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 composition changes with age

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

Digestive function changes with age

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

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

Water balance changes with age

Another implication of the progressive loss of lean body mass in the geriatric cats is the reduction in the amount of water in the body [Perez-Camargo, 2004]. Much of the extravascular water in the body is contained in the lean body mass [Lesser et al., 1980]. In addition, ageing cats are perceived to have reduced sensitivity to thirst. The reduction in the amount of water in the body could make geriatric cats more prone to dehydration or less likely to recover from it.

Immune system changes with age

While there are only a few studies looking specifically at the effect of ageing on the immune system of cats, these studies 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 whether antioxidants, alone or in combination with other nutritional supplements, increase health and longevity in a population of older cats [Cupp et al., in press]. A group of 90 cats between the ages of 7 to 17 were blocked into 3 groups by age, body condition score, and gender. Cats were assigned to one of three diets:

• Diet 1 – control (basal diet of nutritionally complete cat food),
• Diet 2 – basal diet with added antioxidants (vitamin E and β-carotene), and
• Diet 3 – basal diet with LONGEVIS™ blend* (added antioxidants, 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 nutritional strategies could have synergistic or additive effects not evident in studies investigating only individual nutrient components, and that these potential nutrient interactions could measurably benefit the health and longevity of the ageing cat.

This study is ongoing and the Purina Petcare Team continues 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 blood count, serum chemistries, plasma fatty acids, serum antioxidant status, faecal microflora, urinalysis and body composition by DEXA were performed at study initiation and at periodic intervals thereafter. Age at death as well as cause of death and pathologies found at death were 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 death from different initial ages, it was observed that cats on Diet 3 lived about 1 year longer than cats in the other groups.

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).

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

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

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.
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.

Conclusions

Cats fed the diet with antioxidants vitamin E and β-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.
References