

EFFECTS OF PROGESTERONE ON PLASMA CONSTITUENTS IN NON-PREGNANT EWES

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Some metabolic changes observed during pregnancy have been reproduced by administering progesterone (PROG) to non-pregnant ewes. For example, Samad and Ford (1981) reported increased glucose recycling in ovariectomised ewes given subcutaneous implants of PROG. Similarly, Wilson (1984) also reported increased propionate production and increased glucose production from propionate in anoestrous ewes bearing intravaginal pessaries containing PROG analogue. In the study reported here effects of exogenous PROG on metabolite/hormone concentrations in non-pregnant ewes were examined. In late autumn, four ewes received continuous intravenous infusions of either control (CONT) or PROG (42±3 mg/d) solutions. Each solution was infused for 2 days and on the second day of each period blood samples were collected. Mean values for parameters measured are shown in the Table.

	CONT	PROG		CONT	PROG
plasma glucose (mM)	2.89	3.24**	blood acetate (mM)	1.29	1.16
plasma α-amino N (mg/ml)	5.17	5.24	blood βOHB (mM)	0.76	0.60
plasma urea (mM)	5.90	6.02	plasma FFA (μM)	204	197
plasma insulin (mU/l)	31.7	31.7	plasma GH (μg/l)	2.02	1.99
plasma progesterone (μg/l)	2.6	6.1*			

for individual parameters, values differing significantly - *P<0.05; **P<0.01

The rate of PROG infusion approximated PROG production in the pregnant ewe and plasma concentrations were increased more than two fold. Glucose concentration increased by 12% during PROG infusion which is consistent with the observations of Samad and Ford (1981).

In man, PROG treatment results in a reduction in amino acid concentration (Landau and Lugibihl 1961). The present results indicate that PROG does not exert similar effects in sheep since concentrations of α-amino N and urea were not affected by PROG infusion. There is evidence that PROG stimulates insulin secretion in the rat (Ashby et al. 1981). Further, increased concentrations of insulin have been measured in late pregnancy in rats (Sutter-Dub et al. 1973). Although PROG increases during pregnancy, glucose levels are not depressed suggesting that PROG antagonises the effects of insulin (Sutter-Dub et al. 1973). In the present study, insulin was not affected by PROG infusion despite an increase in glucose. This observation is consistent with PROG inhibiting insulin secretion in the ewe. Blood acetate and 3-hydroxy-butyrate (βOHB) and plasma free fatty acids (FFA) were not altered by PROG.

It is unlikely that intermediary metabolism during pregnancy is controlled by the action of a single hormone hence it is not surprising that it was not possible to reproduce metabolic changes occurring during pregnancy by infusion of PROG.

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