SIMULTANEOUS DETERMINATION OF LUTEINIZING HORMONE AND LUTEINIZING HORMONE RELEASING HORMONE IN THE JUGULAR VENOUS BLOOD OF THE SHEEP AT OESTRUS

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The occurrence of a peak of luteinizing hormone (LH) in the peripheral blood of the sheep within the first 16 h of oestrus is well established (Geschwind & Dewey, 1968; Niswender, Roche, Foster & Midgley, 1968; Goding, Catt, Brown, Kaltenbach, Cumming & Mole, 1969). Changes in the LH releasing hormone (LH-RH) content of the hypothalamus have been correlated with the occurrence of the plasma LH peak and the accompanying decline in pituitary LH content (Crighton, Hartley & Lamming, 1973). Using a radioimmunoassay for LH-RH, Kerdelhué & Jutisz (1972) detected increases in plasma LH-RH content in one ewe 2 days before the LH peak and again from 1 h before the start of the LH peak to 8 h after its end. The present report describes the simultaneous determination of LH and LH-RH in samples taken at frequent intervals from onset of oestrus in the sheep.

Serial blood samples (2.5 ml) were taken from an indwelling jugular vein cannula at 15-min intervals for 18 h after the onset of oestrus in two Clun Forest ewes. The precise onset of oestrus was established by constant observation for mounting by a vasectomized ram which was removed once oestrus was observed. Plasma samples were stored at –20 °C until assayed. Both ewes were subjected to laparotomy 3 days later, and in both the ovaries showed recent ovulation. Aliquots of the plasma samples were assayed for LH using a specific double antibody radioimmunoassay (Crighton & Foster, 1972). Further aliquots were assayed for LH-RH using a specific radioimmunoassay described elsewhere (Jeffcoate, Fraser, Gunn & Holland, 1973; Jeffcoate, Fraser, Holland & Gunn, 1973). Methanol extracts of plasma were dissolved in assay buffer and assayed against standard synthetic LH-RH (Hoechst).

The results are shown in Fig. 1; LH peaks typical of oestrus were observed. The concentrations rose from baseline levels of 3–18 ng/ml to peaks of 250 and 236 ng/ml, the duration of the increased hormone level being about 10 h in each case. The LH-RH levels increased intermittently from less than 10 pg/ml to peaks ranging from several hundred pg/ml to > 10 ng/ml. These peaks occurred at 1.5- to 6-h intervals.
and rapidly fell to very low or undetectable values in the next sample taken 15 min later. This fall is due in part to the dilution of jugular venous blood in the general circulation and in part to the rapid clearance of LH-RH (T_1/2 about 5 min in the sheep, unpublished observation).

![Graph]

Fig. 1. Luteinizing hormone (LH) (●—●) and luteinizing hormone releasing hormone (LH-RH) (○—○) concentrations in jugular venous blood of two ewes at oestrus.

The finding of increases in plasma LH-RH has also been made in the rat on the afternoon of pro-oestrus (Fraser, Jeffcoate, Holland & Gunn, 1973) but our results differ from the pattern described by Kerdelhué & Jutisz (1972) in the ewe.

REFERENCES