

## DISTRIBUTION OF $^{51}\text{Cr}$ EDTA IN AND ITS CLEARANCE FROM THE BODY OF MERINO SHEEP SELECTED FOR HIGHER CLEAN FLEECE WEIGHT

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It has been reported that selection of Romney sheep to increase greasy fleece weight increased creatinine clearance from plasma when their diet was a medium quality hay but not when it was a higher quality lucerne hay (Thomson et al. 1989). The authors inferred an effect of selection on renal function because creatinine clearance estimates glomerular filtration rate (GFR). We examine here GFR in Merino sheep, selected since 1960 for higher clean fleece weight, using  $^{51}\text{Cr}$ EDTA as the clearance indicator (Stacy and Thorburn 1966).

Six 2-year old Merino ewes from each of an Armidale selection line (SA), a Cunnamulla line (SC) and a control line (US), all now maintained by CSIRO at Armidale, were given once daily one kg of either lucerne hay (LH) or mixed wheaten and lucerne hays (60/40; WL) in a crossover design. Blood samples were taken by jugular venipuncture at increasing intervals for 6 h after an i.v. dose of  $^{51}\text{Cr}$ EDTA;  $^{51}\text{Cr}$  was assayed in plasma and in urine collected for 72 h after the dose. From the  $^{51}\text{Cr}$ EDTA dose, its urine recovery, plasma water content and the plasma  $^{51}\text{Cr}$  concentration/time curve (which was described very well by the sum of three exponential components), its total clearance, renal clearance (GFR), distribution space and mean transit time were calculated by non-compartmental analysis (Ladegaard-Pedersen 1972).

	Selection line			Diet		Pooled SD
	SA	SC	US	LH	WL	
Liveweight (kg)	43.70	40.90	37.60	40.80	40.60	
Total clearance (g plasma $\text{min}^{-1}\text{kg}^{-3/4}$ )	5.16	5.22	5.26	5.52 <sup>a</sup>	4.90 <sup>b</sup>	0.367
Renal clearance (g plasma $\text{min}^{-1}\text{kg}^{-3/4}$ )	4.85	4.78	4.89	5.14 <sup>a</sup>	4.54 <sup>b</sup>	0.360
Distribution space (water % liveweight)	16.00	15.60	16.30	16.20	15.70	1.03
Mean transit time (min)	86.40	87.70	86.20	82.20 <sup>A</sup>	91.30 <sup>B</sup>	13.00
n =	12	12	12	18	18	

<sup>a</sup><sup>b</sup> Means differ at  $p < 0.001$ ; <sup>A</sup><sup>B</sup> Means differ at  $P < 0.05$  (one-tail test)

There was no effect of selection on total clearance or GFR with either diet. Analysis of the combined data showed significantly lower total clearance and GFR ( $P < 0.001$ ) and longer mean transit time ( $P < 0.05$ ) when the medium quality diet was given to all sheep but there were no differences between the selection lines. The results do not support the findings of Thomson et al. (1989).

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