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OVARIAN FOLLICULAR DEVELOPMENT IN THE IMMATURE GUINEA PIG

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Ovarian follicular development in the immature guinea pig has been described previously by BOOKHOUT (1945) and DEANESLY (1972), but in these reports no correlation was made between growth of antral follicles and other parameters of sexual development, such as uterine weight, vaginal histology, oestrogen secretion or plasma gonadotrophin levels. The changes in plasma concentrations of luteinizing hormone and follicle stimulating hormone in the pre-pubertal guinea pig have been reported by DONOVAN *et al.* (1975 *a*, *b*).

The present work describes a numerical analysis of the sequence of follicular development in the immature guinea pig. Ovaries of immature guinea pigs, selected from animals well within the normal weight range found at each age, were serially sectioned and stained with Ehrlich's haematoxylin and eosin. Each tenth section was examined under the microscope, and the diameters were measured of all the antral follicles where the plane of section passed through the oocyte. Follicles were subdivided into 6 types : healthy antral follicles (AF), follicles with hypertrophied granulosa cells, « early » (A_1), « intermediate » (A_2) and « late » (A_3) atretic follicles, and follicles which had atretic oocytes (A_0). Four individual animals were examined at each stage of development (days 0, 10, 15, 20, day 1 of vaginal opening, and day 3 of the first oestrous cycle).

A few antral follicles were found in animals on the day of birth (14.7 $\pm$ 3.4), but the number had increased markedly by days 10 (118.5 $\pm$ 15.4) and 15 (171.0 $\pm$ 18.8). The total number of antral follicles increased only slowly after day 15 being 160.5 $\pm$ 37.4, 253.2 $\pm$ 18.9 and 206.5 $\pm$ 23.2 on days 20, day 1 of vaginal opening, and day 3 of the first cycle, respectively. The maximum diameter of antral follicles increased from 284 μm at day 0, to 570 μm at day 15 and 1045 μm at the first day of vaginal opening. Follicles with hypertrophied granulosa cells (' pre-ovulatory follicles '), were first encountered on the first day of vaginal opening.

Atretic follicles were not detected in the ovaries of immature guinea pigs

until day 15, when they represented less than 1 p. 100 of the total number of follicles present. By day 20, the incidence of atretic follicles had increased to 19.6 ± 5.7 p. 100, and 14.2 ± 3.6 p. 100 of the total number of follicles were of the A_1 type. By the first day of vaginal opening, the proportion of atretic follicles had further increased to 39.5 ± 5.1 p. 100, while the proportion of A_1 type follicles was now 10.7 ± 2.5 p. 100 of the total follicles, and the proportion of A_3 type was 19.1 ± 1.6 p. 100 of the total follicle count.

The initiation of follicular atresia corresponds closely with body weight and age, occuring only in animals heavier than 155 g body weight at 15 days of age. The increase in the incidence of atresia and appearance of A_3 type follicles, preceedes the pre-pubertal uterine growth spurt, and hypertrophy of vaginal epithelium, which occur at 220-240 g body weight, and culminate in vaginal opening at 258.0 ± 20.9 g, at 25,3 ± 1.4 days of age.

DONOVAN *et al.* (1975 *a*, *b*) did not detect any significant changes in mean levels of plasma gonadotrophins in immature female guinea pigs after birth, whereas they did record relatively high levels of gonadotrophins in the blood to foetal female guinea pigs. It is possible, therefore, that the high levels of gonadotrophin before birth may entrain subsequent follicular growth and atresia, or that follicular sensitivity to endogenous gonadotrophin alters during maturation.

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RÉSUMÉ

DÉVELOPPEMENT DES FOLLICULES DANS L'OVAIRE DE COBAYE IMMATURE

Les follicules à antrum, rares à la naissance, augmentent en taille et en nombre au cours des 15 premiers jours après la naissance, et on ne voit pas de follicules atrétiques avant 15-20 jours. La croissance des follicules peut être mise en relation avec l'hypertrophie vaginale et utérine, mais pas avec les changements du niveau des gonadotropines dans le plasma.

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