Extending Mature Cats Healthy Life

How LONGEVIS™ can extend healthy life in cats aged 7 years plus

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The Ageing Feline – A Summary

There are now more senior and geriatric pet cats than ever before. The average age of cats in Europe has increased from 4.7 to 5.3 years. And, in Europe, the percentage of cats age 10 years and older has increased from about 10% in 1983 to about 40% in 1995 [Kraft, 1998]. In the United Kingdom alone, it is estimated that there are currently about 2.5 million “senior” cats, which represents approximately 30% of the pet cat population [Venn, 1992].

Cats, like people, do not age consistently and chronological age does not always match physiological age. Some cats show obvious signs of old age after 10 years, while others appear almost unchanged until they reach 15 to 16 years of age.
It is generally accepted that cats become “senior” at about 7 to 8 years of age and progress to “geriatric” by 12 to 15 years of age. Regardless, older cats must be cared for and fed based on their individual needs.

Data from recent and ongoing Nestlé Purina studies provide important new information about the feline ageing process [Perez-Camargo, 2004 and Cupp et al., in press].
Some of these changes may even redefine our understanding about the lifestage physiology of the domestic cat, and have implications for the nutritional care of older cats.

Energy Requirements Change With Age

Maintenance energy requirements (MER) in cats decrease about 3% per year from ages 1 to 7 years [Perez-Camargo, 2004], but tend to remain constant during the mature years. However, by about 13 years of age onward, MER per unit of body weight actually increases [Laflamme and Ballam, 2002 and Cupp et al., 2004].
This means that the number of calories per unit of body weight needed to maintain body weight actually increases in geriatric cats. Care should be used to ensure that geriatric cats are fed a highly digestible, energy dense food or given higher rations to help compensate for the increase in MER.

Body weight changes with age

Recent research demonstrates that middle-aged cats have a tendency to be overweight (Figure 1), while catsover the age of 12 years have a higher incidence ofbeing underweight (Figure 2) [Perez-Camargo, 2004].
These data are consistent with clinical observations thatmany older cats experience weight loss.

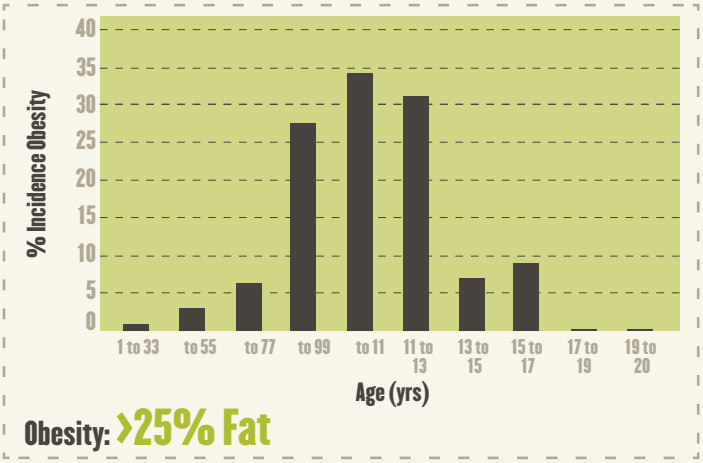

Figure 1. Incidence of Obesity in Cats with Age

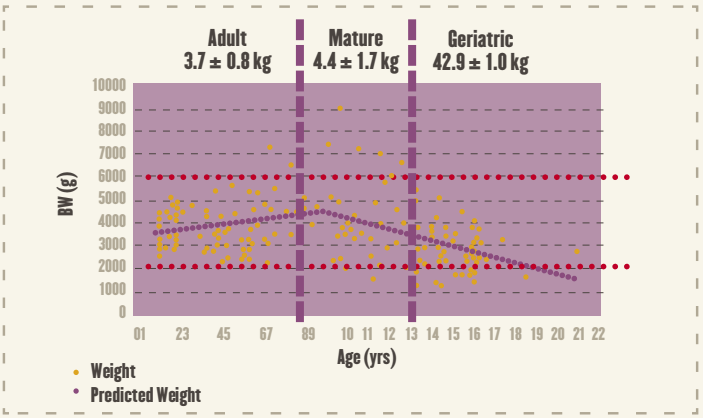

Figure 2. Body Weight (g) of Cats (n=235) by Age


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Body composition changes with age

Lean body mass (LBM) tends to decrease with age (Figure3), especially in cats over the age of 12. By 15 years ofage the geriatric cats had a mean lean tissue under 2 kg,which is about one-third less than the mean duringadulthood (~ 3 kg) [Perez-Camargo, 2004].

