

PLASMA TRIGLYCERIDE METABOLISM IN LACTATING EWES AND GROWING CALVES
TREATED WITH GROWTH HORMONE

P. NIUMSUP, G.H. McDOWELL, D. LEENANURUKSA and J.M. GOODEN

Plasma very low density lipoprotein (VLDL) levels were shown to be lower in lactating than in dry cows (Raphael et al. 1973) suggesting that hepatic synthesis and secretion could not keep pace with the heavy drain on triglyceride (TG) imposed by the mammary gland. Since the administration of exogenous growth hormone (GH) to lactating cows and ewes increased milk fat production and uptake of free fatty acid (FFA) by the mammary gland (McDowell et al. 1984, 1985), this study reports the effect of GH on lipoprotein TG levels in lactating ewes (for details see McDowell et al. 1985) and in non-lactating calves (see Leenanuruksa et al. 1985). Measurements were made on blood collected 3-5 d after commencing daily injection of saline (S) or GH (0.1 mg/kg liveweight; 1.4 U/mg). Arterio-venous differences for TG in plasma, VLDL (+ chylomicrons, $p < 1.006$) and LDL ($1.006 < p < 1.046$) (Raphael et al. 1973) were measured for mammary (M) and/or leg tissues (L).

		Lactating ewes		Growing calves	
		S	GH	S	GH
Milk fat (g/d)		93	127	-	-
Plasma TG (mg/dL)	A	10.56	7.21***	17.85	13.22
	A-L	2.01	1.07**	1.37	1.46
	A-M	4.72	2.20**	-	-
VLDL-TG (mg/dL)	A	7.73	3.60***	12.96	8.15**
	A-L	1.74	0.58*	1.29	0.39
	A-M	4.28	1.42**	-	-
LDL-TG (mg/dL)	A	1.26	1.66**	2.76	3.58
	A-L	0.11	0.31	0.67	1.01
	A-M	0.15	0.48	-	-

* $P < 0.1$; ** $P < 0.05$; *** $P < 0.01$.

Plasma VLDL-TG concentrations were significantly reduced following GH treatment in both lactating ewes and calves suggesting a direct effect on the synthesis or release from the liver. Any effect of GH on circulating chylomicron levels would be minimal since feed intakes were similar for S and GH treatments. The A-V differences across both M and L tissue were dependent on arterial concentration of TG for all lipoprotein classes. McDowell et al. (1985) showed that GH treatment increased the long-chain fatty acid component of milk fat in two ways, firstly by increasing the amount of free fatty acids taken up by the mammary gland and secondly by increasing blood supply to that organ thus compensating for reduced availability of plasma TG.

LEENANURUKSA, D., SMITHARD, R., McDOWELL, G.H., GOODEN, J.M., JOIS, M. and NIUMSUP, P. (1985). Proc. Nutr. Soc. Aust. 10
 McDOWELL, G.H., GOODEN, J.M., VAN DER WALT, J.G., SMITHARD, R., LEENANURUKSA, D. and NIUMSUP, P. (1985). Proc. Nutr. Soc. Aust. 10:
 McDOWELL, G.H., LEENANURUKSA, D., GOODEN, J.M., JOIS, M. and ANNISON, E.F. (1984). Proc. Nutr. Soc. Aust. 9: 164.
 RAPHAEL, B.C., DIMICK, P.S. and PUPPIONE, D.L. (1973). J. Dairy Sci. 56: 1025.

Dairy Research Unit, Dept of Animal Husbandry, University of Sydney, Camden, New South Wales 2570