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Effect of Luteinizing and Follicular Stimulating Fractions of Pituitary on the Thyroid.*

ROY GREEP. (Introduced by Frederick L. Hisaw.)

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That the anterior lobe of the hypophysis exerts a definite action on the thyroid gland seems well established. Although considerable work has been done (Loeb,[1] Riddle,[2] Schockaert,[3] Collip[4]) it is yet a point of discussion as to which factor of the anterior lobe is responsible for this action. The preparation of a luteinizing and a follicular stimulating fraction in this laboratory (Fevold et al[5]) has made it possible to test the thyroid stimulating ability of 2 extracts which differ widely in their physiological action on the ovaries. The gonadotropic ability of the extracts was determined before their thyreotropic action was tested. The follicular stimulating fractions used produced from 300 to 800% increase in weight of immature rat ovaries with production of little or no luteinization, while the luteinizing fraction even in comparatively large doses, had little or no effect.

A series of 9 young male and female guinea pigs from 3 to 12 weeks old were given subcutaneous injections of the luteinizing fraction (0.5 to 3 gm. equivalent pituitary powder) twice daily over a period of 5 days. The thyroid glands and ovaries were weighed and prepared for histological study 12 hours after the last injection. A similar group of 5 guinea pigs were injected with the follicular stimulating fraction (0.5 to 2 gm. equivalent). In each of these groups litter mate controls were kept and autopsied at the same time as the experimental animals.

The luteinizing fraction produced an increase in the weight of the thyroids of 50 to 145%, average 103%, over those of litter

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[1] Loeb, Leo, *Endocrinol.*, 1932, **16**, 129.

[2] Riddle, O., Bates, R. W., and Dykshorn, S. W., PROC. SOC. EXP. BIOL. AND MED., 1933, **30**, 794.

[3] Schockaert, J. A., *Am. J. Anat.*, 1932, **43**, 379.

[4] Anderson, E. M., and Collip, J. B., PROC. SOC. EXP. BIOL. AND MED., 1932, **30**, 680.

[5] Fevold, H. L., Hisaw, F. L., Hellbaum, A., and Hertz, R., *Am. J. Physiol.*, 1933, in press.

mate controls. At the time of autopsy these glands appeared swollen and highly vascular. Upon microscopic examination the acinar epithelium, which in the normal animal is cuboidal, was invariably found to be of a very tall columnar type. The follicles were irregular in outline and the follicular epithelium was thrown into numerous folds. The lumina of the acini, which in untreated animals are typically filled with solid colloid, were found to be empty. In some follicles the lumina had become obliterated by enormously elongated epithelial cells. The cytoplasm of these enlarged cells was filled with granular material and the nuclei were quite vesicular. On the whole, the thyroid picture was one of excessive secretory activity.

The follicular stimulating fraction produced no significant change in the weight of the thyroid. Histologically these glands were quite normal in every respect with the exception of 2 animals. In each of these the thyroid was somewhat atrophic. The acinar epithelium was flattened and the nuclei of the epithelial cells were likewise flattened and pycnotic.

It was found that neither castration nor sex altered the response of the thyroid to either of the gonadotropic substances. Also, similar experiments, in which young female rats were used, gave essentially the same results as those for guinea pigs.

Other preparations such as placental extracts, prolan from pregnancy urine, and corporin, produced no significant changes either in the weight or the histological appearance of the guinea pig thyroid.

The data presented here indicate that thyroid hyperplasia was produced either by the luteinizing principle or by another substance associated with it in the preparation.

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Hypophysectomy and Thyroidectomy of Snakes.*

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The effects of hypophysectomy on mammals and amphibians have been extensively investigated, but apparently no work of this

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