Letters to the Editor

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Œstrogenic Hormone in the Urine of the Stallion

IN further investigations on the œstrogenic hormone, which to a large extent is excreted in the urine of the stallion[1], we have examined the influence of this hormone on the secondary sexual characteristics, especially on the mammary gland. By the use of follicular hormone, Laqueur was able to induce lactation of male guinea pigs. We have now observed the same effect with the hormone obtained from the urine of the stallion and in the actual cases the lactation of the male animals has continued for 21 days.

Another typical effect of the follicular hormone, the hyperpigmentation of the mamillæ and the areolæ of the nipples (Bloch and Schrafl), is also exhibited after the injection of the œstrogenic hormone of the urine of the stallion. These investigations show that all the *biological reactions which are characteristic of the follicular hormone are exhibited by the œstrogenic hormone of the urine of the stallion.*

How can the occurrence of so great a quantity of œstrogenic hormone in a male organism be explained ? I believe that the female hormone which is regularly present in the male organism represents a normal physiological product of the metabolism of the sex hormones, especially since—due to our present chemical knowledge (Butenandt, Marrian, Doisy)—a conversion of the male hormone into the female one appears to be quite possible. I am further of the following opinion : the metabolism of the sex hormones is, in the main, the same in both sexes. At first, the male sex hormone is synthesised from substances which are still unknown, and the male hormone is then converted into the female one. The specific sexual characterisation is solely due to a quantitative regulation of this general process of metabolism. In my opinion, the observations with male equines support this hypothesis from the biological point of view. From the fact that production of the female hormone in large quantities in the stallion occurs only during sexual maturity—when the male hormone is produced—it follows that there exists a connexion between the male and the female hormone. It is possible that in the testes of the stallion—as compared with other organisms—a very great production of male hormone occurs, and that this surplus of male hormone is immediately destroyed by converting it into female hormone and then rapidly excreting the latter. It is impossible to say why this hyperproduction is characteristic of equines. The fact that a not inconsiderable amount of male hormone is to be found in female animals, including women (Loewe, Tscherning), is also in harmony with this hypothesis.

The male hormone represents an intermediate product in the formation of the female one. The regular occurrence of female hormone in the male organism is explained as due to the conversion of part of the male hormone into the female one. In the female organism the male hormone is supposed to constitute a previous product of the female hormone and in the male organism the female hormone is supposed to constitute a degradation product of the male hormone. The dehydrogenation products which Girard has isolated from the urine of pregnant mares (equilin, hippulin and equilenin) do accordingly constitute the final products (which at the present time are known) of the degradation series of the male hormone.

Metabolism of sex hormones outside the sexual glands (extragonadial metabolism) can also occur and this has been the object of a joint communication of H. v. Euler and myself[2].

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[1] NATURE, **133**, 209, Feb. 10, 1934.
[2] *Scand. Archiv Physiol.*, **67**, 261 ; 1934.

A Rapid Test for the Diagnosis of Pregnancy

CURRENT biological tests for the diagnosis of pregnancy or detection of ovary-stimulating substances in gland extracts and body fluids have the main disadvantage that several days must elapse before a result can be obtained. Attempts have been made to remedy this by making use of the doe rabbit, because in this animal a response (ovulation) can be obtained in less than 14 hours[1]. The rabbit, however, requires a good deal of care in order to obtain consistent results. It is essential to know the previous history of does employed, and preferably only to use them a short time after parturition. Even so, variation in response to injection may be so great as to necessitate the use of more than one doe in order to be sure of the result.

The test described in the present note depends upon the observation by Hogben[2] that extraneous ovulation in the South African clawed toad (*Xenopus Lævis*) can be induced by injection of extracts of the anterior lobe of pituitary. *Xenopus* can be obtained easily and cheaply in large numbers. Several hundreds can be kept without difficulty at the sole cost of a few handfuls of raw meat once a week, provided that they are kept in a warm well-lit room and that their water is changed after feeding. Ovulation does not occur spontaneously in captivity. Ova shed as a result of injection are clearly visible and extruded in large numbers. No doubt exists, therefore, as to the validity of a response.

During the past two years, work has been carried out on the use of *Xenopus* for detecting and estimating ovary-stimulating substances in tissue extracts and body fluids such as pregnancy urine. The following main points have emerged[3].

(*a*) At a temperature of 20°–25° a single injection of an active preparation into the lymph sac is followed in the great majority of cases by complete ovulation within 9 hours. Very often a response is obtained in less than 6 hours.

(*b*) A given batch of toads can be used repeatedly, provided that a rest of at least one week is allowed to elapse between successive injections.

(*c*) A definite quantitative relationship holds between dosage and response.

As a result of the first observation, a test for early pregnancy has been elaborated, the exact procedure of which depends upon the time which has elapsed from the last missed menstrual period :—

(1) If one month or more has elapsed, untreated urine from the suspected case is used. Ten toads