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6013

Specificity in Action of Anterior Pituitary of Different Mammals, and Urine of Pregnant Women on Ovary and Thyroid.*

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During the past 2 years we have compared the action of the anterior pituitary of various species of mammals as well as of the urine of pregnant women on ovary and thyroid gland of the immature guinea pig and have observed typical differences in their effects. These we shall very briefly summarize.

1. Various preparations of *cattle anterior pituitary* (anterior pituitary inoculated in substance, alkali and acid extracts, residue after preceding extraction), all have in common the production of a hypotypical condition of the ovarian follicles, largely, but perhaps not entirely, due to the increased basal metabolism caused by the hyperactivity of the thyroid which these substances induce. They also tend to produce pseudolutein bodies and interstitial gland. Ovulation does not occur except when, after a period of long-continued injections, the effect of the extracts on the thyroid gland has ceased.

2. *Inoculation of anterior pituitary of mature male guinea pigs* accelerates markedly maturation of follicles and may produce a relatively slight amount of interstitial gland and pseudolutein tissue. The administration of this anterior pituitary substance has in many cases been followed by premature ovulation. Acceleration of maturation of follicles and ovulation are therefore the most characteristic effects observed. Variation in the amount of the inoculated material may lead to variations in the intensity of the effects without causing thereby the relation between acceleration of maturation and production of interstitial gland and pseudolutein tissue to be greatly altered.

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3. *Inoculation of anterior pituitary of young male adult rabbits* accelerates markedly maturation of follicles, but at the same time, it induces formation of pseudolutein tissue and of interstitial gland to a much higher degree than does anterior pituitary of guinea pig. It does not as a rule induce ovulation. At later periods of inoculation we may find the ovary largely filled with interstitial gland.

4. *Inoculation of anterior pituitary of cats* exerts on the whole the same action as rabbit anterior pituitary, but it is apparently somewhat less effective than the latter; therefore somewhat larger quantities need to be administered.

5. *Intraperitoneal injection of urine of pregnant women* converts follicles into pseudocorpora lutea of various sizes and induces production of interstitial gland. During the third week of injection the greater part of the ovary becomes gradually converted into areas of interstitial gland which develop around atretic follicles. Mature follicles are as a rule not produced and ovulation does not take place.

Each of the preparations used exerts specific effects, largely, but not entirely, independent of the quantity of the material used. In general, ovulation is induced in the guinea pig only by anterior pituitary of the guinea pig. As to their effects we can arrange these preparations in the following order: (1) Urine of pregnant women; (2) cattle anterior pituitary; (3) rabbit anterior pituitary; (4) cat anterior pituitary; (5) guinea pig anterior pituitary. (1) and (2) cause the production of the greatest amount of interstitial gland and pseudolutein tissue. (5) mainly accelerates maturation of follicles and may cause ovulation; it produces only little interstitial gland and pseudolutein tissue. (3) and (4) are intermediate in their action.

If we compare with these effects on the ovary, the action of these substances on the thyroid gland, we find that (2) and especially the extracts cause the greatest hypertrophy. However, we must consider the fact that in preparing these extracts a relatively much greater amount of substance of cattle anterior pituitary is used than is possible to inoculate daily into the guinea pig if we use the gland substance as such. (5) has only a very slight effect or none, while the effects of (3) and (4) are again intermediate. As we previously observed injection of urine does not cause any definite hypertrophy of the thyroid gland. To a certain extent the hypertrophying effect of these substances on the thyroid follows therefore a parallel course to their ability to produce interstitial gland and pseudolutein tissue in the ovary; it seems independent of their ability to accelerate maturation of follicles and to produce ovulation. As

to the exceptional position of urine of pregnant women which causes a marked production of interstitial gland and pseudolutein tissue, without causing hypertrophy of the thyroid gland, there are some indications that the active substance in urine may be different from the active principle in the anterior pituitary.

6014

Administration of Theelol to the Immature Brown Leghorn Female.*

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The properties of theelol as an estrogenic substance allied to theelin, and the report of atretic degeneration in the ovary of the rat upon continuous administration of theelin[1] suggested the possibility of some action of theelol upon the ovary of the immature fowl.

Using 20 Brown Leghorn pullets, 5 months of age, 5 served as controls (saline injected), and 15 received daily an aqueous solution of theelol intramuscularly. These were in 3 equal lots receiving 2.5, 10, and 20 rat units respectively per day. After 40 days the dosage was double in each lot, and again after 16 days the dose was further increased to 20, 40, and 100 units per bird per day respectively. The birds were inspected and weighed weekly.

As indicated by comb-growth and egg-production, after a total of 96 days of injection, no signs of ovarian stimulation or inhibition were noted. The first bird to lay was a control, followed by 2 birds of the smallest theelol dose, and later by members of the other groups. Laying commenced a week after the heaviest dosage was started, and after 3 weeks, 2 controls, three 20-unit, two 40-unit, and one 100-unit bird was laying. Autopsies revealed only ovaries and oviducts normal for birds of laying age. Thus there was found no inhibition nor stimulation of ovulation by theelol as employed. The problem is being further studied, especially with reference to elimination rate as a possible explanation.

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[1] Doisy, E. A., Thayer, S. A., Levin, L., and Curtis, J. M., PROC. SOC. EXP. BIOL. AND MED., 1930, **28**, 88; Doisy, E. A., Curtis, J. M., and Collier, W. D., *Ibid.*, **28**, 885.