or less alpha naphthol. The reaction product of 1.2 naphthoquinone-4-sodium sulphonate and guanidine as made in the Sullivan guanidine reaction, with a nitrogen content of 19.35%, a decomposition point of 242-245°C. and yielding hydroxynaphthoquinone on hydrolysis is explainable on the basis of formula (A) or (B).

## 8317 C

## The Effect of Hypophysectomy upon Mammary Gland Development and Function in the Guinea Pig.*

WARREN O. NELSON.

*From the Department of Anatomy, Yale University.*

Studies on mammary gland development and lactation during the past few years have indicated that the ovarian hormones are responsible for the proliferation of the glands while the lactogenic hormone of the anterior pituitary is concerned with the initiation and maintenance of milk secretion. However, the possibility of a direct action of the anterior pituitary, as at least a contributing factor in mammary development, cannot be disregarded and obviously requires investigations on the character of development in hypophysectomized animals. Asdell and Seidenstein[1] have reported that hypophysectomized rabbits treated with oestrone and progesterone show mammary development comparable to that obtained in the intact animal. In addition to the question of a direct influence of the hypophysis on mammary growth there are uncertainties in regard to the necessity of the hypophysis for the initiation and maintenance of lactation.[2]

Hypophysectomy has been carried out in the guinea pig by a parapharyngeal approach. The operation is well tolerated, operative and early post-operative mortality being low, but deaths, probably due to hypoglycemic crises, are frequent during the first week. This has been successfully combatted to some extent by the routine administration of glucose during the first 10 days after operation.

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1 Asdell, S. A., and Seidenstein, H. R., PROC. SOC. EXP. BIOL. AND MED., 1935, **32**, 931.

2 Nelson, W. O., *Endocrinology*, 1935, **19**, 187.

Animals have been maintained for as long as 51 days after hypophysectomy.

Of a group of hypophysectomized male guinea pigs which were subsequently treated with oestrone† (40 R.U. daily) 6 survived for at least 5 weeks. The character of mammary development as judged by the nipple size, gland spreads, and histological section was of a degree comparable to that observed in normal animals.[3] Autopsy showed pituitary fragments in 2 of these animals.

Six male guinea pigs which had carried functional ovarian grafts for 7 to 10 weeks, and 3 males and 4 females which had been injected with 40 R.U. oestrone daily for 5 to 7 weeks were hypophysectomized. At the same time the ovarian grafts were removed, or in the case of the oestrone-injected animals treatment was suspended. Such animals, with intact hypophyses, will invariably lactate within 60 hours.[2] Nine of the above animals survived more than three days. Five animals failed to lactate during a period of 5 to 10 days, while 2 showed a scanty and 2 about the normally expected degree of lactation. Autopsy revealed complete hypophysectomies in all animals which had failed to lactate and in one of those which had presented a scanty secretion. In the remaining animals pituitary fragments were found.

Three pregnant guinea pigs were operated within a few days of term. One animal died before parturition, but the remaining 2 delivered successfully. One failed to lactate and the other showed only a scanty serous secretion which did not persist. Hypophysectomy was complete in both animals.

Three females which had passed through normal pregnancies were operated 7 days after delivery. Lactation is well established at that time and normally will continue for about 2 weeks. Lactation declined the day after operation in one animal, but she died before observations could be completed. However, the other 2 survived, showing a rapid decrease in secretion after the second day. On the fifth day milk was no longer present in the glands.

In these studies it has been observed that under suitable stimulation the guinea pig mammary glands undergo development in the absence of the pituitary. This development appears to be entirely comparable to that seen in the intact animal. However, lactation does not occur in suitably prepared animals when the hypophysis is absent. This evidence supports the idea[2] that the initiation of lacta-

† The oestrone used in this study was theelin-in-oil and was kindly supplied by Dr. Oliver Kamm of Parke, Davis & Co.

[3] Nelson, W. O., and Smelser, G. K., *Am. J. Physiol.*, 1933, **103**, 373.

tion depends upon activity of the anterior hypophysis following the removal of the inhibitory influences exerted by the estrogenic hormone. Furthermore, it was observed that the maintenance of lactation depends upon the presence of the anterior hypophysis.

8318 P

## Differentiation and Function of Heterotopic Autoplastic Transplants of the Amphibian Hypophysis.

WAYNE J. ATWELL.

*From the Department of Anatomy, the University of Buffalo.*

Conflicting evidence has been obtained regarding the ability of the epithelial hypophysis to differentiate and function in heterotopic transplants in amphibia. Blount,[1] using *Amblystoma punctatum,* failed to obtain differentiation of the epithelial hypophysis independent of the infundibulum. Etkin[2] made successful single and multiple transplants in *Rana sylvatica* with a minimum of brain tissue, but he made no attempt to remove all possible adherent brain.

The writer, in 1931, removed the hypophysis from 18 specimens of *R. sylvatica* at the tail-bud stage and transplanted it in the same individual to a location between the right otic vesicle and the hind brain. Care was taken not to include any brain tissue or any entoderm. Eight of these animals gave evidence of function of the hypophysis according to one or more of the criteria enumerated below, although 5 were sacrificed at a stage before evidence of anterior lobe function can be obtained. In the present year similar operations were attempted on 75 *R. sylvatica,* 30 *R. pipiens* and 50 *A. punctatum.* From the experiments of these 2 years serial sections of head, thyroid and gonad-adrenal regions have been studied from 64, 8 and 5 animals of the above species, respectively. In addition, the condition of the hypophysis and the thyroid has been determined at autopsy in 10 *A. punctatum,* while 30 animals of this species are still alive. For control study records and sections from more than 200 normal, or completely or partially hypophysectomized amphibia, mostly *R. sylvatica,* were available.

The pigmentary condition of the animal was taken as an indicator

[1] Blount, R. F., *Proc. Nat. Acad. Sc.,* 1930, **16**, 218; *J. Exp. Zool.,* 1932, **63**, 113; 1935, **70**, 131; *Anat. Rec.,* 1935, **61**, Suppl., 6.

[2] Etkin, W., PROC. SOC. EXP. BIOL. AND MED., 1935, **32**, 1653.