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Development of Rat Testes

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# Studies on the Movement of Vas Deferens

## VI. Change of Motility of the Vas Deferens during the Development of Rat Testes

By

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As the growth of the vas deferens largely depends on the male sexual hormone secreted from the testis, it may be expected that the motility and sensitivity of the muscle of the vas deferens are also influenced by the hormone.

This experiment was designed under such assumption to investigate the change of motility of the vas deferens and its sensitivity to some drugs during the development of rat testes.

### Materials and Methods

All animals used in this experiment were Wistar strain rats, bred and fed in our laboratory. The animals were sacrificed at the age of 20, 30, 40, 60, 90, 120, 150 and 180 days respectively and preparations of the vas deferens were dissected. The motility of each preparation and its sensitivity to acetylcholine chloride, adrenaline chloride and barium chloride were examined in Locke's solution at 37.5°C in the usual way. Sensitivity of the vas deferens to each drug was expressed by the lowest concentration of a drug needed to induce recognizable contractions. At the same time the weights of testes, seminal vesicles and levator ani muscles were measured as the indicator of the level of endogenous androgen. The seminal vesicles were weighed after fixation with Bouin's fluid for 24 hours.

### Results

*Spontaneous movement.* Spontaneous contractions were recognized only in three among the six preparations obtained from rats of 30 days old. The vasa deferentia of rats older than the age of 40 days did not exhibit spontaneous contractions.

*Sensitivity to acetylcholine.* The results are summarized in Fig. 1. The vas deferens of rats in 30 and 40 days old showed low sensitivity to acetylcholine and those of rats at the other ages showed almost constant sensitivity. Sensitivity of the vas deferens in 30 day-old rats exhibited a large variation, ranging from  $8 \times 10^{-5}$  to  $3 \times 10^{-7}$ . And the muscles which revealed spontaneous contractions were more sensitive to the drug than the ones which did not show any spontaneous movement.

*Sensitivity to adrenaline.* Sensitivity of the vas deferens of rats to adrenaline during

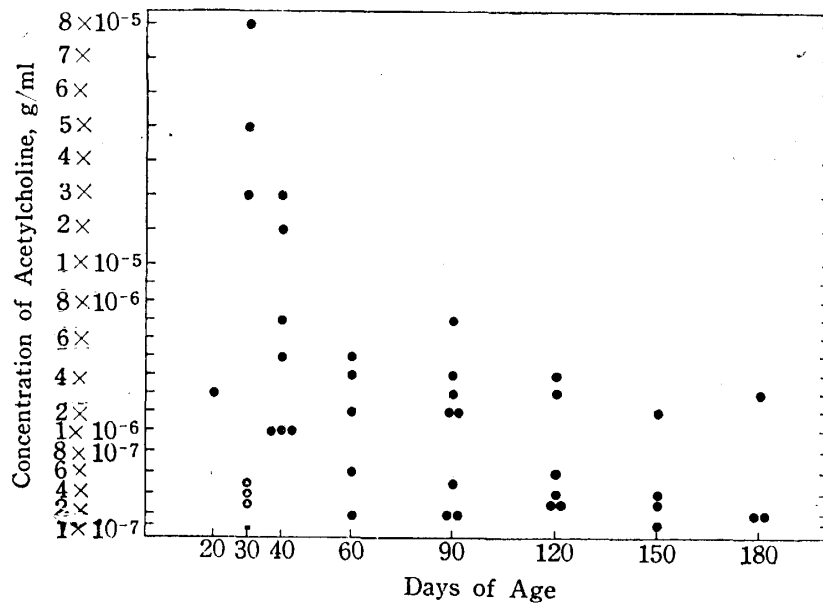


Fig. 1. Changes of sensitivities of the isolated vasa deferentia of rats to acetylcholine. In this figure and Figs. 2 and 3, triangle symbols indicate spontaneous contraction.

