TABLE 1

The Effects of Starvation and Injections of Biotin on Plasma Glucose Concentrations and Glucose Synthesis Rates in Merino and Border Leicester-Merino Crossbred Ewes Close to Lambing

Group	Ewes Bearing Single Lambs	Ewes Bearing Twin Lambs	Average No. of days from Lambing	Plasma Glucose Concentration (mg/100ml)	Glucose Synthesis rate (g/kg $^{3/4}$/d)	Level of Significance †
Merinos						
24 h starvation						
Biotin	9	0	23	36.8 ± 1.3	7.4 ± 0.5	*
Placebo	9	0	31	35.5 ± 2.2	6.1 ± 0.4	
48 h starvation						
Biotin	9	0	23	35.6 ± 1.3	6.6 ± 0.4	***
Placebo	9	0	31	31.9 ± 2.3	4.8 ± 0.1	
Crossbreds						
24 h starvation						
Biotin	6	1	20	30.0 ± 1.3	5.4 ± 0.1	N.S.
Placebo	5	3	14	27.2 ± 1.6	4.8 ± 0.4	
48 h starvation						
Biotin	6	1	20	27.0 ± 1.4	4.8 ± 0.1	*
Placebo	5	3	14	24.5 ± 1.4	4.2 ± 0.2	

† Significance of differences in glucose synthesis rates. * $P < 0.05$ *** $P < 0.001$

Glucose synthesis rates were significantly higher in both groups of biotin-treated ewes after 48 h starvation, the differences being 38% in the Merinos ($P<0.001$) and 14% in the crossbred sheep ($P<0.05$).

Pregnancy was more advanced in the Merino ewes injected with biotin but the reverse was the case with the crossbred ewes. The demand for glucose by the foetus increases as pregnancy advances (Kronfeld 1958), and although a pregnant sheep on a fixed feed intake increases its glucose entry rate as it approaches term, in the same sheep starved for four days there were no differences in glucose entry rates at any period of pregnancy (Steel and Leng 1968). The differences observed in the animals in this study are therefore unaffected by the time from lambing especially since at a maximum the mean difference was only about 8 days. Therefore it seems reasonable to suggest that the biotin increased glucose synthesis rates in both breeds of animals when starved for 48 h.

The results suggest that biotin may become a factor limiting the rate of gluconeogenesis in fasted pregnant sheep which have been on a high plane of nutrition. This may indicate a rapid loss of biotin in the tissues of pregnant sheep, particularly after the onset of starvation. Further studies are planned on the effects of biotin on glucose metabolism and the incidence of pregnancy toxaemia.

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T. J. KEMPTON,
D. BALNAVE,
R. A. LENG,

Department of Biochemistry and Nutrition,
The University of New England,
Armidale, New South Wales, 2351

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ENTERIC CORONAVIRUS-LIKE PARTICLES IN SHEEP

An outbreak of diarrhoea in Merino x Corriedale weaner sheep on a property in Gippsland, Victoria, was investigated during November 1977. Approximately 10% of a flock of 1500 were affected. Although the faeces were fluid in nature and greenish in colour, the sheep showed no ill-effects and recovered uneventfully within 3 to 4 days. At the time of the outbreak the pasture was drying off and conditions that may have predisposed to nutritional diarrhoea were considered

unlikely. The sheep had been drenched with an anthelmintic thiophanate* 14 days before the outbreak and the faecal samples examined by light microscopy did not contain nematode eggs.

A total of 8 samples (including 3 samples collected from sheep per rectum and 5 freshly deposited samples obtained from the paddock) were examined and no recognised pathogenic bacteria were isolated. However, when faecal homogenates were pelleted by ultracentrifugation and examined by electromicroscopy, coronavirus-like particles were observed in one of the samples

The isolation of coronaviruses from sheep has not previously been reported although there are a number of overseas reports that this group of viruses can cause serious diseases in young animals of other species. These diseases include transmissible gastroenteritis in pigs (Bruner and Gillespie 1973) and neonatal diarrhoea in calves (Stair *et al* 1972). Morphologically similar viruses are also suspected to cause diarrhoea in foals (Bass and Sharpee 1975), dogs (Takeuchi *et al* 1976) and possibly man (Caul *et al* 1975; Schnagl *et al* 1977). This isolate from sheep is believed to be the first reported enteric coronavirus isolated from animals in Australia.

It is uncertain at this stage whether the virus was aetiologically associated with the diarrhoea in the weaner sheep. Work is in progress to determine the pathogenicity of this agent for sheep and other animals and the antigenic relationship of this virus to other known coronaviruses.

*Nemafax, May & Baker Ltd, Footscray, Victoria

S. TZIPORI,
MEGAN SMITH,
T. MAKIN,

Department of Agriculture,
Veterinary Research Laboratory, Attwood,
Westmeadows, Victoria, 3047

C. McCAUGHAN,

District Veterinary Officer,
Department of Agriculture,
Maffra, Victoria, 3860

21 February 1978

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