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An Experimental Study of the Factors Concerned in Mammary Growth and in Milk Secretion.

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Greuter[1] has recently reported that the injection of anterior pituitary extracts into lactating cows and goats increases the flow of milk. Corner[2] in a recent demonstration has shown that it is possible to initiate the milk flow in oöphorectomized adult virgin rabbits by injecting an anterior lobe extract.

At the time of these reports the present authors were engaged in a study of the factors concerned in mammary growth and milk secretion. The animals employed were normal and castrated immature male and spayed immature female guinea pigs. The animals were given a preliminary treatment consisting of daily subcutaneous injections of a lipid extract of sows' corpora lutea. This treatment produced a very marked hypertrophy of the glands and nipples as was demonstrated both macroscopically and by histological study. In no instance (12 animals) was milk secreted although in some cases injection was continued for a month. If, however, the growth treatment was followed by injection of anterior pituitary substance, milk was secreted within 3 days (7 animals). Since either fresh gland (rat) or an extract of sheeps' glands containing the maturity hormone* proved efficacious in this respect it seems probable that the maturity hormone of the pituitary is the one involved in this

[1] Greuter, F., Paper read before the Second International Congress for Sex Research, London, 1930.

[2] Corner, G. W., *Anat. Rec.*, 1930, **45**.

* The anterior pituitary extract employed in this work was supplied through the courtesy of Dr. Oliver Kamm of Parke, Davis & Co.

reaction. It is possible, of course, that an at present unknown principle of the anterior lobe rather than the maturity hormone is responsible, but the nature of the material used in this work is indicative of the latter.

A series of controls (8 immature males and females) was injected with the pituitary extract only. In no instance was milk produced nor were the mammary glands hypertrophied during the period of injection (5 to 6 days).

Preliminary work employing oestrin in the growth treatment has been carried out on immature males. Although considerable hypertrophy of the mammary glands was obtained in the 4 animals subjected to this treatment, subsequent injection of the pituitary extract has so far proved unsuccessful in initiating milk secretion. Further work along this line is in progress.

That the factor contained in the lutein extract is not oestrin has been shown by adequate controls. Oestrin may be present, but not in sufficient quantities to respond to physiological tests.

The authors have been able to confirm Corner's work,[2] using adult virgin guinea pigs which were gonadectomized during oestrus. A copious flow of milk was produced in 3 animals on the second or third day after the treatment was begun. The only agent employed was the anterior pituitary extract referred to above.

The results obtained to date indicate that the mammary glands must first be developed to a proper state by some ovarian factor before the pituitary principle can initiate secretion. On the other hand, ovarian factors alone are not sufficient. These indications are suggestive of the rôle that may be played by the ovarian and pituitary hormones in normal milk production.

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Further Note on a Substance in Liver Active in Pernicious Anemia.

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A method has already been described[1] for the separation from liver of an acidic substance clinically potent in pernicious anemia. The substance on hydrolysis was found to yield β-hydroxyglutamic acid and evidence was also obtained of the presence in the hydrolytic

[1] *J. Biol. Chem.*, 1930, **88**, 427.