

DECREASED MUSCLE AND WHOLE BODY PROTEIN BREAKDOWN IN LAMBS WITH GENETICALLY HIGH WEANING WEIGHT

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Lambs with genetically increased weaning weight (W+) deposit a greater proportion of nitrogen intake in body protein than lambs with genetically low weaning weight (W-) (Oddy et al. 1989). The present work was carried out to determine whether there were associated changes in protein synthesis or breakdown.

Eight W+ (44.6 \pm 1.03 kg; mean \pm sem) and 10 W- (31.8 \pm 1.37 kg) wether lambs (approximately 14 months old) were offered, at a constant rate, a pelleted diet of 60% lucerne hay and 40% oats grain at approximately 0.4, 0.8, 1.2, 1.6 and 2 x maintenance requirements. Protein dynamics in the whole body and hind limb, were measured using 4,5 3 H-phenylalanine (Phe) as a marker, and oxygen uptake by the hind limb (Oddy et al. 1987; Oddy et al. 1988).

In hind limb muscle, the slope of the relationship between feed intake (g/d) per kg liveweight (I) and protein gain (G), and between I and degradation (D), differed between genotypes (P<0.05) (units for both G and D μ moles Phe/kg/min). As feed intake increased W+ gained protein at a faster rate than W- lambs. There was a decreased rate of protein degradation in W+ lambs with increased feed intake, whereas there was no significant change in W- lambs. The relationships were :-

W+ lambs:-	G = -0.373 + 0.0194*I	r ² = 0.75	P<0.005
	D = 0.858 - 0.0162*I	r ² = 0.78	P<0.005
W- lambs:-	G = -0.135 + 0.0092*I	r ² = 0.39	P=0.06
	D = 0.515 + 0.0122*I	r ² = 0.10	NS

Protein synthesis in hind limb muscle was not significantly related to feed intake or genotype. Oxygen uptake by hind limb muscle was significantly less (P<0.05) in W+ than W- (respectively 87.7 \pm 5.19 and 124.9 \pm 9.54 μ moles O₂/kg/min), but this was not related to rate of protein synthesis.

In the whole body, irrevocable breakdown of phenylalanine (an index of protein degradation) tended (P>0.06<0.11) to be less in W+ (16.1 \pm 2.3 %) than W- (22.8 \pm 2.32 %) lambs. There was no difference in protein synthesis between genotypes (W+, 0.814 \pm 0.123; W-, 0.791 \pm 0.054 μ moles Phe/kg/min).

Improved protein deposition in the fleece free body of W+ lambs resulted from decreased protein breakdown rather than by increased rate of protein synthesis.

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