



WALTHAM Research News

Caring for senior pets: Optimum nutrition for our ageing companions

KEY POINTS

- **DOGS:** Older, non-working, dogs are at risk from obesity, due to a combination of decreased lean body mass and a more sedentary lifestyle. To compensate for this, a reduction in daily energy provision in the order of 18-20% is appropriate.
- Older dogs do not require a reduction in dietary protein concentration, UNLESS inadequate renal function is demonstrated, in which case a diet with controlled phosphorous and moderately reduced protein content is indicated.
- **CATS:** Unlike dogs and humans, ageing cats do not require a reduced energy provision. Due to a reduction in digestive efficiency, they may actually require an increase in energy provision to maintain body weight.
- Ageing cats do not require a reduction in dietary protein content, unless inadequate renal function is demonstrated, in which case a diet with reduced phosphorous and moderate protein restriction is indicated.

Senior dogs

As a general guideline, dogs may be considered to be geriatric once they have reached the final third of their anticipated lifespan. The aim of feeding elderly but otherwise healthy animals is to slow or prevent the progression of metabolic changes associated with ageing and thus to increase longevity and preserve the quality of life. Old age can, however, be accompanied by clinical disease, such as chronic renal failure or heart disease, for which dietary management may constitute an important component of therapy. There is a tendency towards obesity in older dogs, and oral hygiene measures have particular significance in old age.

In humans, ageing is associated with a gradual decline in maintenance energy requirement (MER), generally equivalent to a 20% decrease in maintenance requirements of the young adult. This decline in energy requirement appears to be linked to both a reduction in physical activity and a reduction in lean body tissue, which has a lower basal metabolic rate (BMR) than body fat. Sustained physical activity throughout adulthood can, however, offset the age-related decline in MER through both the increased cost of energy expenditure and an elevated BMR.

Similarly, ageing dogs exhibit an approximately 20% decline in MER and a decrease in lean body mass to fat ratio which echoes that of ageing humans in its extent and rate of change (1,2). One WALTHAM study compared energy requirements of senior dogs (> 8 years) with those of young adult dogs (< 6 years) and found that the senior dogs needed approximately 21 kcal/W^{0.75} (W = body weight) less than the younger dogs to maintain bodyweight, equivalent to an 18% reduction in daily energy demand (3). Another WALTHAM study established that for the majority of older dogs, maintenance energy requirements could be predicted from the equation $MER = 90W^{0.75}$ (kcal/day)

The causal factors are assumed to be the same as those in humans and there is no doubt that many older dogs sleep more, prefer shorter walks and are generally less active. Preliminary data suggest that working Border Collies that remain active throughout adulthood do not display an age-related decline in MER, unlike less active pet dogs of the same breed. Although individual dogs may have increased energy requirements, it is clear that many senior dogs are at risk of obesity unless energy provision is reduced according to their needs. Since it appears that digestive efficiency is maintained in older dogs, calculation of their energy intake is relatively straightforward and should be based on a 20% reduction of adult energy requirement (4).

Historically, there has been a belief that reducing protein intake in older animals will relieve "stress" on their renal function and may help to prevent or slow progression of renal disease. More recent data has, however, shown that this theory cannot be substantiated. Whereas older dogs have a higher incidence of renal disease than younger dogs, not all old animals invariably develop renal failure. Studies with geriatric dogs receiving either a 18% or 34% protein diet have shown no harmful effects of the higher protein diet, and mortality was actually higher in the dogs receiving 18% protein (5). The routine use of protein restricted diets in all geriatric dogs is therefore not required. High levels of dietary protein may, however, increase the renal workload when kidney function is impaired to some extent. Conversely, very low protein diets may be associated with a risk of protein malnutrition and tend to be rather unpalatable. In general, healthy older dogs should have diets based on their individual needs, which will be related to bodyweight, condition and physical activity. Early clinical and biochemical signs of chronic renal failure would support the introduction of a diet with a controlled phosphorus and moderately restricted protein content. As a rule, protein sources for older dogs should be highly digestible and of high biological value.

Although restriction of dietary sodium or phosphorus may be indicated in old dogs with cardiac or renal diseases respectively, there is no evidence that healthy individuals have altered requirements for these minerals. However, bioavailability of copper, zinc and manganese may be reduced in the older dog and current recommendations are that dietary levels of these minerals are increased to approximately twice those required for adult maintenance.