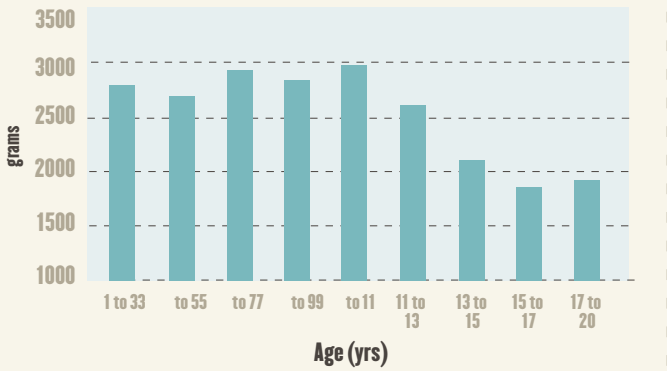

Figure 3. Changes in Lean Tissue (g) of Cats with Age

Digestive function changes with age

Older cats may experience a reduction in digestivecapabilities. The incidence of low fat digestibility in catsincreased with age, affecting 10-15% of mature cats (7 to 12 years of age) and approximately one-third ofcats over 12 years of age (Figure 4) [Patil et al., 2004].These findings were consistent across four differentcolonies of cats and were independent of diet type.

Reduced protein digestibility also occurs in geriatric cats. Although low protein digestibility did not affect as manycats as low fat digestibility, it affected one in five cats overthe age of 14 [Patil et al., 2004]. Reduced proteindigestibility with age may contribute to loss of lean bodymass in geriatric cats.

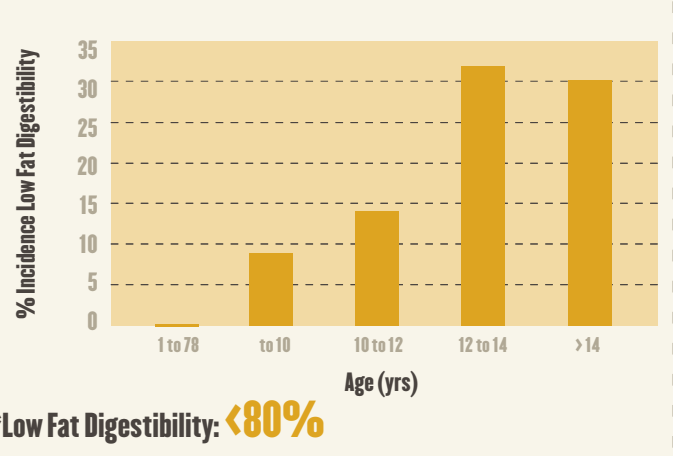

Figure 4. Incidence of Low Fat Digestibility* in Cats with Age

Water balance changes with age

Another implication of the progressive loss of lean bodymass in the geriatric cats is the reduction in the amountof water in the body [Perez-Camargo, 2004]. Much of theextravascular water in the body is contained in the leanbody mass (Lesser et al., 1980). In addition, ageing catsare perceived to have reduced sensitivity to thirst. Thereduction in the amount of water in the body could makegeriatric cats more prone to dehydration or less likely torecover from it.

Immune system changes with age

While there are only a few studies looking specifically atthe effect of ageing on the immune system of cats, thesestudies do appear to confirm that cats, like other species,show a decline in immune function with age.

