. However, the increase was manyfolds in the seminal vesicle.

(*ii*) Androgen failed to induce the growth of preputial gland and penes in absence of hypophysis. Some residual size effect was seen in the levator ani muscle and seminal vesicles ($p<0.01$).

The biochemical changes were as follows :

Total RNA and DNA in preputial and levator ani mucsle was significantly high in those animals which received TP both in infancy and in adulthood (Table II, group 4). Testosterone propionate did not bring about any significant increase in the nucleic acid content in the absence of hypophysis.

Discussion

Denef and De Moor (1968) reported that the fact that neonatal treatment of testosterone propionate in rats may influence the activation or depression of synthesis had been well established in prostatic tissue after testosterone treatment (Liao *et al.* 1965; Fujii and Villee 1968).

The present study showed that the weight and dimension of the penis and the weight and nucleic acid concentration of the preputial gland, levator ani muscle and of the seminal vesicles of neonatally androgenized rats were increased significantly when TP was given to those animals during adult life. Pituitary appears necessary for such a response to TP action. Since in the absence of the said gland no such change in the nucleic acid concentration of the levator ani muscle, preputial gland and seminal vesicles were seen. Weight change in the preputial gland was also not discernible.

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