

WHY IS THE PROTEIN/ENERGY RATIO RECOMMENDED FOR HUMANS SO DIFFERENT FROM THAT FOR DOMESTIC ANIMALS?

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It has been suggested by a Joint FAO/WHO Expert Committee (WHO 1973) that man's requirement for protein with an ideal balance of amino acids (reference protein) is about 4% of total energy intake, irrespective of age or body weight after the first few months of life. This recommendation seems contrary to observations with domestic animals; first, because the requirement does not fall markedly with maturation and, secondly, because it is, by comparison, extremely low. The effect of body weight and growth rate on the estimated reference protein requirement of liquid-fed lambs is presented in the Table. In fast-growing lambs the protein/energy requirement declines with maturation. However, in lambs given an energy intake sufficient to simply maintain body protein equilibrium, the protein/energy requirement is constant regardless of body weight. Since protein accretion in man contributes only slightly to total protein requirements, the recommendation suggesting little effect of body weight on his protein requirement seems compatible with animal data.

Nevertheless, the estimated requirement for protein equilibrium in lambs of 12.2% of total energy from protein, is about 3 times the suggested value for man. When the requirement for wool is removed, still 8% of total energy must be supplied from protein. A comparison between species shows that the obligatory N loss in urine and faeces in man is only 0.43 mg N per basal kJ (Who 1973) and in lambs is 0.75 mg N per basal kJ (Norton and Walker 1971). The higher obligatory N loss from sheep suggests that either a greater proportion of body protein is catabolized or that a greater proportion of catabolized protein is not resynthesized and is lost from the system. The first suggestion is supported by estimates of the rate of protein degradation in children and lambs of comparable size. Protein degradation rate in normal children weighing 8 kg has been estimated at 4.7 g/kg per day (Picou and Taylor-Roberts 1969) compared with 11.1 g/kg per day for milk-fed lambs weighing 12 kg (Black and Colebrook unpublished). These values correspond to a daily turnover of 3% of total body protein or 20 mg/basal kJ in children and 7.6% of total body protein or 39 mg/basal kJ in lambs.

Reference protein requirement of lambs (from Black and Griffiths 1975).

Lamb Wt. (kg)	% of total energy required from protein		
	Body Protein Equilibrium	Growth rate 25 g/d	300 + g/d
5	12.2	17.0	20.9
20	12.2	12.8	13.5
35	12.2	9.5	7.4

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