SERUM CONCENTRATIONS OF FOLLICLE-STIMULATING HORMONE AND LUTEINIZING HORMONE AFTER UNILATERAL OVARIECTOMY IN THE ADULT RAT

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In the rat, unilateral ovariectomy (ULO) performed at dioestrus 2 results in compensatory follicular growth within 24 h (Welschen, 1972). Furthermore, compensatory follicular growth seems to require increased gonadotrophin levels (Greenwald, 1968; Welschen, 1972). Benson, Sorrentino & Evans (1969) and Peppler (1972), using bioassay methods, detected changes in serum gonadotrophin levels 1–4 days after ULO. However, on the basis of the follicular response, more acute changes might be expected. Therefore, it seemed of interest to measure gonadotrophin levels at short intervals after ULO.

Wistar rats (180–200 g), which had had at least three consecutive 5-day cycles, were used. ULO or sham-operation was performed under ether anaesthesia at oestrus (12.00 h) or at dioestrus 2 (12.00 h). The rats were bled and killed after a postoperative period of 0–96 h. Blood was obtained under ether anaesthesia by puncture of the ophthalmic venous plexus and was allowed to clot overnight in a refrigerator before centrifugation. Serum was stored at −20 °C until assayed. Concentrations of follicle-stimulating hormone (FSH) and luteinizing hormone (LH) were estimated in duplicate by double antibody radioimmunoassays using a micro-modification and antibodies raised in rabbits against NIH–FSH–S9 and NIH–LH–S17 (kindly supplied by NIAMD, Bethesda, Md., U.S.A.). Details of the method are described elsewhere (Welschen, Osman, Dullaart, de Gref, Uilenbroek & de Jong, 1975). Data are expressed in terms of NIAMD-rat-FSH/LH–RP1 Standards. The results (Fig. 1) show a significant rise in FSH levels already at 5 h after ULO regardless of whether ULO was performed at oestrus or at dioestrus 2. Periovulatory values (about 300 ng/ml) were reached. Levels returned to control values at 16 to 24 h after operation. Concentrations of LH showed large individual differences, and tended to be higher shortly after ULO. However, significant increases were only found at 72 h after ULO at oestrus and at 24 h after ULO at dioestrus 2.

Recently, Howland & Skinner (1973) and Ramirez & Sawyer (1974) also reported on changes in concentrations of radioimmunoassayable FSH and LH after ULO. Howland & Skinner, measuring daily, found increased FSH levels at day 1, but not at days 2 and 3 after operation, whereas Ramirez & Sawyer, measuring every 12 h, found sharply increased FSH levels at 12 and 24 h after operation, but not at later times. Both studies indicate that LH levels were slightly increased at 12–24 h after ULO. The data available at present show that FSH levels are increased to peri-
Fig. 1. Concentrations of FSH and LH in serum of unilaterally ovariectomized rats. Values are means ± s.e.m. White columns represent values in unilaterally ovariectomized animals, hatched columns those in sham-operated animals. *Significantly different from controls (Wilcoxon's two sample test was used; a difference was considered significant if the double-tailed probability was < 0.05).

ovulatory values already at 5 h after ULO, thus preceding compensatory follicular growth. At that time LH levels might show a marginal increase only. Therefore, it seems reasonable to suggest that compensatory follicular growth after ULO is initiated by a sharp increase of serum FSH levels. (This study was supported in part by the Organization of Medical Research in the Netherlands (FUNGO).)

REFERENCES