GLUCOSE METABOLISM IN HIND LIMB MUSCLE OF PREGNANT AND LACTATING EWES

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Studies on glucose utilization in pregnant and lactating ewes showed that increased glucose irreversible loss (GIL) in pregnancy was disproportionate to the increase in feed intake (Hough et al. 1985). In the same experiments the ewes were prepared with catheters in the lateral saphenous vein for the measurement of arterio-venous (AV) differences of glucose, lactate and blood gases, and blood flow (Oddy et al. 1984). The results are shown below.

Physiological state	NPNL n=6	MP n=5	LP n=5	EL n=5	LL n=6
Blood flow (ml/min/kg)	77 ± 7	90 ± 10	106 ± 18	136 ± 20	133 ± 16
Glucose AV difference (μM)	187 ± 25	99 ± 33	87 ± 35	84 ± 37	92 ± 21
Extraction rate (%)†	7.1 ± 0.9	4.1 ± 1.2	3.3 ± 1.3	2.8 ± 1.2	3.4 ± 0.8
Lactate AV difference (μM)	14 ± 8	-26 ± 9	-62 ± 6	-33 ± 11	26 ± 15
Glucose uptake (GU) (μmol/min/kg)	14.4	8.9	9.2	11.4	12.2
Corrected GU** (μmol/min/kg)	14.4	7.7	5.9	9.3	12.2
GU (as % GIL)	39	15	9	13	19
CO_2 from glucose (%)	16.5 ± 4.5	34.3 ± 16.8	12.3 ± 4.3	46.6 ± 22.2	-
Glucose oxidized (%)	26.4 ± 4.8	48.7 ± 16.9	17.7 ± 8.0	48.4 ± 30.2	-
Maximum possible*** contribution to oxidative metabolism	57	41	17	42	38
GU accounted for as CO_2 and lactate output	26	62	54	68	-

† A-V/A x 100

** Corrected for lactate output

***(Corrected GU x 6)/oxygen uptake

Metabolic adaptations in skeletal muscle in pregnancy and early lactation included reduced glucose uptake, and substantial release of lactate. In late pregnancy, glucose uptake was halved, and lactate output accounted for about 35% of glucose uptake. Faichney et al. (1981) reported similar values for lactate release. In pregnancy and lactation, lactate release and glucose oxidation accounted for more than half of glucose uptake by muscle, in contrast to the much lower value in NPNL ewes, which has been reported earlier (see Pethick, 1984).

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