

UPTAKE AND OXIDATION OF GLUCOSE BY THE HIND LIMB MUSCLE AND
MAMMARY GLAND OF THE LACTATING EWE

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Classical arteriovenous difference techniques together with isotope dilution studies have been used for many years to study mammary metabolism (Annison and Linzell, 1964). Chronic preparations using the recurrent tarsal vein of hind limb muscle of sheep have been used to study muscle metabolism (Domanski *et al.* 1974; Jarrett *et al.* 1976). We have established the validity of using both preparations in the same animal (Gooden *et al.* 1980).

A pelleted complete ration (9.55 MJ ME/kg DM) was fed to calculated ME requirements from a continuous feeder. Glucose biokinetics were determined by continuous intravenous infusions of [$U-^{14}C$] glucose and $NaH^{14}CO_3$. Towards the end of each infusion blood flows of hind limb muscle and mammary gland were measured and the concentration and specific radioactivity (SRA) of glucose and CO_2 estimated in arterial blood and venous blood from the recurrent tarsal (R), subcutaneous mammary (M) and external pudendal (P) veins.

Mean values \pm SE and number of observations for glucose biokinetics were as follows: glucose irreversible loss (IL) 112 ± 11.4 mg/min (6); $4.9 \pm 0.3\%$ of CO_2 produced from glucose (6); IL of CO_2 366 mgC/min (2); 15% of glucose produced by fixing of CO_2 (2). Glucose uptake, the output of lactate and CO_2 ($\mu\text{mol } 100\text{g}^{-1} \text{min}^{-1}$) and the ratio of venous CO_2 SRA to arterial CO_2 SRA (V:A CO_2) during [$U-^{14}C$] glucose and $NaH^{14}CO_3$ infusions were as shown below:-

	R	M	P
glucose uptake	2.4 ± 0.27 (5)	21.7 ± 2.28 (4)	6.7 ± 1.55 (3)
lactate output	4.4 ± 2.17 (4)	14.1 ± 5.57 (3)	8.1 ± 0.17 (3)
CO_2 output	10.3 ± 1.66 (8)	83.9 ± 13.82 (5)	30.7 ± 3.87 (5)
V:A CO_2 glucose	1.04 ± 0.041 (6)	1.44 ± 0.113 (5)	1.28 ± 0.137 (4)
V:A CO_2 $NaH^{14}CO_3$	0.87 ± 0.129 (3)	0.90 ± 0.057 (2)	0.74 ± 0.195 (2)

All of the glucose taken up by muscle appeared as lactate and 39% of the glucose taken up by the mammary gland was also degraded to lactate.

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