Nutrition Research Reviews (2007), **20**, 1–2
DOI: 10.1017/S0954422407764521

Editorial

As *Nutrition Research Reviews* achieves its 20th anniversary it is pleasing to report that the impact factor has now broken above 2·0, and last year was 2·053, placing it well into the upper half of nutrition and food science journals. I think that this issue contains a collection of similarly interesting and citeable papers.

Previous issues of this journal have contained detailed reviews showing that topics such as amino acid availability[1] and glycaemic index[2], which merit at most a short paragraph in most textbooks, are considerably more complex than they appear. Rutherford & Moughan[3] return to the problems of amino acid availability in this issue, concentrating on just one amino acid, lysine. In human diets based largely on cereals lysine may be the limiting amino acid, and for pigs and poultry it usually is. This means that, especially in formulation of diets for livestock, it is important to know how much of the lysine that is present in the diet is available to the animal for tissue protein synthesis – and indeed to define what we mean by availability; the method of determination will affect the results. The problem is that lysine that has undergone reaction at the ϵ-amino group (for example, with carbohydrates, especially after heating the foodstuff) is not available for digestion and absorption. Rutherford & Moughan[3] discuss the problems with various chemical and biological methods of assay, ending with a description of a technique that they have developed to measure true lysine availability by combining determination of chemically reactive lysine with measurement of ileal digestibility.

Those of us raised on tales of the old American west may believe that cattle going to slaughter still walk sedately across miles of prairie land, grazing contentedly *en route*; those of us old enough will remember when, at least in Europe, butchers slaughtered locally raised animals, then dressed and sold the carcasses locally. On a very small scale this still happens; my local farmer advertises by leaflet in the town when he is about to slaughter his pigs. However, most meat is now bought from supermarkets, and quite apart from the 'food miles' travelled by the packaged meat between processing station, central depot and supermarket, the animals have to be transported, often considerable distances, from farm to slaughterhouse. They no longer walk through pastureland, but are transported by lorry, sometimes with journeys lasting several days. Hogan *et al.*[4] note that it is usual to deprive animals of food and water for up to about 12 h before transportation, and throughout the journey. The aim of this prolonged fasting is to minimise the load of digesta in the animals' gut, and so reduce fouling of other animals, the trucks and roads, and minimise the risk of faecal contamination of the carcass. However, to me it sounds as stressful as leaving home without breakfast to take a long-haul flight on one of the worst budget airlines. So it is for the animals as well. There may well be changes in rumen bacterial activity, with a reduced capacity to control pathogenic organisms, and the effects of stress affect the quality of the meat, so that the animals need a period to recover from their stressful journey before slaughter. Hogan *et al.*[4] discuss the metabolic effects of this food and water deprivation, and the various ways in which the animals adapt to it.

Another group now driven rather than walking are children. Unlike lambs to the slaughter, they are not deprived of food and water (or other beverages) before or during their journey. An overly simplistic explanation of the aetiology of childhood obesity is that they have too little exercise and too much food. Procter[5] discusses the problems of obesity in children and its aetiology, in order to provide a basis for public health policies and population-level interventions. At one time we might have said that a major factor in determining childhood obesity was genetic; after all, fat parents frequently have fat children – but they also often have overweight cats and dogs, suggesting that environmental factors are more important. The rapid increase in childhood obesity over the last few decades is further evidence that an obesogenic environment is the major factor. Lower physical activity is obviously important – not only being driven rather than walking or cycling, but more sedentary leisure pursuits (television and computer games rather than outdoor activities). Procter[5] notes that the correlation between television watching and obesity is not only due to low physical activity, but also snacking (perhaps on energy-dense, nutrient-poor foods) while viewing. The other side of the equation is food consumption – here the data are conflicting; food available for consumption has increased, but energy intakes of adolescents, as determined by questionnaire, have decreased over the period when obesity has increased considerably. However, the pattern of eating has changed, with family meals becoming uncommon, and snacking and (energy-dense) fast food consumption becoming more usual. One factor is outside the child's control – his or her experiences *in utero*, with modest energy restriction leading to metabolic programming for a more efficient or thrifty phenotype. Procter[5] concludes that there is a need for a multi-level approach to prevent childhood obesity, attacking a range of social and environmental areas.

The key question arising from Procter's[5] review on childhood obesity is 'how can we change behaviour to prevent childhood obesity?'. Spencer *et al.*[6] discuss the transtheoretical model, reviewing advances since Horwath[7] first applied this psychological concept to eating behaviour. The transtheoretical model describes behaviour change in five stages, from precontemplation, through contemplation and preparation for a change to action when the change in behaviour begins and finally maintenance. If we can identify relevant drivers or processes at each of these stages then we

should be able to formulate programmes to help individuals to contemplate, prepare for, and finally achieve, changes in eating behaviour, be it reduction in fat intake or increase in fruit and vegetable consumption.

