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Gametokinetic Action of Extracts of Follicle-Stimulating Urine.*

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Injections of extracts of follicle-stimulating urine† in hypophysectomized males induce a marked proliferation and a maturation of the germ cells but do not affect the interstitial tissue of the testes or the accessory genital organs. This action has been shown in a series of experiments in male rats which were hypophysectomized when immature. In part of the series (immediate treatment) injections were begun at the time of hypophysectomy, in the other series (postponed treatments) a post-operative period of 7-40 days elapsed before beginning injections. Series of littermates were used. In the immediate treatments in each series there was a reference control (autopsied at the time of operation), usually an unoperated control (killed at the termination of the experiment) and one or more rats injected with F.-S.U. extract, P.U. extract,‡ and a mixture of these two extracts. In the postponed injections, 1 testis was ablated from each animal before beginning the various treatments.

Immediate Treatments. Five series, 19 hypophysectomized immature rats, age at operation 26-42 days. Duration of treatment 14-25 days. In every case the injection of F.-S.U. extract caused a marked proliferation of the germ cells. In certain of the tubules the secondary spermatocytes appear not to be normal, however, having vacuolated signet-ring nuclei. In the animals hypophysectomized at the younger ages, spermatids, and in the older ages, spermatozoa, were formed. Some of the latter were motile. In no case did the interstitial cells show hypertrophy and the accessory genital organs remained infantile in type.

In the combined injections (F.-S.U. + P.U.) sperm formation was increased over the F.-S.U. treatment alone. There was some, though not a marked response of the interstitial cells and the ac-

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† The urine was collected from women past the menopause or after ovariectomy. An abbreviation of F.-S.U. is used for this follicle-stimulating urine which seems not inappropriate since pregnancy urine is commonly designated as P.U.

‡ Antuitrin S was used as the P.U. extract. Thanks are expressed to Dr. Kamm for this material.

cessories were greatly enlarged. In both types of treatment in the younger animals the testes show a marked increase in size.

Postponed Injections. Five series, 16 hypophysectomized immature rats. Both the F.-S.U. and the combined treatments caused a marked proliferation of the germ cells. The reparative effect on the tubules was somewhat greater in the combined treatments than when F.-S.U. only was injected. In both types of treatments as well as with P.U. extract injections the testes increase markedly in size.

The interstitial tissue of the testes remained atrophied in the F.-S.U. treatments and the accessory genital organs were of the hypophysectomized (castrate) type. In the combined injections there was an interstitial tissue response and the accessories enlarged. The interstitial cell response is still greater when P.U. extract, only, was injected. These observations offer strong evidence that the interstitial cells, only, secrete the male sex hormone.

These series of experiments show clearly that follicle-stimulating urinary extracts have an action only on the germ cells in males. There is no reparative effect on adrenals, thyroids, or body growth.

These findings are in harmony with those secured in hypophysectomized female rats. In them, treatment with F.-S.U. extract causes a maturation of ova and a proliferation of their genetic line of cells—the granulosa—which results in the formation of follicles with but little or no thecal response. P.U. extract, on the other hand, does not induce follicular growth but a marked hypertrophy of the interstitial tissue and theca and occasionally luteinization when the granulosa is sufficiently developed.

Both extracts cause oestrin secretion, whereas F.-S.U. extract does not stimulate secretion of male sex hormone.