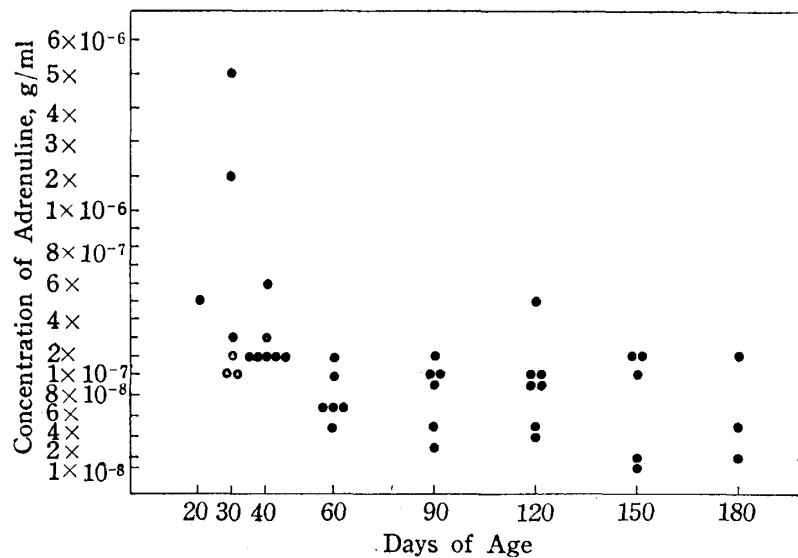


Fig. 2. Changes of sensitivities of the isolated vasa deferentia of the rats to adrenaline.

the period between 20 and 180 days old varied similarly as the sensitivity to acetylcholine. The sensitivity to adrenaline was almost constant at any age, except the preparations from rats at 30 and 40 days of age, which showed lower sensitivity than the others (Fig. 2). As in the case of acetylcholine, vasa deferentia that showed spontaneous contractions were also more sensitive to adrenaline than the quiescent preparations.

*Sensitivity to barium chloride.* Sensitivity of the vas deferens to barium chloride differed from those to acetylcholine and adrenaline. As shown in Fig. 3 the sensitivity did not change during the growing period and also the phenomenon that a spontaneously

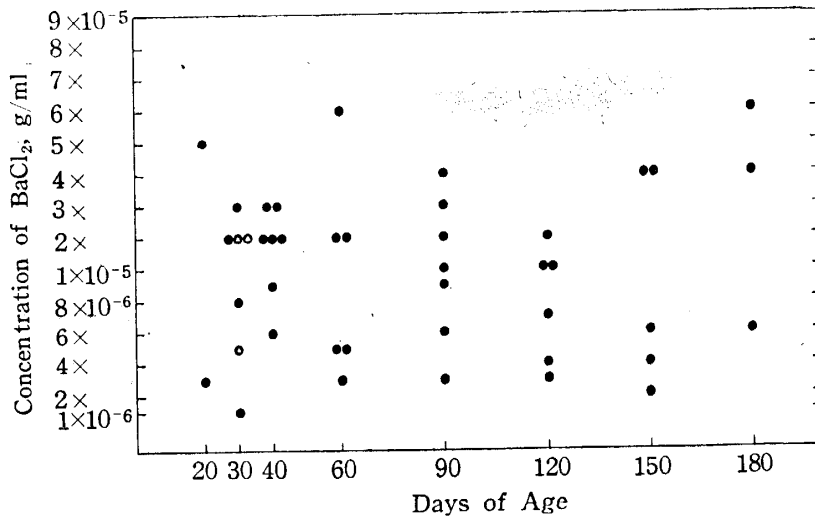


Fig. 3. Changes of sensitivities of the isolated vasa deferentia of the rats to barium chloride.

contracting vas is more sensitive than the quiescent one as observed in both acetylcholine and adrenaline, was not recognized in this case.

*The weights of testes, seminal vesicles and levator ani muscles.* Testes began to increase their weights during the period between 40 and 60 days and the increase continued until 120 days old. Until 60 days the weights of both seminal vesicles and levator ani muscles showed a slight increase and at the age of 90 days they enhanced abruptly and the increase continued till 180 days old (Fig. 4).

