THE UPTAKE OF NITROGENOUS COMPOUNDS FROM THE GUT OF SHEEP GENETICALLY DIFFERENT IN WOOL PRODUCTION

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The Fleece Plus (F+) and Fleece Minus (F-) lines developed at Trangie by the NSW Department of Agriculture have been selected for and against clean fleece weight production respectively. Early studies found the two lines to have the same feed intake, to have the same measured digestibilities but for F+ sheep to grow more wool and have a lower level of cysteine in plasma (Williams 1987). The aim of this study was to determine if any difference in nitrogen flux across the gut exists between the F+ and F- genotypes.

Eight sheep (4 F+ and 4 F-) were prepared with catheters in the portal vein and femoral artery . An ultrasonic blood flow probe (Transonics Inc., Ithaca, NY) was placed around the portal vein for the measurement of portal blood flow (PBF). The sheep were continuously fed lucerne chaff at four levels of feed intake calculated to meet 70, 90, 110 and 130 % of maintenance requirements in an experimental design of two 4 x 4 Latin Squares. Blood was sampled at hourly intervals for 8 hours from the portal and arterial catheters. PBF was also recorded. The net portal absorption (NPA) of α-amino nitrogen (AAN) and urea nitrogen (urea N) was calculated by multiplying PBF by the portal-arterial concentration difference. The results are presented in the following table as least squares means ± S.E..

Metabolite	Genotype	Feed intake (% maintenance)			
		70	90	110	130
NPA of AAN	F+	2.653±0.956	3.412±1.004	3.706±1.004	4.501±0.956
(mg N/min)	F-	2.005±1.104	2.204±1.104	3.112±0.956	3.285±1.104
NPA of Urea N	F+	-1.428±0.868	-0.075±0.065	-1.498±0.854	-0.532±0.854
(mg N/min)	F-	1.456±0.980	-1.302±0.980	-0.504±0.854	-2.380±0.980

The NPA of AAN increased as feed intake increased and was consistently higher in F+ sheep although not significantly. In addition, F+ sheep had significantly higher levels of AAN in arterial and portal blood ($P<0.05$) as reported earlier (Hough et al. 1988). The NPA of urea N was not significantly affected by genotype or feed intake, nor were any trends evident. As for AAN, arterial and portal levels of urea N were significantly greater ($P<0.05$) in F+ sheep. Hough et al. (1988) found no significant difference in plasma urea N levels between the two genotypes. Although not significant, the F+ sheep showed a greater uptake of AAN from the gut at all levels of feed intake. The small number of sheep studied, the variability within sheep and the relatively low precision of amino acid analysis contributed to the failure to demonstrate significant between genotype differences. The explanation for the differences in blood urea N levels is not clear. Fleece weight selected Romney sheep in New Zealand have lower plasma levels of urea N than unselected sheep and this has been attributed to a difference in kidney function (Thomson et al, 1989). A.J. Williams (pers. comm.) found no difference between F+ and F- genotypes in urea and creatinine clearance by the kidneys.

HOUGH, G.M., WILLIAMS, A.J., McDOWELL, G.H., and ANNISON, E.F. (1988). Proc. Aust. Soc. Anim. Prod. 17:422.

THOMSON, B.C., DELLOW, D.W., and BARRY, T.N. (1989). Aust. J. Agric. Res. 40:1065.

WILLIAMS, A.J. (1987). In 'Merino Improvement Programmes in Australia', p. 481, ed B.J. McGuirk (AWC).

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