THE EFFECT OF FOETAL ANDROGEN STATUS ON THE RESPONSE OF MERINO LAMBS TO A GLUCOSE CHALLENGE

J. W. GILL, B. J. LEURY, and B. J. HOSKING

Acute prenatal androgen treatment (APAT) is a technique involving the administration of a single intramuscular injection of testosterone propionate to a pregnant ewe during the second trimester of pregnancy. APAT female progeny have displayed an enhanced growth potential (Gill and Hosking 1993). The response of merino lambs to a glucose challenge was examined as part of a research program aimed at identifying some of the underlying mechanisms involved in the observed increases in APAT female growth rates.

Four month old lambs (mean LW = 23 kg) were placed into metabolism crates and fed lucerne chaff (65% DDM 3% N) at 1.6 x maintenance requirements. Animals were grouped on the basis of foetal androgen status (FAS) into one of three groups; female (n=2), APAT female (n=2) and male (n=4). After two weeks on the diet the animals were fitted with indwelling jugular catheters. On day 16, the lambs were given a glucose challenge (0.18g/kg LW). Blood was collected at -30, -15, -1, 2.5, 5, 7.5, 10, 15, 20, 30, 45, 60, 75, 90, 120 (minutes) after challenge and analysed for plasma glucose concentration.

The effect of FAS on the coefficient of glucose uptake (U) as defined bv Crista et al. 1979.

	FAS		
Time interval (mins)	Female	APAT Female	Male
2.5 - 15	0.94 ± 0.053[a]	0.69 ± 0.053[b]	0.72 ± 0.038
15 - 30	0.47 ± 0.122	0.62 ±0.122	0.45 ±0.086
30 - 45	0.44 ± 0.108	0.68 ±0.108	0.46 ±0.076
45 - 60	0.30 ± 0.066	0.48 ± 0.066	0.37 ± 0.046
60 -120	0.10 ± 0.072	0.19 ± 0.072	0.18 ± 0.051
Baseline [glucose]	4.69 ± 0.32	4.92 ± 0.28	5.11 ± 0.28
Glucose distrib[n].space (%FLW)	22.3 ± 2.46	17.9 ± 2.46	17.8 ± 1.742
Rate Constant $T_{0\text{-}15}$ (K)	0.053 ± 0.002[c]	0.027 ± 0.002[d]	0.032 ± 0.001[d]

FLW = Fasted liveweight.
Rows with different superscripts a & b differ significantly (P<0.05)
Rows with different superscripts c & d differ significantly (P<0.001)

Foetal androgen status had no effect on glucose distribution space or baseline glucose concentrations. Over the first 15 minutes, female lambs had a higher rate of glucose uptake (P<0.05) than either male or APAT female lambs . This finding is supported by the highly significant differences in the rate constants (K) for glucose clearance from $T_{0\text{-}15}$ (P<0.001).

Foetal androgen status, attained by either APAT or the presence of testes, appears to slow acute glucose uptake in sheep. This suggests reduced acute pancreatic sensitivity as a result of foetal androgen status.

CRISTA, N., GAFTON, G., GARICI, I and SPARAIU, S. (1979). Ann. Rech. Vet. 10: 37.
GILL, J.W. and HOSKING, B.J. (1993). Proc. 15th Int. Congr. Nutr. 2: 655.

School of Agriculture, University of Melbourne, Parkville, Victoria 3052