INSENSITIVITY OF THE AUTOTRANSPLANTED OVARY OF THE EWE TO OVINE LUTEINIZING HORMONE

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Studies of progesterone secretion from the autotransplanted ovary of the ewe have shown the response to luteinizing hormone (LH) infusion to be small, short-lived and variable (McCracken, Uno, Goding, Ichikawa & Baird, 1969; Collett, Land & Baird, 1973). It was suggested that the response might be related to the pregnant mare serum gonadotrophin treatment and/or the age of the luteal tissue (Collett et al. 1973).

The sensitivity of young spontaneous corpora lutea was studied in two Merino ewes with transplanted ovaries. Infusion of substances into the ovarian artery, the collection of ovarian venous blood, and the measurement of progesterone have been described (Collett et al. 1973). The maintained corpora lutea were regressed by the infusion of prostaglandin F$_2$α (PG) into the ovarian artery (44 µg/h for 3-5 h) (McCracken, Glew & Scaramuzzi, 1970). Progesterone secretion fell below 0-01 µg/min 24 h after the start of the infusion. One ewe showed oestrus, and the other was presumed to have ovulated ‘silently’, a common occurrence in this flock of Merinos (Wheeler & Land, 1973).

Ovaries of both ewes were secreting about 2 µg progesterone/min 11 and 12 days after PG infusion. Three doses (10, 100 and 1000 µg) of NIH-LH-S14 were infused into the ovarian artery for periods of 1 h, each preceded by a control infusion of saline for 1 h. These infusions were repeated about 35 days later. The mean blood flow and progesterone secretion rates during the first control period were 24-9 ml/min and 1-98 µg/min for ewe A and 13-4 ml/min and 2-06 µg/min for ewe B on days 11 and 12. The equivalent figures 35 days later were 18-9 ml/min and 2-01 µg/min, and 12-3 ml/min and 4-62 µg/min for ewes A and B respectively.

The progesterone secretion rate for each sample was expressed as a percentage of the mean of the first six control samples, and the individual and average percentage values for the two ewes plotted in Fig. 1. On the first occasion the response was very small, the secretion rate during all infusion periods being 7% (P < 0-05) and 11% (P > 0-05) above that of all control periods in the two ewes. The increase was higher (P < 0-05) for only one of the six LH infusion periods. The average increases found 1 month later were 30 (P < 0-01) and 15% (P < 0-01), over twice as great. Furthermore, they were higher (P < 0-05) in three out of the six periods.

It is concluded that progesterone secretion by the new spontaneously formed corpus luteum which has not been pretreated with gonadotrophins is little affected

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Fig. 1. The mean (solid line) and individual progesterone secretion rate (% of the first control period) after infusion of 10, 100 and 1000 µg luteinizing hormone/h (i) 11 or 12 and (ii) 46 or 48 days after luteal regression, together with the 95% fiducial limits of the first control period (broken lines). Significant changes ($P < 0.05$) relative to the previous control periods are marked for each sheep A (x) or B (●).

by large doses of LH, indicating that the corpora lutea of the oestrous cycle are secreting at a maximum. The increase in sensitivity between the two series of infusions may be related to their age, for autotransplantation to the neck has been shown to cause luteal maintenance (McCracken, Baird & Goding, 1971), but sensitization by the first series of infusions cannot be excluded.

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