Effect of Nutritional Interventions on Longevity in Senior Cats

Methods and Materials

A recent study by Nestlé Purina evaluated whetherantioxidants, alone or in combination with other nutritional supplements, increase health and longevity ina population of older cats [Cupp et al., in press]. A groupof 90 cats between the ages of 7 to 17 were blocked into3 groups by age, body condition score, and gender. Catswere assigned to one of three diets:

- **Diet 1**– control (basal diet of nutritionally complete cat food),
- **Diet 2**– basal diet with added antioxidants (vitamin Eand ß-carotene), and
- **Diet 3**– basal diet with LONGEVIS™ blend* (addedantioxidants, dried whole chicory root – source of prebiotic–and a blend of supplemental n-3 and n-6 fatty acids).

* Patent – pending proprietary blend

The diets were fed exclusively for the remaining lifetime of each cat.

It was hypothesised that combining several nutritionalstrategies could have synergistic or additive effects notevident in studies investigating only individual nutrientcomponents, and that these potential nutrient interactionscould measurably benefit the health and longevity of the ageing cat.

This study is ongoing and the Purina Petcare Teamcontinues to monitor the progress of the remaining cats in each of the three groups.

What parameters were measured in the study?

Physical exams, body condition scores, complete bloodcount, serum chemistries, plasma fatty acids, serumantioxidant status, faecal microflora, urinalysis and bodycomposition by DEXA were performed at study initiationand at periodic intervals thereafter. Age at death as well as cause of death and pathologies found at deathwere evaluated.

Results

Cats fed Diet 3 (diet with antioxidants vitamin E and ß-carotene, dried chicory root and a blend of n-3 and n-6 fatty acids) lived significantly longer than cats fed a standard nutritionally complete feline diet ($p < 0.05$, Figure 5). After calculating the predicted age of deathfrom different initial ages, it was observed that cats on Diet 3 lived about 1year longer than cats in the other groups.

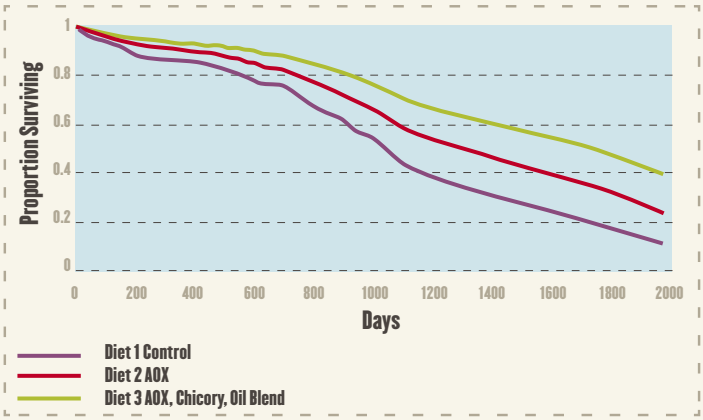

Figure 5. Adjusted Survival Curves for an initial age of 11

Preliminary data from cats that have died show trends indicating a positive impact on gastrointestinal and endocrine system function, suggesting that nutrient blend may contribute to improvements in health as well as increased longevity.

All three groups lost weight over time, on average, an expected result with ageing cats. Dietary differences in the average trends (slopes) were statistically significant for body weight ($p < 0.05$), with cats fed Diet 3 showing less decrease in body weight over time than cats on Diets 1 and 2 (Figure 6). Average food consumption in calories per kilogram body weight increased over time for all three groups. Cats fed Diet 3 showed less of an increase in food consumption over time than cats fed Diets 1 and 2 (Figure 7).

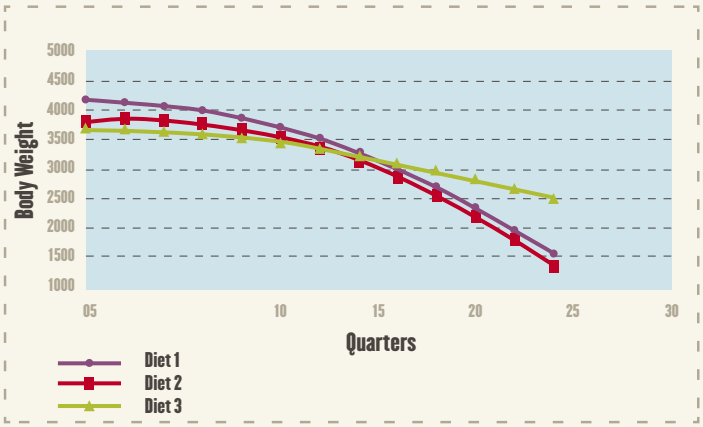

Figure 6. Body Weight. Longitudinal Analysis Results, initial age = 12

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Figure 7. Average Food Consumption, kcal/Body Weight. Longitudinal Analysis Results, initial age =12

