

THE EFFECT OF DIET AND STAGE OF PREGNANCY ON GLUCOSE UPTAKE AND
EXTRACTION BY THE UTERUS AND LEG MUSCLE OF SHEEP

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The supply of glucose for uterine development puts substantial demands on maternal metabolism. This report outlines some of the changes in glucose metabolism which we have observed during pregnancy.

The animals and diets for which the following results were obtained have been described in these Proceedings by Gooden et al. (1981).

Glucose uptake by the pregnant uterus was similar across diets at both 90 and 130 days of pregnancy (53.4 vs 47.7 μ moles/min/kg) but as uterine weight increased 2.5 times from 90 to 130 days glucose uptake was greater at 130 than at 90 days (224.3 vs 87.3 μ moles/min). Glucose uptake by leg muscle was similar at 90 and 130 days of pregnancy (12.0 vs 12.3 μ moles/min/kg) and was greater in sheep eating lucerne than in those eating oaten hay (16.1 vs 6.0 μ moles/min/kg; $P < 0.01$). Similar uterine glucose uptakes were achieved by increased extraction of glucose by the uterus as pregnancy advanced ($P < 0.01$) as shown in the Table. There were no significant alterations in leg glucose extraction due to diet or stage of pregnancy.

Effect of stage of pregnancy and diet on extraction of glucose by the pregnant uterus and leg. Extraction = $\frac{[A]-[v]}{[A]} \times 100$, values are mean (\pm SE).

Diet	Days Pregnant	[Glucose] mM	Uterine Extraction	Leg Extraction
Oaten Hay	90	1.93 (0.09)	7.7 (1.9)	5.8 (0.8)
	130	1.62 (0.10)	11.5 (1.6)	4.6 (1.5)
Oaten Hay/ Lucerne	90	-	-	-
	130	1.95 (0.17)	13.6 (0.8)	7.2 (2.6)
Lucerne	90	2.22 (0.20)	6.2 (1.2)	8.2 (1.2)
	130	2.36 (0.10)	9.8 (2.6)	7.3 (2.2)

These results demonstrate that the pregnant uterus has a substantial uptake of glucose, which despite diet and stage of pregnancy is relatively constant per kg of uterus. This occurs, despite a decrease in uterine blood flow as pregnancy advances (Gooden et al. 1981), by an increased extraction of glucose. There appears to be no concomitant increase in glucose uptake by leg muscle due to stage of pregnancy suggesting a specific uterine mechanism for maintenance of glucose uptake.

GOODEN, J.M., ODDY, V.H., TELENI, E., JONES, A.W., McDOWELL, G.H., and ANNISON, E.F. (1981). Proc. Nutr. Soc. Aust. 6: 106.