

were 11 with from 1 to  $3 \times 10^{-8}$  gm. of lead; 20 from 4 to 6; 5 from 7 to 9; 4 from 1 to  $1.2 \times 10^{-7}$ ; 3 from 1.3 to 1.5; 2 from 1.6 to  $1.8 \times 10^{-7}$ . It will be noted that the greatest number of the cases showing lead fell around  $6 \times 10^{-8}$  gm. None of the members of the series show an amount of lead greater than  $1.9 \times 10^{-7}$ . By way of comparison it may be pointed out that a definite case of plumbism contained  $3.2 \times 10^{-8}$  gm. of lead per cc. of blood. This case falls within the limits of the pathological range of  $2 \times 10^{-6}$  to  $1 \times 10^{-5}$  gm. of lead per cc. of blood set by Blumberg and Scott.<sup>2</sup>

### 8978 P

#### Initiation and Maintenance of Lactation in Hypophysectomized Guinea Pigs.\*

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The somewhat purified preparation of the lactogenic hormone (galactin), unlike crude pituitary extracts, failed to initiate or to maintain lactation in hypophysectomized guinea pigs.<sup>1, 2</sup> These observations were not taken to indicate the inadequacy of the lactogenic hormone in stimulating secretory activity of the mammary epithelium but rather as a result of the general physiological disturbance in the hypophysectomized animal which invariably reduces to a low level the available precursors of milk in the blood.

There is an increasing amount of evidence that the pituitary secretes hormones which directly or indirectly through their action upon other endocrine glands, regulate the composition of the blood and therefore play an important indirect rôle in milk secretion. Graham<sup>3</sup> and Gaunt and Tobin<sup>4</sup> have indicated the importance of the thyroid and adrenal cortex in relation to milk secretion.

Nelson and Gaunt<sup>2</sup> reported that the administration of Swingle-

<sup>2</sup> Blumberg, H., and Scott, T. F. M., *Johns Hopkins Hosp. Bull.*, 1935, **56**, 32.

\* Contribution from the Department of Dairy Husbandry, Missouri Agricultural Experiment Station, Journal Series No. 483.

<sup>1</sup> Gomez, E. T., and Turner, C. W., *PROC. SOC. EXP. BIOL. AND MED.*, 1936, **34**, 404.

<sup>2</sup> Nelson, W. O., and Gaunt, R., *PROC. SOC. EXP. BIOL. AND MED.*, 1936, **34**, 671.

<sup>3</sup> Graham, W. R., Jr., *J. Nutrition*, 1934, **7**, 407.

<sup>4</sup> Gaunt, R., and Tobin, C. E., *Anat. Rec. (Supp.)*, 1936, **64**, 18.

Pfiffner's adrenal cortical extract in hypophysectomized guinea pigs failed to initiate lactation or prevent its cessation. However, the lactogenic hormone plus adrenal cortical hormone initiated lactation in 12 hypophysectomized guinea pigs, and by continued treatment milk secretion was maintained for about 5 days.

The present paper presents results which confirm and extend the above observations. The spontaneous hypoglycemic coma which develops in hypophysectomized guinea pigs was successfully controlled to a great extent by the daily administration of 1 cc. of 20% glucose solution per 100 gm. body weight. In the experiments to be described it should be recognized that this solution played an important rôle in maintaining the level of blood glucose which is an important precursor of milk.

*Initiation of lactation.* Six sexually mature male and 4 involuted multiparous female guinea pigs† which were prepared for lactation by the injection of theelin (in oil)‡ daily for 20 days were hypophysectomized 24 hours after the last injection. Immediately after hypophysectomy, one of the males was given 0.2 dog unit of adrenal cortical hormone (eschatin)‡ and another 5 mg. of lactogenic hormone (galactin). The rest were injected with 5 mg. of galactin and eschatin in amount ranging from 0.2 to 0.4 dog unit administered simultaneously by subcutaneous injection daily for a period of 5 to 7 days, when the animals were sacrificed.

The animals receiving galactin or eschatin alone showed no evidence of lactation during a period of 7 days. In all instances, however, lactation was induced within 2 to 3 days after the first injection in animals receiving galactin and eschatin; and by continued treatment milk secretion was maintained throughout the observation period of 5 to 7 days. With the exception of 2 animals which showed microscopic evidence of anterior pituitary fragments in the sella turcica, all the animals were found to be completely hypophysectomized.

*Maintenance of Lactation.* Ten lactating guinea pigs, hypophysectomized 2 to 3 days after parturition, were immediately injected with 3 to 5 mg. of galactin and 0.2 to 0.4 dog unit of eschatin simultaneously once daily for periods ranging from 5 to 20 days. Gross daily observations of these animals before the young were allowed to nurse after being kept away over night revealed abundant milk secretion in the mammary glands. However, the amount of

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† A considerable number of animals which succumbed to the treatment too soon to allow for the necessary observations are omitted from this report.

‡ These hormones were kindly and generously supplied by Dr. Oliver Kamm of Parke, Davis and Company.

milk secreted declined gradually so that by the 10th to 20th day of injection only a few drops of milk could be expressed from the nipples. In spite of continued milk secretion, there appeared to be a gradual involution of the mammary gland. In 2 similar cases in which galactin alone was injected, milk secretion stopped in 3 days after the first injection. Lactation was reinitiated in these animals within 3 days with 5 mg. of galactin and 0.2 dog unit of eschatin, injected immediately after the cessation of lactation and maintained throughout the observation period of 10 days.

*Summary.* The lactogenic hormone (galactin) in conjunction with the adrenal cortical hormone (eschatin) and glucose was capable of initiating or reinitiating lactation in hypophysectomized guinea pigs with properly conditioned mammary glands. Though simultaneous injections of these 2 hormones and glucose support the maintenance of lactation in hypophysectomized lactating guinea pigs, the involution of the mammary glands was only slightly, if at all, prevented.

### 8979 P

#### Influence of Suckling upon Galactin Content of the Rat Pituitary.\*

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We have reported<sup>1</sup> that the pituitary glands from 48 hour post-partum rats contained, on the average, 7.72 bird units of galactin per gland. In this experiment the young were with the mother continually up until the time when she was sacrificed.

In the light of Selye's<sup>2</sup> work upon the nervous control of lactation it became exceedingly interesting to study the influence of suckling upon the galactin content of the rat pituitary. The litters of 10 rats were removed 36 hours after parturition and then returned to their mothers 12 hours later, without receiving any nourishment from other lactating rats during this 12-hour period. Frequent observations were then made to see if the young were nursing.

\* Contribution from the Department of Dairy Husbandry, Missouri Agricultural Experiment Station, Journal Series No. 485.

<sup>1</sup> Reece, R. P., and Turner, C. W., *Proc. Soc. Exp. Biol. and Med.* (in press).

<sup>2</sup> Selye, Hans, *Am. J. Physiol.*, 1934, **107**, 535.