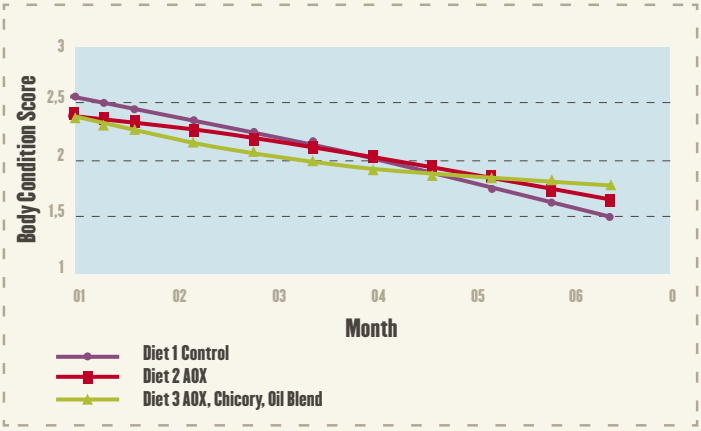

Figure 8.Body Condition Score. Average lines for initial age of 12

Cats on Diet 3 showed positive indicators of intestinal health with a significant increase in Bifidobacteria ($p < 0.01$) and a significant decrease in Clostridium perfringens bacteria ($p < 0.01$), while cats consuming Diet 1 had no significant changes (Table 1). Cats on Diet 3 also had an overall improved faecal flora profile than cats on Diet 1, as shown by the ratio of Bifidobacteria + Lactobacilli to Clostridium perfringens (Table 1). Overall, the data showed that cats consuming Diet 3 harboured healthier gut microflora than cats fed the control (chicory-free) diet.

Faecal Microflora (log cfu/g faeces) - Control & Diet 3					
	Diet 1 (Control)		Diet 3		P-value, Changes from initial Diet3 v Diet 1
Bacteria	Initial	3 Months	Initial	3 Months	
Bifidobacteria	7.45	6.19	6.56*	8.23	0.002
Clostridium *perfringens*	10.70	8.36	10.93*	7.70	0.000
Lactobacill	5.85	6.96	6.29	6.67	0.629
Bifido + Lacto: Clostridium *perfringens*	1.24	1.57	1.17*	1.93*	0.07

* Means across rows with different letter superscripts are statistically different ($F < 0.05$)

Table 1. Faecal microflora.

For body composition (DEXA and body condition score), longitudinal analysis showed significant decreases over time across all treatment groups ($p < 0.05$). Cats fed Diet 3 showed less decrease over time than both Diets 1 and 2 for body condition score (Figure 8), bone density, and bone mineral content, and less decrease over time than Diet 1 for lean body mass and total tissue (Figure 9). There were no significant differences between diets for fat.

Cats fed Diet 3 had significantly higher levels of serum vitamin E (Figure 10), serum ß-carotene (Figure 11), and plasma linoleic acid (Figure 12) compared to cats fed Diet 1. Both test diets in the current study were formulated with the same supplemental levels of vitamin E and ß-carotene, and both groups of cats showed significant increases in serum ß-carotene over control (Diet 1) and baseline levels.

