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Function of Pituitary Grafts in Mice.*

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It is only very recently that anterior pituitary tissue has been successfully grafted. Hohlweg and Junkmann,¹ Gardner and Hill,² and Haterius, Schweizer, and Charipper³ have all obtained viable grafts with varying success. May⁴ cited a slight increase in body size and a repair of the testes as evidence of function in 2 hypophysectomized rats bearing intraocular pituitary implants obtained from new-born rats.

In the mouse a genetical uniformity of host and donor is necessary for successful intra-testicular grafts of pituitary tissue (Strong⁵). Will the anterior lobe become functional when implanted in the testis where pressure is slight and vascularization of the graft normal? A large amount of data has been collected which very definitely establishes function of such grafts.

Brief notes on only 2 representative cases are here presented. Intra-testicular grafts become well established and vascularized within 3 weeks. Grafts which have been in the host animal for shorter periods have not been examined. Mouse 103 received an intra-testicular graft of a sister pituitary when 50 days old. The animal was hypophysectomized at 73 days of age and was killed 120 days later. The mouse ejaculated when killed with gas just as many normal male mice do. The seminal vesicles were of normal size and were filled with secretion. The testes were normal in size, and pituitary tissue could not be observed macroscopically in the sella. Serial sections of the sella showed a very tiny cluster

*This investigation has been supported, in part, by the Fluid Research Funds of the Yale University School of Medicine. Mice of intensively inbred strains were supplied by Dr. L. C. Strong.

†Further support has been given by the Committee for Research in Problems of Sex of the National Research Council through grants made to Professor Edgar Allen.

¹ Hohlweg, W., and Junkmann, *Klin. Wchnschr.*, 1932, **11**, 321.

² Gardner, W. U., and Hill, R. T., *Proc. Soc. Exp. Biol. and Med.*, 1935, **32**, 1382.

³ Haterius, H. O., Schweizer, M., and Charipper, H. A., *Endocrinology*, 1935, **19**, 673.

⁴ May, R. M., *C. B. Soc. d. Biol.*, 1935, **12**, 867.

⁵ Strong, L. C., unpublished data.

of pituitary cells. The fragment, measuring not more than 1.5% of the volume of a normal mouse pituitary, consisted largely of intermediate and posterior lobe tissue. Such a small piece of pars anterior did not maintain the gonads of controls and other experimental animals. Our data show that somewhat more than 5% of the anterior lobe (exclusive of posterior and intermediate lobes) must be left in the sella in order to maintain the gonads. Such animals may be, therefore, considered as physiologically hypophysectomized as sexual activity and adrenal cortex are not maintained normally.

The tubules of the epididymis contained large numbers of sperm. The majority of the seminiferous tubules were normal in spermatogenic function, though possibly somewhat reduced in diameter, measuring an average of 190 micra. The tubules of an untreated hypophysectomized mouse (4 months) measure from 95-120 micra in cross section, those of a normal mouse being about 200 micra. The amount and structure of the interstitial tissue was normal. Interstitial cell function was indicated by the fact that the seminal vesicles had a normal epithelial lining and contained a large amount of secretion. The zona fasciculata of adrenal cortex had not atrophied.

Mouse 124 was hypophysectomized at 40 days of age, and 43 days later the pituitary and an ovary from a sister were grafted in the right testis. One seminal vesicle was removed at this time. The animal was killed 4½ months later and good ovarian and hypophyseal grafts recovered. The rudimentary male mammary glands had grown many branched ducts as a result of function of the ovarian graft. Many testis tubules contained large numbers of sperm. The remaining seminal vesicle contained some secretion and was not greatly different from the control specimen removed at biopsy. The adrenal cortex had not undergone atrophy. Only 2.8% of the pituitary remained in place, and here again the fragment was made up of anterior, intermediate, and posterior lobes. These 2 cases show that a grafted female pituitary is able to maintain normal testes, or to restore the degenerate testes of hypophysectomized animals. The female pituitary causes testicular interstitial tissue to function normally in some cases, and at the same time supports the growth and function of a grafted ovary.