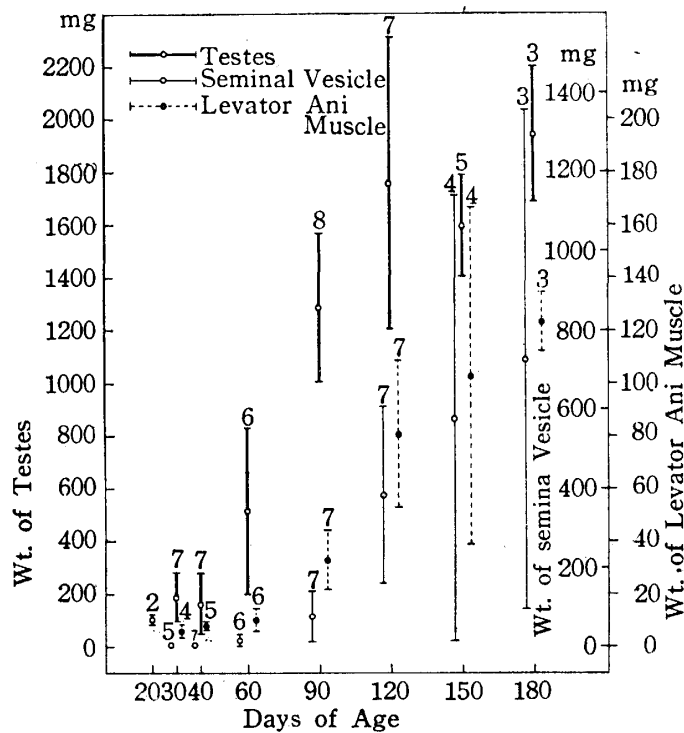


Fig. 4. Changes of the weights of testes, seminal vesicles and levator ani muscles of rats. Numerals in figure indicate number of rats.

### Discussion

Several workers have reported observations of spontaneous contractions in the isolated vas deferens of rat. But their results are not consistent<sup>1-7)</sup>. In the present experiment, only some of the vasa deferentia obtained from 30 day-old rats showed spontaneous contractions. But the vasa deferentia at the age older than 30 days did not reveal any spontaneous movement.

The seminal vesicles and levator ani muscles began to grow at about 60 days after birth and their weights increased until 120 days old. These results suggest that the output of androgen begins to increase in about 60 days. While the sensitivity of the vas deferens to the drugs remained constant during the androgen-increasing period. These observations indicate that sensitivity of the vas deferens to the muscle stimulants is not influenced by the endogenous androgen in the growing period. The reason why the vasa deferentia from 30 and 40 day-old rats show lower sensitivity than the others remains unknown.

### Summary

Motility and sensitivity to acetylcholine, adrenaline and barium chloride were investigated on the isolated vasa deferentia of rats, ranging from 20 to 180 days old.

Spontaneous contractions were recognized only in some of the preparations obtained from 30 day-old rats. These spontaneously motile muscles were more sensitive to acetylcholine and adrenaline than non-motile one.

The sensitivities of the vas deferens to the drugs examined, did not show any change during the androgen-secreting period. The relationship between the sensitivity of the vas deferens to the drugs and the androgen output during the growing period was not recognized. The vasa deferentia from 30 and 40 days-old rats showed lower sensitivity than those from the other ages.

### References

- 1) MARTINS, T. and J. R. VALLE *Pflügers Arch. ges. Physiol.* **243**, 243 (1940).
- 2) MARTINS, T., J. R. VALLE and A. PORTO *ibid.* **242**, 155 (1939).
- 3) MARTINS, T., J. R. VALLE and A. PORTO *Ztschr. f. ges. exp. Med.* **105**, 512 (1939).
- 4) PERUTZ, A. and E. TAIGNER *Arch. Derm. Syph.* **131**, 316 (1921).
- 5) VALLE, J. R. and A. PORTO *Compt. Rend. Soc. Biol.* **131**, 302 (1938).
- 6) VALLE, J. R. and A. PORTO *Endocrinology* **40**, 308 (1947).
- 7) WADDELL, J. A. *J. Pharmacol. Exp. Therap.* **8**, 551 (1916).