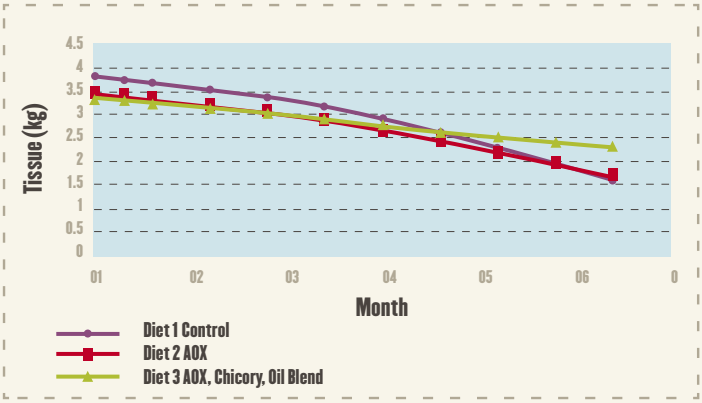

Figure 9. Body tissue (kg). Average lines for initial age of 12

However, only cats fed Diet 3 showed a significant increase in serum vitamin E over control (Diet 1) and baseline values as well as a significant effect on longevity. Antioxidants alone (Diet 2) did not deliver visible or measurable benefits. Possible explanations could include higher levels of oxidative stress and antioxidant requirements in the Diet 2 cats, reduced absorption of vitamin E from the intestinal tract, or differences in the intestinal microenvironment, producing a vitamin E sparing effect for Diet 3.

