



How the cats can be helped through the **ageing?** **process!**



i. Ageing is an **insidious and individual process**

Ageing is a slow and sometimes silent process. Individual cats and body systems age at different rates.

What is ageing?

Ageing is a complex biological process. It causes a progressive loss of capacity to maintain homeostasis and to respond to diseases or environmental factors.

What are the characteristics of ageing?

4 On the whole, ageing can be discerned by **Characteristics**

- Sets in progressively and insidiously
- Irreversible
- Involves all organs
- Varying expressions according to individuals



ii. Old cat's population

Life expectancy of pet cats is increasing.

7 Approximately one third of pet cats are now **years of age or older**

- In Europe, **20 million cats are over 10 years of age** (30% of the population over 8) and life expectancy is around 16 years.
- In the USA, **the number of cats above the age of 10 has increased by 15%** over the last 10 years and **cats of more than 15 years old represent 14%** of the population. Life expectancy is around 15 years.

In veterinary practice

Senior animals represent only 10 to 20% of vet consultations and only 14% undergo regular health screening.

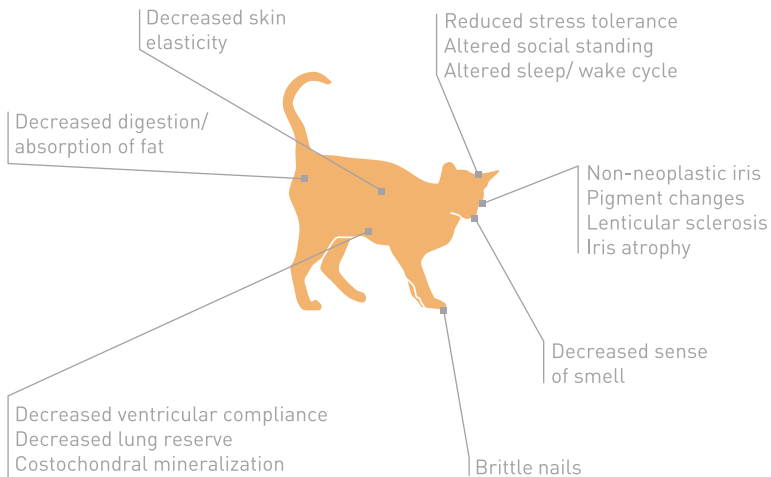
Cat owners often express a belief that cats "do not need medical care".

	Average visit times per year to vets
Dogs	2,3
Cats	1,1

2 reasons for this misconception:

- the signs of illness are often difficult to detect
- cats are perceived to be self-sufficient

iii. Common changes caused by ageing ^[3]



Effects of ageing

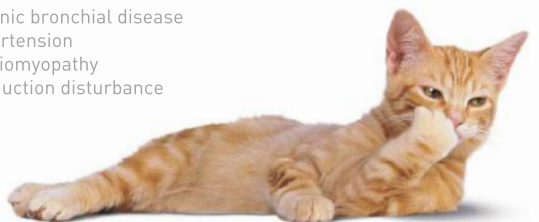
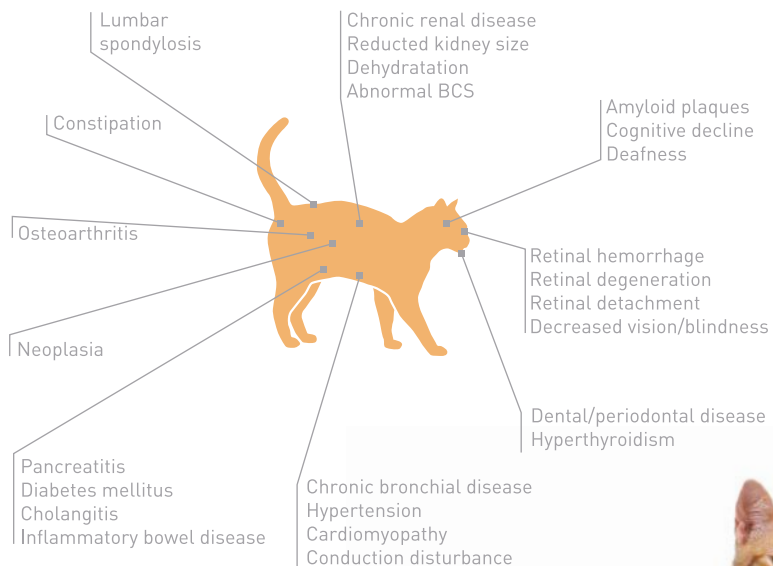
Old age brings a number of changes to how the body works.

- As old cats are often less active, their muscle tone tends to decline which may further reduce their ability to run, jump and climb.
- Older cats frequently suffer from a poor appetite, as their taste and smell sense often deteriorate with age.
- Teeth problems are common and can discourage eating.
- Reduced vision and hearing may lead to a decrease in adaptation to changes in its home environment.
- Bowel function may deteriorate with age, may cause reduced ability to absorb food nutrients and lead to weight loss.
- Elderly cats often have an increased water requirement, this can be due to reduced kidney function and/or mobility and/or appetite and may result in reduced water intake.
- With increasing age the immune system can become less efficient, leading to increased susceptibility to infection.
- Old cats often have poor coat condition.

Clinical conditions in older cats

Senior cats are prone to developing health issues such as kidney failure, osteoarthritis...

