THE CONCENTRATIONS OF ADRENOCORTICO-TROPHIN, VASOPRESSIN AND OXYTOCIN IN THE FOETAL AND MATERNAL PLASMA OF THE SHEEP IN THE LATTER HALF OF GESTATION

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Pregnant ewes bearing foetuses aged 80–143 days were anaesthetized by the spinal administration of procaine. The foetus was exteriorized by Caesarian section and amniotic and allantoic fluid samples were removed. Heparinized blood samples were obtained simultaneously from the mother (dorsalis pedis artery) and foetus (umbilical artery) within 15 min of inducing spinal anaesthesia. Plasma was separated immediately at 4 °C and stored at −15 °C.

Adrenocorticotrophin (ACTH) was determined by radioimmunoassay (Landon & Greenwood, 1968) after preliminary extraction (Ratcliffe & Edwards, 1970). Anti-diuretic activity was assayed as described by Forsling, Jones & Lee (1968). The active material in selected plasma samples was identified as arginine vasopressin (AVP) by its lability to thioglycollate (Ames, Moore & van Dyke, 1950) and tyrosinase (Bisset, 1962), and by radioimmunoassay for AVP (Edwards, Chard, Kitau & Forsling, 1970). Oxytocin was determined by radioimmunoassay (Chard, Boyd, Forsling, McNeilly & Landon, 1970); the foetal fluids were extracted with porous glass.

A wide range of ACTH concentrations was found in the maternal plasma. There was no correlation between the foetal values and the maternal, indicating that there must be little or no placental transfer of ACTH. Foetuses of 107 days or less had no detectable ACTH (Table 1).

AVP was present in very variable quantities in the maternal plasma. As with ACTH, there appeared to be little or no placental transfer. No AVP was detected in the foetuses of 101 days or less but appreciable quantities were present in some of the older foetuses. There was no clear correlation between AVP and ACTH concentrations either in the mother or foetus. Small quantities of oxytocin were found in the plasma of two of the mothers and one foetus. Amniotic and allantoic fluids contained at most only very low concentrations of ACTH, AVP and oxytocin.

The presence of AVP and ACTH in foetal plasma provides evidence that the posterior and anterior pituitary are functional in the sheep foetus. The higher levels of ACTH in older foetuses indicate either (a) that the concentrations in utero are higher, agreeing with the adrenal growth curve of the foetal adrenals
readily evoked by stress in the older foetus. The results are consistent with the possibility that foetal ACTH is involved in the onset of parturition in sheep (Liggins, 1969).

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REFERENCES


