

ing leukopenia, with or without an eosinophilia, which, if present, is most pronounced about the end of the prepatent period. From about the 40th day there is an excess of euglobulin in the blood plasma. Moderate to late clinical cases usually give a positive precipitation test for serum globulin. The total erythrocyte counts are little altered in experimental and clinical cases, but there is definite evidence of regeneration of these cells, as indicated by a hyperplastic bone marrow and an increased reticulocyte count.

7178 P

Functional Capacities of Ovaries of New-born after Transplantation into Adult Ovariectomized Rats.*

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Smith and Engle¹ pointed out that in mice more than 10 days old, sexual maturity may be induced by hypophysis transplants, but at this early date 5 daily transplants are required. After the 17th day 2 or 3 daily transplants are sufficient. Hill² has shown that this age difference holds for injections of pregnancy urine. However, the ovary of the new-born rat responds neither to the amount required for the 15-20-day-old rat nor to a much higher dosage (Wiesner³ and Pfeiffer, unpublished work). It remained to be tested how early the ovary of the new-born might mature if it were subjected to gonadotrophic hormones from the time of birth. This could be done by injections. However, if the ovaries are transplanted into an adult female at the time of castration, they will be supplied with a constant, or possibly a steadily increasing amount of anterior pituitary hormone.

Young, healthy, mature female rats whose cycles had been followed for some time previous to the operation were used for hosts. The ovaries were obtained from new-born young and one ovary was transplanted under the dorsal surface of each kidney of the host, on which bilateral ovariectomy was performed at the time of implanta-

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¹ Smith, P. E., and Engle, E. T., *Am. J. Anat.*, 1927, **40**, 159.

² Hill, Margaret, *J. Physiol.*, 1932, **75**, 44.

³ Wiesner, B. P., *J. Physiol.*, 1932, **75**, 39P.

tion. Seven animals were used and the grafting was successful in 5 cases. The changes in the ovary were followed by daily vaginal smears which also indicated the extent to which the immature ovary was able to fulfill the endocrine functions of the adult ovary. After $4\frac{1}{2}$ to $8\frac{1}{2}$ months the grafts and the hypophyses were removed, sectioned, and studied, in order to correlate the oestrus condition with the histological structure in the ovary and in the hypophysis. Proof that no regeneration of the ovaries had taken place was obtained by a study of sections through the region of the ovarian stalk and by comparison with a series of control castrates.

Following ovariectomy the cycles immediately cease, but if the graft takes, they reappear after 12 to 16 days. The return of sexual activity begins with a rather long oestrus stage of 5 to 8 days which is followed by fairly regular but usually slightly prolonged cycles. The average duration of the cycles is $5\frac{1}{2}$ to 6 days instead of the usual 4 to $4\frac{1}{2}$ days. The lengthening occurs either in the cornified or the leucocyte stage, extending to 10 days in a few cases. The oestrus cycles of one of the rats were as regular as those of the controls except that they were consistently of $5\frac{1}{2}$ day intervals. The cycles of a second animal ceased after a short time and biopsy showed only one graft, which was also undergoing degeneration. A third animal, after about 3 months of cyclic function, ran constant oestrus until autopsy 4 weeks later.

The ovarian grafts are quite large due to large cystic follicles, which in some cases are 1.5 cm. in diameter. This indicates that ovulation does not take place. The walls of the large cystic follicles are composed of connective tissue rather than follicle cells. Only a few ripening follicles and a few remnants of corpora lutea are found, yet some of the hosts show fairly normal cycles even in the absence of both ripe follicles and corpora lutea. As shown by Levine and Witschi⁴ the absence of follicles does not necessarily preclude cyclic function. Therefore, the follicles are evidently not the only factors which bring about oestrus. Since corpora lutea may be absent, it is apparent that they are not necessary for the return to dioestrus.

In one animal, autopsied after 4 weeks of constant oestrus, the graft contained several cystic follicles and a nearly full grown follicle in which was found a degenerating ovum with a first maturation spindle. Castillo⁵ has reported that ripe follicles and corpora

⁴ Levine, W. T., and Witschi, E., *PROC. SOC. EXP. BIOL. AND MED.*, 1933, **30**, 1152.

⁵ del Castillo, E. B., *Compt. Rend. Soc. Biol.*, 1932, **109**, 331.

lutea are found in ovarian grafts (immature ovaries) in castrate females but that there is "no tumultuous initiation of cycles and the grafts have only a short duration." In the present experiment the grafts were able to maintain the cyclic functions for $8\frac{1}{2}$ months, at which time the animals were autopsied.

In only one case did the influence of the graft completely prevent formation of castrate cells in the hypophysis. In fact, in the animal which had been in constant oestrus for some time before autopsy, the hypophysis showed quite a large number of castrate cells. Haterius and Nelson⁶ have shown that the mature ovarian graft is able to bring back the normal histological picture in the hypophysis of the male as well as in the female. However, our results show that the grafts of the ovary of the new-born do not as a rule maintain the normal condition of the hypophysis, even though they do maintain the cyclic changes in the genital system. The secondary sex characters are maintained, and the animals show varying amounts of sexual drive. They copulate quite frequently at the beginning of the cornified cell stage.

It is concluded from this experiment that the ovary of the new-born rat matures under the influence of the adult (castrate) hypophysis within 12 to 16 days, after which time it is able to maintain the cyclic changes in the genital system. However, due to the abnormal conditions of the transplantation, the ovary is able neither to ovulate, nor to insure maintenance of the normal histological picture of the hypophysis. Ripe follicles and corpora lutea are not indispensable to cyclic function of the ovary.

7179 C

Observations Upon Refractory Period of Auricular Extrasystoles in the Mammalian Heart.

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By means of an adaptation of the method reported by Andrus and Carter,¹ the authors have determined the refractory period of

⁶ Haterius, H. O., and Nelson, W. O., *J. Exp. Zool.*, 1932, **61**, 175.

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¹ Andrus, E. Cowles, and Edward P. Carter, *J. Exp. Med.*, 1930, **51**, 357.