Continuing the theme of changing eating behaviour, Thorogood *et al.*[8] have conducted a systematic review of population and community interventions to change diets in order to reduce cancer risk. They note that while individual counselling has been shown to have some effect, this is very labour intensive; their question was whether programmes aimed at whole populations or specific groups and communities are effective in changing eating behaviour. Their conclusion is that positive messages (for example, eat five servings of fruit and vegetables a day) do lead to changes in eating habits, while the effect of negative messages (eat less red meat, eat less fat) is less clear, and in most trials such messages do not change eating habits significantly. Not only is the '5-a-day' message positive, it is also a clear prescription for five servings a day, and therefore easier to understand or implement than rather vague exhortations to 'eat less fat'.

Dew *et al.*[9] describe yet another benefit of eating fruit and vegetables – the polyphenols may not only be antioxidants but may also contribute to optimum bone mineral density, both by inhibiting bone resorption and stimulating bone growth. There is good epidemiological evidence of a protective effect of tea consumption on bone health; part of this may be due to the fluoride content of tea, but again polyphenols seem to be important. However, they note that tea also contains caffeine, which has been associated with loss of bone mineral; it seems likely that the adverse effects of caffeine have been overestimated, and the beneficial effects of other compounds in tea (and I would like to think, also coffee) may be greater than any adverse effects of caffeine.

The importance of vitamin D for bone health and Ca homeostasis has been known for many years. What has become apparent over the last 25 years is that vitamin D affects many other tissues. The vitamin D receptor has been found in tissues that are not involved in bone metabolism or the intestinal absorption and renal re-absorption of Ca, including insulin-secreting β-islet cells of the pancreas, adipose tissue and most cells of the immune system. These emerging new roles of vitamin D (which include regulation of cell proliferation and apoptosis, and a potential anti-cancer action) have led to suggestions of appropriate levels of intake considerably greater than current reference intakes, which are based on the amount required to maintain the same plasma concentration of calcidiol as is found in young adults at the end of winter. This is almost certainly an inappropriate marker of adequacy, because by the end of winter plasma concentrations of calcidiol have fallen to a level not very much above that seen in individuals with sub-clinical deficiency and impaired Ca absorption. Nevertheless, the intakes suggested (5–15 μg, depending on age and which set of reference intakes you use) are not readily achievable from foods, and higher levels of intake would certainly not be. This has led to a controversy between those who say that we should increase our sunlight exposure to increase vitamin D status, and those who warn of the dangers of skin cancer as a result of sunlight exposure. Baeke *et al.*[10] review the role of vitamin D in immune system function by inhibiting pathogenic T cells and increasing the number of regulatory T cells. In experimental animals high doses of calcitriol can prevent or cure some auto-immune diseases and graft rejection, although these actions are seen at levels that would lead to hypercalcaemia; a number of less calcaemic analogues of calcitriol have been tested in animal models, and hold out hope for future clinical use.

David A. Bender
Editor-in-Chief
Department of Biochemistry and Molecular Biology
University College London
Gower Street
London WC1E 6BT, UK
d.bender@ucl.ac.uk

References

1 Moughan PJ (2003) Amino acid availability: aspects of chemical analysis and bioassay methodology. *Nutr Res Rev* **16**, 127–141.
2 Brouns F, Bjorck I, Frayn KN, Gibbs AL, Lang V, Slama G & Wolever TMS (2005) Glycaemic index methodology. *Nutr Res Rev* **18**, 145–171.
3 Rutherfurd SM & Moughan PJ (2007) Development of a novel bioassay for determining the available lysine content of foods and feedstuffs. *Nutr Res Rev* **20**, 3–16.
4 Hogan JP, Petherick JC & Phillips CJC (2007) The physiological and metabolic impacts on sheep and cattle of feed and water deprivation before and during transport. *Nutr Res Rev* **20**, 17–28.
5 Procter KL (2007) The aetiology of childhood obesity: a review. *Nutr Res Rev* **20**, 29–45.
6 Spencer L, Wharton C, Moyle S & Adams T (2007) The transtheoretical model as applied to dietary behaviours and outcomes. *Nutr Res Rev* **20**, 46–74.
7 Horwath CC (1999) Applying the transtheoretical model to eating behaviour change: challenges and opportunities. *Nutr Res Rev* **12**, 281–317.
8 Thorogood M, Simera I, Dowler E, Summerbell C & Brunner E (2007) A systematic review of population and community dietary interventions to prevent cancer. *Nutr Res Rev* **20**, 75–89.
9 Dew TP, Day AJ & Morgan MRA (2007) Bone mineral density, polyphenols and caffeine: a reassessment. *Nutr Res Rev* **20**, 90–106.
10 Baeke F, van Etten E, Overbergh L & Mathieu C (2007) Vitamin D_3 and the immune system: maintaining the balance in health and disease. *Nutr Res Rev* **20**, 107–119.

https://doi.org/10.1017/S0954422407764521 Published online by Cambridge University Press