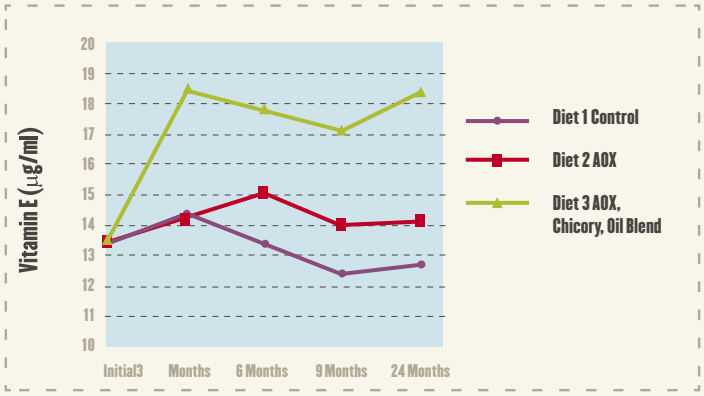

Figure 10. Serum Vitamin E

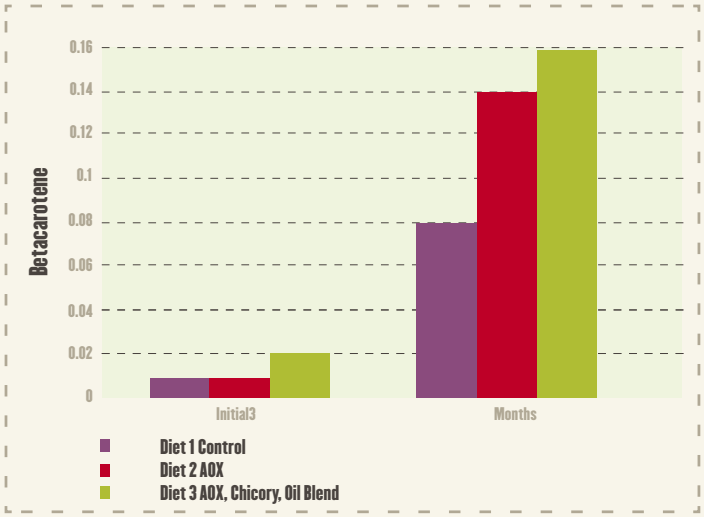

Figure 11. Serum ß-carotene

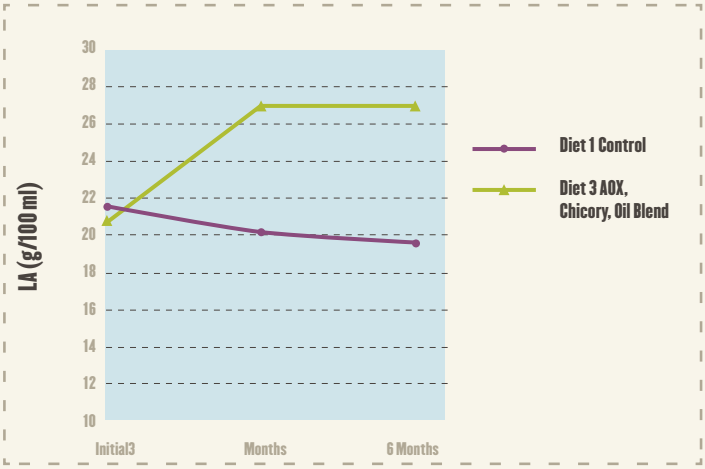

Figure 12. Serum Linoleic Acid

Conclusions

Cats fed the diet with antioxidants vitamin E and ß-carotene, dried chicory root and a blend of n-3 and n-6 fatty acids (LONGEVIS™ blend) have lived significantly longer than cats fed a standard nutritionally complete feline diet. Antioxidants alone (Diet 2) did not deliver visible or measurable benefits. Preliminary data from cats that have died show trends indicating a positive impact on gastrointestinal and endocrine system function, suggesting that nutrient blend may contribute to improvements in health as well as increased longevity. While this study is still on-going, additional data collected over the next few years may help further elucidate the mechanisms for both the increased survival and improvement in health status of these ageing cats.

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References

1. Venn, A: Diets for geriatric patients. Vet Times. 1992; May issue.

2. Kraft W: Geriatrics in canine and feline internal medicine. Eur J Med Res. 1998; 3: 31-41.

3. Gunn-Moore, G. Considering Older Cats. Comp Cont Edu Small Anim Pract 2004; 26 (Suppl 2A): 5-10.

4. AAFP and AFM panel report of feline senior health care. Comp Cont Edu Small Anim Pract. 1999; 21(6): 531-539.

5. Broussard JD, Peterson ME, Fox PR. Changes in clinical and laboratory findings in cats with hyperthyroidism from 1983-1993. J Am Med Assoc. 1995; 206(3): 302-305.

6. Perez-Camargo G: Cat nutrition: what's new in the old? Comp Cont Edu Small Anim Pract 2004; 26(Suppl 2A): 5-10.

7. Laflamme, DP and Ballam, JM. Effect of age on maintenance energy requirements of adult cats. Comp Cont Edu Pract Vet. 2002; 24(9A): 82.

8. Cupp, C, Perez-Camargo, G, Patil, A, and Kerr, W: Long-term food consumption and body weight changes in a controlled population of geriatric cats. Comp Cont Edu Small Anim Pract 2004; 26(Suppl 2A): 60

9. Patil, AR, Cupp, C, Perez-Camargo, G: Incidence of impaired nutrient digestibility in ageing cats. Comp Cont Edu Small Anim Pract 2004; 26(Suppl 2A): 72

10. Lesser GT, Deutsch S, Markofsky J. Fat-free mass, total body water, and intracellular water in the aged rat. Am J Physiology 1980; 238:R82-R90.

11. Allison JB, Wannemacher RW, Banks WL, Wunner WH. The magnitude and significance of the protein reserves in rats fed at various levels of dietary nitrogen. J Nutr 1964; 84:383-388.

12. Wannemacher RW, McCoy JR: Determination of optimal dietary protein requirements of young and old dogs. J Nutr. 1966; 88: 66.

13. de Groot LCP, van Staveren WA. Low-protein intakes and protein turnover in elderly women. Nutr Rev 1996; 54: 58-65

14. McMurray DN. Effect of moderate protein deficiency on immune function. Comp Cont Edu Small Anim Pract 1999; 21(Suppl 11): 21-24.

15. Cupp, C, Jean-Philippe, J, Kerr, W, Patil, A, Perez-Camargo, G: Effect of Nutritional Interventions on Longevity of Senior Cats. In press.

16. Taylor EJ, Adams C, Neville R: Some nutritional aspects of ageing in dogs and cats. Proc Nutr Society, 54:645-656, 1995.

17. Meydani M: Effect of functional food ingredients: vitamin E modulation of cardiovascular diseases and immune status in the elderly. Am J Clin Nutr, 71:1665S-1668S, 2000.

18. Burkholder WJ: Age-related changes to nutritional requirements and digestive function in adult dogs and cats. JAVMA, 215 (5):625-629, 1999.

19. Allen, TA: Management of advanced chronic renal failure. In: RW Kirk (Ed), Current Veterinary Therapy X, Philadelphia, WB Saunders, pp. 1195-1198, 1989.

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