

## THE URINARY EXCRETION OF PREGNANE-3 $\alpha$ :20 $\alpha$ -DIOL IN THE FEMALE RABBIT IMMEDIATELY AFTER MATING

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### SUMMARY

The transient excretion of pregnano-3 $\alpha$ :20 $\alpha$ -diol in the urine of female rabbits after mating is derived from progesterone liberated from the ovary.

In a previous paper from this laboratory [Verly, Sommerville & Marrian, 1950], it was shown that in female rabbits immediately after mating there is a transient excretion in the urine of pregnane-3 $\alpha$ :20 $\alpha$ -diol. This excretion of pregnanediol was found to last for 1-3 days and in some cases amounted to as much as 3 mg./24 hr. In all cases it was observed that the greater part of the pregnanediol was excreted during the first 24 hr. after copulation, a fact which precluded the possibility of the pregnanediol being derived from progesterone secreted by newly formed corpora lutea. The phenomenon appeared to be of such interest that a number of preliminary experiments were carried out in an attempt to determine the origin of this pregnanediol. In these experiments urinary pregnanediol was determined by the method of Sommerville, Gough & Marrian [1948] as modified for rabbit urine by Verly *et al.* [1950].

The first possibility considered was that the pregnanediol might have been formed from precursors secreted by the adrenal cortex as a result of its stimulation via the anterior pituitary by the act of mating. To test this possibility, two ovariectomized female rabbits were each injected intravenously with 100  $\mu$ g. of a preparation of adrenocorticotrophin (Organon), 2.5  $\mu$ g. of which was stated to produce a 50% reduction in the adrenal ascorbic acid of 50% of hypophysectomized rats. This treatment did not raise the pregnanediol excretion of either rabbit above the very low 'blank' level. These experiments, although not absolutely conclusive, made it seem unlikely that the adrenal cortex could be the source of the pregnanediol.

In an attempt to determine whether the pregnanediol had arisen from the ovaries or from some extra-ovarian source, two ovariectomized female rabbits were mated after inducing oestrus by four successive daily intramuscular injections of 0.2 mg. oestradiol benzoate in oil. In neither case was the mating followed by any detectable excretion of pregnanediol. Since these large doses of oestrogens may have interfered with the mechanism leading to the production of the pregnanediol precursor, this finding was not entirely conclusive. However, it did suggest that the possibility of the pregnanediol arising from some precursor liberated by the ovary immediately after mating should be investigated. Accordingly, it was decided to examine the urine of female rabbits after injection of chorionic gonadotrophin.

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One hundred i.u. c.g. (International Standard preparation) were injected intravenously into one rabbit. During the following 48 hr. a total of 1 mg. pregnanediol was excreted in the urine. The animal was then killed and at autopsy four ruptured follicles were found in one ovary and five in the other. Two hundred i.u. of the same preparation of c.g. were injected into a second rabbit. During the following 24 hr. 3.8 mg. of pregnanediol were excreted in the urine. The animal was killed 36 hr. after the injection, and at autopsy five ruptured follicles were found in each ovary.

These findings suggest that the pregnanediol excreted by the female rabbit immediately after mating arises from a precursor, presumably progesterone, liberated from the ovary.

In this connexion it is interesting to recall that Boling & Blandau [1939], Astwood [1939] and Hisaw & Astwood [1942] have adduced evidence to suggest that progesterone may be secreted at the time of oestrus in the rat and the guinea-pig. Long & Evans [1922] described persistence of gravidal and non-gravidal corpora lutea during subsequent oestrous cycles in the rat, and luteal cells have been seen in preovulatory follicles in the cat [Dawson & Friedgood, 1940] and in the mouse [Allen, 1941]. Using induced growth of the ovipositor of the bitterling as a criterion, Duyvené de Wit [1938] found progesterone-like material in the follicular fluid in the sow and the cow.

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