There are few studies of the vitamin requirements of healthy senior dogs but levels of B-group vitamins may be increased to approximately twice those required for adult maintenance to compensate for possible increased losses. A similar increase in vitamin E intake may also be beneficial since this is an important antioxidant nutrient that may help to combat oxidative stress, which is thought to contribute to the ageing process.

Senior cats

Similar to dogs, cats may also be considered to be geriatric once they have reached the final third of their anticipated lifespan. Chronic renal failure and hyperthyroidism, are common problems of middle-aged and old cats, and oral hygiene measures have particular significance in old age. Free access to a clean supply of water is essential to prevent dehydration.



Tasba, a Newfoundland, lived to 14 years of age at the WALTHAM Centre for Pet Nutrition.



Domestic short hair cat Nellie lived to 18 years of age at the WALTHAM Centre for Pet Nutrition.

Until recently, it has been assumed that older cats may also have a reduced energy requirement, with a tendency towards obesity. However, there is increasing evidence to suggest that this is not the case. Recent WALTHAM studies support the view that, although obesity may be a problem in individual, particularly middle-aged, cats, there is a greater tendency for geriatric cats to be underweight (2).

WALTHAM studies have also shown that cats do not exhibit an age-related decline in either MER or lean body mass to fat ratio (6). All evidence to date supports the view that the maintenance of body composition and energy requirements in older cats is related to the relative inactivity of most cats throughout adult life, such that there are no obvious age-related changes in physical activity.

Furthermore, recent WALTHAM studies have demonstrated that many senior cats exhibit a significant decline in digestive efficiency, particularly of fat and protein (3,4). The combined effect of this is a highly significant decline in energy digestibility, with some cats exhibiting energy digestibility coefficients as low as 0.65. Interestingly, the cats with compromised digestive function increased their daily food intake to compensate for this effect, suggesting that cats continue to control energy intake as they age.

Thus, senior cats maintain their energy requirements but often experience a diminished capacity to derive energy from their diet. The practice of feeding older cats a reduced amount of food may therefore be ill advised, except where the cat is overweight, and advice to cat owners should be to feed senior cats at the same energy level as younger adult cats. It is recommended that highly digestible, energy dense foods are offered to ensure that an adequate energy intake can be achieved.

In view of the high protein requirements of the cat and reduced digestive efficiency in old age, restriction of dietary protein is not recommended in healthy individuals because of the associated risk of protein malnutrition. In cats with evidence of chronic renal failure, moderate restriction of dietary protein to alleviate clinical signs of uraemia may be implemented, together with dietary phosphorus restriction. Again, highly digestible protein sources of high biological value should be employed for all older cats.

Careful monitoring of food intake is important in the senior cat and may

help to identify conditions associated with altered food intake. For example, hyperthyroidism is characterised by weight loss despite an increased appetite, and prolonged inappetence may predispose an obese cat to hepatic lipidosis.

REFERENCES

1. Harper EJ (1998a) Changing perspectives on ageing and energy requirements: Ageing and energy intakes in humans, dogs and cats. *Journal of Nutrition* **128**: 2623S-2626S
2. Harper EJ (1998b) Changing perspectives on ageing and energy requirements: Ageing, bodyweight and body composition in humans, dogs and cats. *Journal of Nutrition* **128**: 2627S-2631S
3. Taylor EJ, Adams C and Neville R (1995) Some nutritional aspects of ageing in dogs and cats. *Proceedings of the Nutrition Society* **54**: 645-656
4. Harper EJ (1998c) Changing perspectives on ageing and energy requirements: Ageing and digestive function in humans, dogs and cats. *Journal of Nutrition* **128**: 2632S-2635S
5. Finco DR, Brown SA, Crowell WA, Brown SA, Barsanti JA, Carey JP & Hirakawa DA (1994) Effects of ageing and dietary protein intake on uninephrectomised geriatric dogs. *American Journal of Veterinary Research* **55**: 1282-1290
6. Peachey SE, Harper, EJ & Dawson JM (1999) Effect of ageing on resting energy expenditure in cats. *Veterinary Record* **15**: 420

