

THE RELATIONSHIP BETWEEN GROWTH AND GLUCOSE AVAILABILITY
IN SHEEP AND CATTLE

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The additional growth of ruminants fed bypass protein is believed to be a response to extra available amino acids. Bypass proteins, however, can also supply glucogenic precursors and, therefore, part of the response to bypass protein may also be to the increased supply of glucose. In pregnant and lactating ruminants glucose synthesis is apparently increased, suggesting a 'major role of this nutrient in production. No information is available, however, on the amounts of glucose available for anabolic and-catabolic processes in growth.

For these reasons we have examined the amount of glucose available to ruminants (growing lambs and cattle) on a variety of diets. Different rates of growth were obtained by varying the amount of bypass protein in the diet. A number of diets, including those based on sugar, cellulose and starch, have been used with lambs; with cattle, only molasses-based diets supplemented with fish meal have been examined so far. The relationships between glucose entry rate, measured using a single injection of $[2-^3\text{H}]\text{glucose}$, and growth rate of lambs and cattle are shown in Figure 1.

Glucose entry rate increased with growth and was also directly related to feed intake. At high growth rates (340 g/d) lambs require up to 200 g of glucose, which represents 20% of digestible energy intake.

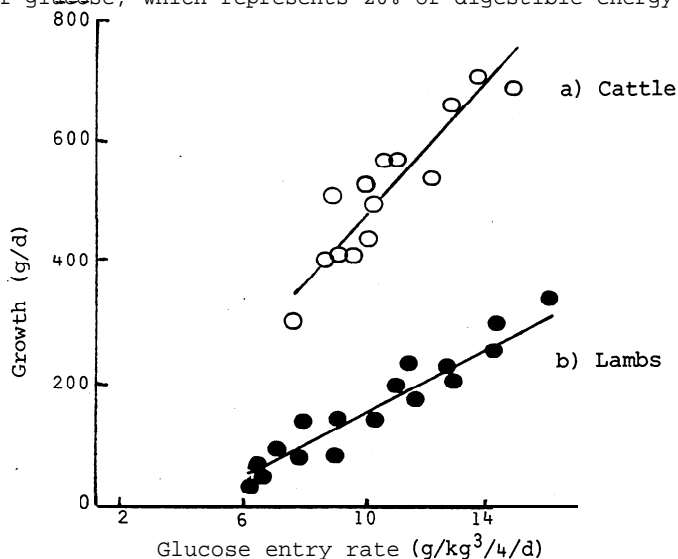


Figure 1. Relationship between glucose entry rate and rate of growth in weaner cattle and lambs.

The results indicate a major role for glucose in growth, and that glucose precursors may be regarded as essential nutrients for ruminants.

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