

METABOLIC EFFECTS OF PLACENTAL LACTOGEN IN SHEEP

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There has been speculation that in humans placental lactogen (PL) regulates maternal metabolism to ensure an adequate supply of glucose for the foetus. More specifically, it appears that PL is lipolytic and exerts 'anti-insulin' effects leading to increased plasma non-esterified fatty acids (NEFA), promotion of proteolysis and gluconeogenesis (see Grumbach et al. 1973). Recent studies have provided circumstantial evidence for similar effects of PL in goats (Hayden et al. 1980) and sheep (Oddy and Jenkin 1981). We report here results of a preliminary study designed to determine whether ovine PL exerts metabolic effects in sheep.

Four non-pregnant, non-lactating Masham ewes (ca 80 kg liveweight) were housed in metabolism cages and fed to calculated requirements. They were fitted with indwelling catheters in both jugular veins and received continuous infusions of either saline or ovine PL in saline (ca 500 µg/h) during periods of 36 h one week apart. The preparation of ovine PL was isolated using the procedures described by Chan et al. (1976). Measurements were made of plasma insulin (INS), PL, glucose, urea and NEFA and whole body irreversible losses of glucose, urea and NEFA. Results are presented in Table 1.

Table 1. Plasma hormones, metabolites and irreversible losses of metabolites during infusion of saline (n = 4) or PL (n = 3). Values for individual parameters which differ significantly are indicated -
* p < 0.1; ** p < 0.05.

Infused with	Insulin µU/ml	PL ng/ml	Glucose		Urea	NEFA		
			mM	mmoles/min	mM	µmoles/min	µM	µmoles/min
Saline	45.2	0	3.88	1.08	4.67	671	219	515
PL	52.8	41.4**	4.24	1.21	5.18	645	292*	735*

The above data are consistent with ~~PL~~ regulating metabolism to spare glucose utilisation. Plasma concentrations of NEFA and irreversible loss of NEFA increased significantly (P < 0.1) during infusion of PL and there was a consistent, but not significant (P > 0.1), increase in plasma glucose concentration.

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