48. *Effect of Ovarian Androgen on Mouse Adrenal.*

By Kiyoshi TAKEWAKI.

Zoological Institute, Faculty of Science, Tokyo Imperial University.

(Comm. by N. YATSU, M.I.A., June 12, 1939.)

It is now a well established fact that the zona reticularis of the adrenal cortex of normal or gonadectomized mice of whichever sex is inhibited by various androgenic substances (Martin, 1930 ; Poll, 1933 ; Cramer and Horning, 1937 ; Deanesly and Parkes, 1937 ; Takewaki, 1938 ; Starkey and Schmidt, 1938).

Hill (1937 a) found that the mouse ovaries transplanted in the ears can produce an androgen and restore the atrophied accessories of castrated male mice to normal. I thought it would be of great interest to see how the ovarian androgen works on the adrenal cortex, in the face of the fact suggested by Hill and Strong (1938) that the androgens discharged from the male and female gonads may be two entirely different substances.

Seventeen male mice about a month old were castrated and in each of them about one half of an ovary from a litter-sister was transplanted in the ear of either side by the technique described by Hill (1937 a). At 86-112 days after the operation the animals were offered and after examining the accessories *in situ* the grafts, adrenals and accessories were fixed with Bouin's solution for histologic study. Since Hill (1937 b) reported that the androgen secretion of ovarian grafts could be enhanced by subjecting the grafts to low temperature, my experiments were carried out in the cold season, October, 1938 to March, 1939. In the course of the experimentation the room temperature varied from 5° to 17° C.

Of the 17 transplanted animals the ovarian grafts were found in 14 cases at the time of autopsy. The grafts somewhat resembled the ovaries sterilized with X-rays (Brambell and Parkes, 1927) and excepting a few small follicles neither healthy follicles nor corpora lutea were present (fig. 2, 3). The tissues composing the grafts consisted chiefly of the lutein-like cells (fig. 4) but cells still retaining the characters of the granulosa cells were also met with. The vascularization of the grafts was well established.

In four animals the accessories had become practically normal indicating the androgenic activity of the transplanted ovaries. The zona reticularis of the adrenal cortex had completely disappeared in these animals and the adrenal medulla was surrounded by a definite medullary membrane. In all the other animals the accessories were atrophic and the zona reticularis was present in the adrenals, although in some the zone was more or less vacuolated (fig. 5, 6). In the controls castrated but receiving no grafts in the ear (6 cases) the zone was also well developed.

It has been pointed out by Hill (1937 a) that the ovarian grafts in the ear also secrete oestrous hormone. But the zona reticularis was

- Fig. 1. Adrenal of castrated male mouse with ovarian graft in ear. Accessories well developed. $\times 55$
- Fig. 2. Ovarian graft in ear. A primary follicle and a cavity containing blood are seen. $\times 55$
- Fig. 3. Ovarian graft in ear. $\times 55$
- Fig. 4. The same ovarian graft shown in fig. 3 highly magnified. $\times 270$
- Fig. 5. Adrenal of castrated male mouse with ovarian graft in ear. Accessories atrophic. Zona reticularis well developed. $\times 55$
- Fig. 6. Adrenal of castrated male mouse with ovarian graft in ear. Accessories atrophic. Zona reticularis slightly vacuolated. $\times 55$

completely obliterated only in the animals in which the male accessories were well developed. Moreover in fifteen castrated mice about a month old the subcutaneous transplantation of ovaries was made. At autopsy performed at 89-93 days after the operation the well developed grafts were found in 13 cases. The accessories were, however, always in an atrophic condition. In the adrenals the zona reticularis was present, although slight degenerative changes due probably to the effect of oestrogen from the grafts were often recognized. From these results it may be concluded that the androgenic substance produced from the ovary grafted in the ear suppresses the zona reticularis in the castrated mice.

So far I failed to annihilate the zona reticularis in the spayed females with ovarian grafts in the ear (16 cases), although the full oestrous vaginal reaction was obtained in them.

References.

- Brambell, F. W. R. and A. S. Parkes *Proc. Roy. Soc. Lond., B.*, **101** (1927), 316.
Cramer, W. and E. S. Horning *Lancet*, **1** (1937), 1330.
Deanesly, R. and A. S. Parkes *Quart. J. Exp. Physiol.*, **26** (1937), 393.
Hill, R. T. *Endocrinology*, **21** (1937 a), 495.
——— *Endocrinology*, **21** (1937 b), 633.
Hill, R. T. and M. T. Strong *Endocrinology*, **22** (1938), 663.
Martin, S. J. *Proc. Soc. Exp. Biol. and Med.*, **28** (1930), 41.
Poll, H. *Deutsch. med. Wschr.*, **59** (1933 a), 567.
——— *Anat. Anz.*, **77** (1933 b), 113.
Starkey, W. F. and E. C. H. Schmidt, Jr. *Endocrinology*, **23** (1938), 339.
Takewaki, K. *Proc.*, **14** (1938), 152.
-