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Luteinization in the Immature Guinea Pig.*

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In the investigation of the various sex hormones, the guinea pig has been neglected chiefly because it does not readily respond to manipulation. In the ovary of rats, mice, and rabbits, the effect of treatment with anterior pituitary-like substances is usually maturation of follicles, ovulation, and the formation of corpora lutea. No such changes have been reported for the guinea pig.

Jares[1] found that the ovaries of mature guinea pigs injected intravenously with pregnancy urine were entirely negative. Loeb and Kountz[2] reported that injection of ovarian extract produced in the immature ovary a slight acceleration of maturation. Aron[3] used anterior pituitary extracts and described a growth and vascularization of the theca interna and a degeneration of the granulosum cells leading to atresia. Almost the same picture was presented by Papanicolaou[4] using the urine of pregnant cows.

In the course of a study of the immature guinea pig the following significant observation was made: that luteinization can be produced in less than 48 hours by the injection of a suitable amount of anterior pituitary-like substance. The luteinization occurred in the ovaries of animals weighing from 205 to 265 gm. after injection of (a) pregnancy urine of high titre (3.0-4.0 cc.), (b) commercial anterior pituitary-like substances extracted from pregnancy urine (200 units), (c) sheep anterior pituitary gland emulsion (0.5-2.0 cc.) and (d) to a limited extent by pregnancy blood serum. True corpora lutea were not formed.

The steps in the process seem to be as follows: (1) a degeneration of the granulosum cells with an increased vascularity of the stroma and the theca interna; (2) an outpouring of a primitive type of cell resembling a fibroblast. These 2 steps were also produced by *theelin* alone, either by the direct action of *theelin* on the particularly sen-

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[1] Jares, J., *Anat. Rec.*, 1931, **49**, 185.

[2] Loeb, L., and Kountz, W. B., *Am. J. Phys.*, 1928, **84**, 283.

[3] Aron, M., *Compt. rend. Soc. Biol.*, 1931, **108**, 20.

[4] Papanicolaou, G., PROC. SOC. EXP. BIOL. AND MED., 1931, **28**, 807.

sitive ovarian cells or else by reflex stimulation of the pituitary gland of the animal. The third step is luteinization of the theca interna, and fourth, luteinization of undifferentiated cells throughout the whole ovary. (See figures.)

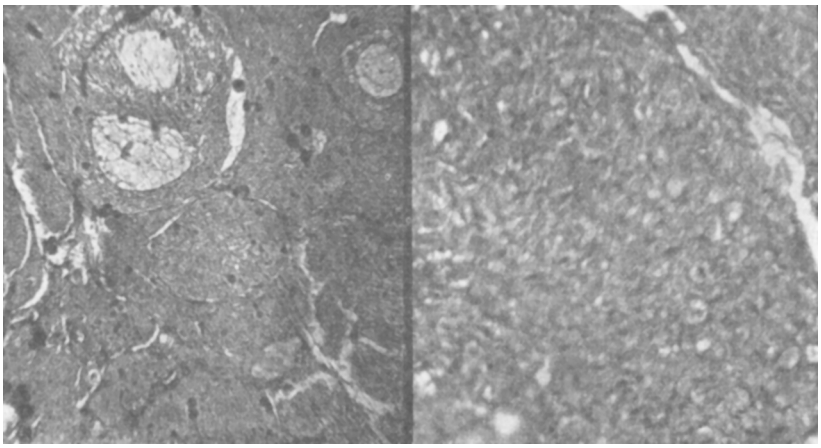

FIG. 1. FIG. 2.

Luteinization in the ovary of immature guinea pigs.

The degree of luteinization varied, however, and no factor other than the individuality of the animal could be found to explain the quantitative differences. The question is brought up of the threshold of reaction of tissues in any animal as a result of the normal biphasic hormone cycle which occurs even long before puberty. While this observation strengthens the belief in the luteinizing powers of the prehypophysis, it should stimulate further investigation of the guinea pig in the study of species difference and tissue responses.

Since the presentation of this paper attention has been called to the report of Selye, H., Collip, J. B., and Thomson, D. L., (PROC. SOC. EXP. BIOL. AND MED., 1933, **30**, 780) who treated 6 immature guinea pigs with 200 to 700 units of anterior pituitary-like hormone per day for 6 to 14 days, and produced luteal changes in the theca cells.