THE CLEARANCE OF CYSTINE FROM PLASMA OF SHEEP GENETICALLY DIFFERENT IN WOOL PRODUCTION

A.J. WILLIAMS and K.J. THORNBERRY

We have compared the clearance of an intravenously injected dose of L-cysteine in sheep from flocks with different genetic capacities for wool growth.

Two groups, each of eight 2 year old Merino ewes, were selected from larger progeny groups which had been sired by either Fleece Plus or Fleece Minus rams, with dams also sired by either Fleece Plus or Fleece Minus rams. The Fleece Plus and Fleece Minus rams were from a single character selection experiment (Pattie and Barlow 1974), maintained at the Agricultural Research Centre, Trangie, NSW.

The sheep, kept in metabolism crates equipped with continuous feeders, were offered daily a diet consisting of a mixture of chaffed lucerne (500g) and cereal (250g) hays. Each sheep was injected intravenously with lg of cysteine hydrochloride, and blood samples were collected at the following times after injection: 5, 10, 20, 30, 40, 50, 60, 75, 90, 120, 150, 180 minutes. Five samples of blood were also collected on the day preceding the injection. The plasma from these blood samples was assayed for total cystine using a semi-automated method (Williams et al.1986).

The effects of the injected cysteine on the concentration of cystine in plasma after injection were evaluated by computing the area under the concentration/time curve; and the slope and intercept of the linear relationship between the concentration (log) and time after injection. The slope provided an estimate of half life(t1/2) of cystine in plasma (assuming first order kinetics). The results are presented in the table below.

	Fleece Plus	Fleece Minus	SEM
Cystine concentration pre-injection ($\mu mol.l^{-1}$)	39.0	45.0[b]	1.8
Area under concentration-time curve (min. $\mu mol.\ 1^{-1}$)	6036	10772	493
t1/2 (min^{-1})	20.0	24.6[b]	1.3
A° (log [cystine])	5.34	5.58[a]	0.04
Clean wool production ($mg.cm^{-2}.day^{-1}$)	1.14	0.64[a]	0.15

[a] $P<0.05$ [b] $P<0.10$

The results indicated that the sheep with the greater genetic capacity for wool growth as a result of selective breeding,

(i) maintain a lower basal concentration of cystine in their plasma (cf Williams et al. 1986)
(ii) clear an intravenously injected bolus of cysteine from their plasma more rapidly (smaller area, greater slope and shorter t1/2).
(iii) have a larger space into which the injected cysteine initially distributes (injected dose/antilog A°).

PATTIE, W.A. and BARLOW, R. (1974). Aust. J. Agric. Res. 25: 643.
WILLIAMS, A.J., MURISON, R.D. and CROSS, C.C. (1986). Aust. J. Agric. Res. 37: 657.

NSW Agriculture and Fisheries, Agricultural Research and Veterinary Centre, Orange, NSW 2800