

Effect of castration and testosterone administration on the noradrenaline content of the vas deferens and the seminal vesicle of the guinea-pig

Treatment	No.	Body weight g	Weight of pair of vasa deferentia g	Noradrenaline in vas deferens $\mu\text{g/g}$ tissue wet weight	Noradrenaline in vasa deferentia total amount $\mu\text{g}$	Weight of pair of seminal vesicles g	Noradrenaline in seminal vesicle $\mu\text{g/g}$ tissue wet weight	Noradrenaline in seminal vesicles total amount $\mu\text{g}$
Controls .	5	424 $\pm$ 17	0.10 $\pm$ 0.01	10.0 $\pm$ 0.7	1.0 $\pm$ 0.1	0.49 $\pm$ 0.09	3.7 $\pm$ 0.2	1.8 $\pm$ 0.4
Castrated	5	444 $\pm$ 18	0.06 $\pm$ 0.00 <sup>b</sup>	13.8 $\pm$ 0.4 <sup>b</sup>	0.8 $\pm$ 0.0	0.25 $\pm$ 0.03 <sup>a</sup>	5.4 $\pm$ 0.3 <sup>b</sup>	1.3 $\pm$ 0.2
Testosterone 'low dose'	6	428 $\pm$ 13	0.12 $\pm$ 0.01	10.9 $\pm$ 0.5	1.3 $\pm$ 0.1	0.61 $\pm$ 0.04	3.0 $\pm$ 0.2	1.8 $\pm$ 0.1
Testosterone 'high dose'	4	458 $\pm$ 13	0.16 $\pm$ 0.01 <sup>b</sup>	7.5 $\pm$ 1.0	1.2 $\pm$ 0.2	0.87 $\pm$ 0.08 <sup>a</sup>	2.8 $\pm$ 0.3 <sup>a</sup>	2.3 $\pm$ 0.0
Castrated + testosterone 'low dose'	4	413 $\pm$ 28	0.11 $\pm$ 0.00	8.9 $\pm$ 0.5	1.0 $\pm$ 0.1	0.71 $\pm$ 0.07	2.7 $\pm$ 0.2 <sup>a</sup>	1.9 $\pm$ 0.2

<sup>a</sup> Different from controls  $P < 0.05$ ; <sup>b</sup> different from controls  $P < 0.01$ .

concentration of noradrenaline in the seminal vesicle, but not in the vas deferens; the total amount of noradrenaline in both the seminal vesicle and the vas deferens are not overtly affected. When judging these results it should, however, be kept in mind that the number of animals in each group is small and that there is a rather large range in the individual noradrenaline values. Anyhow the present findings would imply that testosterone has no marked effect on the adrenergic innervation (noradrenaline content) per se of the vas deferens and the seminal vesicle of the guinea-pig. Castration and testosterone administration probably mainly affects non-nervous tissues such as the smooth muscle and the secretory mucosa of the organs<sup>7,8</sup>.

**Zusammenfassung.** Die NoradrenalinKonzentration im Vas deferens und den Vesiculae seminales erhöht sich nach Kastration, wird aber nach Behandlung mit Testosteron leicht vermindert. Der gesamte Noradrenalinegehalt er-

fährt jedoch nach keiner der beiden Behandlungen eine bedeutende Veränderung verglichen mit unbehandelten Kontrollorganen. Das bedeutet, dass Androgene keinen ausgesprochenen Einfluss auf die adrenergische Innervation per se haben, sondern hauptsächlich Gewebe, wie Glattmuskel- und sekretorische Zellen, influieren.

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### Effect of Chronic Hypogastric Denervation on the Noradrenaline Content of the Vas Deferens and the Accessory Male Reproductive Glands of the Rat

Hypogastric denervation in the rat and other species does not reduce the noradrenaline content of the vas deferens and the accessory male genital glands, when the organs are examined 3 weeks after denervation<sup>1,2</sup>. This seems to be due to the fact that these organs are innervated by short adrenergic neurons<sup>3-5</sup>.

Since resection of the inferior mesenteric ganglion in male rodents causes permanent sterility in contrast to resection of the lumbar sympathetic chain, which only produces temporary sterility<sup>6</sup>, it seemed to be of interest to examine whether prolonged decentralization and hence inactivation of the short adrenergic neurons would produce a reduction in noradrenaline content of the male organ due to nervous atrophy.

**Material and methods.** Nine male rats of the Wistar strain, initially weighing about 200 g, were used. Four rats were subjected to resection of the hypogastric nerves.

Five animals were left as untreated controls. The animals, controls as well as operated ones, were sacrificed 9 months after denervation. The rats then weighed about 500 g. The vasa deferentia and the accessory male genital glands were taken out and cleaned. Their contents were squeezed out and the organs were homogenized in 20 ml of 10% trichloroacetic acid. After extraction the noradrenaline content was estimated according to the method of EULER and LISHAJKO<sup>7</sup>. The noradrenaline is expressed as  $\mu\text{g}$ -free base/g wet tissue weight. At the time of killing the vas deferens and the accessory male glands of the denervated specimens were extended and filled with spermatozoa

<sup>1</sup> N. O. SJÖSTRAND, *Acta physiol. scand.* 56, 376 (1962).

<sup>2</sup> N. O. SJÖSTRAND, *Acta physiol. scand.* 65, Suppl. 257, (1965).

<sup>3</sup> B. FALCK, CH. OWMAN and N. O. SJÖSTRAND, *Experientia* 21, 98 (1965).

<sup>4</sup> CH. OWMAN and N. O. SJÖSTRAND, *Z. Zellforsch.* 66, 300 (1965).

<sup>5</sup> CH. OWMAN and N. O. SJÖSTRAND, *Experientia* 22, 759 (1966).

<sup>6</sup> Z. M. BACQ, *Ann. J. Physiol.* 96, 321 (1931).

<sup>7</sup> U. S. VON EULER and F. LISHAJKO, *Acta physiol. scand.* 51, 348 (1961).

Effect of chronic hypogastric denervation on the noradrenaline content of the vas deferens and the accessory male reproductive glands of the rat

	Number	Body weight g	Weight of pair of vasa deferentia g	Noradrenaline in vas deferens $\mu\text{g/g}$ tissue	Weight of pair of seminal vesicles + coagulating glands g	Noradrenaline in seminal vesicles + coagulating gland $\mu\text{g/g}$ tissue	Weight of pair of prostate glands + ampullary glands g	Noradrenaline in prostate gland + ampullary gland $\mu\text{g/g}$ tissue
Controls mean $\pm$ S.E.M.	5	502 $\pm$ 9	0.20 $\pm$ 0.01	15.4 $\pm$ 0.4	0.71 $\pm$ 0.06	1.78 $\pm$ 0.15	1.28 $\pm$ 0.15	1.62 $\pm$ 0.17
Denervated mean $\pm$ S.E.M.	4	512 $\pm$ 18	0.21 $\pm$ 0.01	13.8 $\pm$ 2.1	0.74 $\pm$ 0.08	1.51 $\pm$ 0.21	1.27 $\pm$ 0.07	1.72 $\pm$ 0.05

and secretion. In addition the secretions of the glands, especially that of the seminal vesicles, were more solid than those of the non-denervated rats. The denervation was further checked by electric stimulation in the area, where the hypogastric nerves normally are located. In no case was a contraction of the vas deferens and the reproductive glands seen, in contrast to the controls where an immediate response was obtained on stimulating the hypogastric nerves.

**Results.** The results are given in the Table and the Figure. As can be seen, no statistically significant reduction in noradrenaline content after chronic hypogastric denervation is observed. There are no significant differ-

ences between denervated rats and controls in other respects (body weight and weight of organs) when tested by the student *t*-test.

**Discussion and conclusion.** The present results indicate that not even prolonged denervation and hence inactivation of the short adrenergic neurons innervating the accessory male genital organs reduces the noradrenaline content of these organs. An interesting additional finding was noticed on the vas deferens, when compared with the results previously described<sup>2</sup>. The big rats (500 g) used in this investigation had about twice as much noradrenaline (in  $\mu\text{g/g}$  tissue wet weight) in their vasa deferentia as the smaller ones used in the previous investigation<sup>2</sup>. The noradrenaline content of the rat vas deferens is thus probably dependent upon the age of the animal as is the case with the brain content<sup>8,9</sup>.

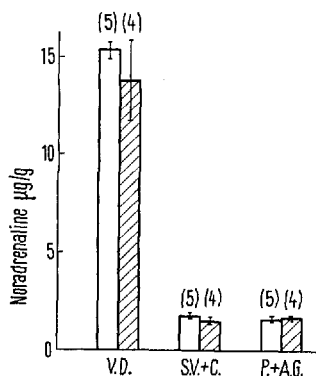
**Zusammenfassung.** Die vorliegenden Ergebnisse zeigen, dass auch langdauernde Dezentralisierung und dadurch bedingte Inaktivierung der kurzen adrenergischen Neurone, welche das Vas deferens und die akzessorischen männlichen Geschlechtsorgane der Ratte innervieren, keine Verminderung des Noradrenalinegehaltes dieser Organe verursachen.

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<sup>8</sup> L.-M. GUNNE, Acta physiol. scand. 58, Suppl. 204 (1963).

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Effect of chronic hypogastric denervation (9 months) on the noradrenaline contents of the vas deferens, prostate and seminal vesicle of the rat (means  $\pm$  S.E.M.). White columns controls, shaded columns hypogastric denervated. Number of animals within brackets. V.D., vas deferens; S.V., seminal vesicle; C, coagulating gland; P., prostate; A.G., ampullary gland.

## Colour Vision and Colour Preference in the Tropical Eye-Fly

The tropical eye-fly (*Siphonella funicola*, M. family Chloropidae) is attracted to the human and animal eye and causes great inconvenience in tropical countries. The phototropic and chromatophilic characteristics of this insect were studied for the first time.

**Methods.** A glass cylinder 8 inches in length, and 1 inch in diameter, open at both ends and covered by a thin layer of muslin-gauze, with the central 3 inches blackened to render it lightproof, was mounted on a

vertical movable axis. Two identical Wild Heerburgg (MTr/3) lamps with diaphragm, electric regulator and arrangement for attaching coloured filters, were arranged with their parallel beams incident on the transparent ends of the cylinder at a distance of 8 inches. About 40–50 eye-flies were transferred to this cylinder for each experiment. The experiments were done in a dark room at a temperature of 26°C; the coloured filters used were Kodak Wratten filters, Klett-Summerson filters and Coleman filters. Monochromatic colours were projected at one pole of the cylinder, with varying degrees of illumination (as measured with a Standards (British) photo-