Conditions that impact quality of life and/or require further diagnosis or treatment

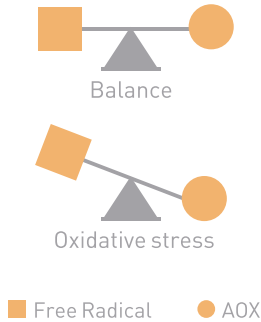


iv. Understanding the physiologic changes of ageing

Antioxidant defences declining

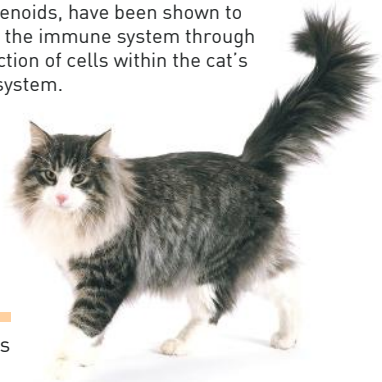
In the senior cat, the antioxidant defences decline with age whilst there is an increase in free radicals which result in oxidative stress.

When the production of free radicals exceeds the organism's antioxidant capacities.



An oxidative stress may cause irreversible damage of important cellular components. This oxidative damage is a major contributor to ageing and to degenerative diseases such as cancer, cardiovascular disease, immune system decline, brain dysfunction, and cataracts.

Antioxidants (AOX), such as Vitamins E & C and carotenoids, have been shown to stimulate the immune system through the protection of cells within the cat's immune system.



Weight loss

Weight loss is one of the most common presenting signs in older cats.

This might be due to a reduced...

- ability to smell and taste food
- digestive capacities

Cats in the senior group often become underweight with low Body Condition Score

With ageing there is changing in lean mass/fat mass ratio and therefore advise that energy content should be taken into consideration in the nutritional approach.

The cat's energy requirements vary over the years. From 1-7 years, the energy requirement decrease by 3% per year then remains stable until senior-hood where energy requirements increases.

Older cats require a greater energy density in their diet⁽¹⁵⁾.

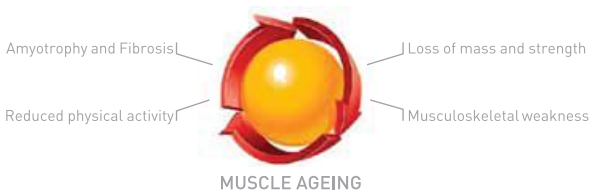
Age-related sarcopenia

Sarcopenia is the muscular atrophy that occurs as the result of ageing.

It corresponds to a loss of muscle strength and functional capacity.

Sarcopenia causes muscle fibres to be replaced by fat and results in increases fibrosis.

Age-related sarcopenia vicious circle



The ageing muscle is still able to respond to amino acids, mainly Branched-Chain Amino Acids which stimulate muscle protein synthesis in older individuals⁽²¹⁾.

Cognitive dysfunction

28% of pet cats aged 11 to 14 years develop at least one geriatric behavioural problem, increasing to more than 50% for cats of 15 years of age or older. ^[10]

The brain is, by essence, vulnerable to oxidative stress as it is formed from long chain polyunsaturated fatty acids (PUFA) which are highly sensitive to peroxidation processes.

Signs of cognitive dysfunction, the most common changes include^[18]:

- spatial or temporal disorientation (e.g. getting trapped in corners or forgetting that they have been fed)
- altered learning and memory
- house soiling with inappropriate urination/defecation
altered interaction with the family (increased attention seeking, aggression, irritability, anxiety, or decreased responsiveness)
- changes in sleep/wake cycles
- changes in activity (aimless wandering or pacing or reduced activity)
- altered interest in food (typically decreased)
- decreased grooming and/or inappropriate vocalization (loud crying at night)

Cognitive changes may also result from systemic illness (e.g. hyperthyroidism, hypertension), organic brain disease (e.g. brain tumour), or behavioral problems (e.g. anxiety)^[10]

The owners play a key role in diagnosing cognitive dysfunction in their cats, on condition if the "right questions" are asked, hence the interest of **precise questionnaires**^[17].

Osteoarthritis and joint performance loss

are deeply linked to the ageing process for the senior feline.



For a long time, the cat was considered to be a species that only exceptionally suffered from osteoarthritis. Recent studies have revealed that this is not so, in particular in elderly cats^[6].

A study carried out on 292 cats with a mean age of 9.5 years revealed that 33% of the cats with positive radiographies presented obvious clinical signs of osteoarthritis but only 17.5% of them presented lameness^[9].

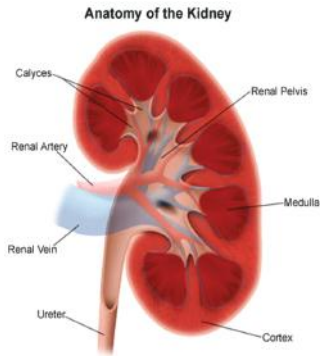
The variety of these symptoms and their low specificity mean that most owners don't notice them, or consider them to be normal considering the often advanced age of the cats^[11].

The owners can play a key role in diagnosing osteoarthritis in their cats, hence the interest of **precise questionnaires** on mobility^[17].

90% of cats older than 12 years show radiological signs of **degenerative joint lesions**



Renal ageing



Kidney disease is extremely prevalent in the ageing cat population and is one of the most common medical reasons older cats are seen in veterinary practice.

Data from the USA suggest that
1 in 3 cats over the age of 12 years have some form of **renal insufficiency**⁽¹⁹⁾

In studies of Feline Chronic Renal Failure, it has been shown the mean age of diagnosis is between 6.5 years and 12.6 years⁽⁷⁾.

A moderate phosphorus intake is essential to ensure kidney function:

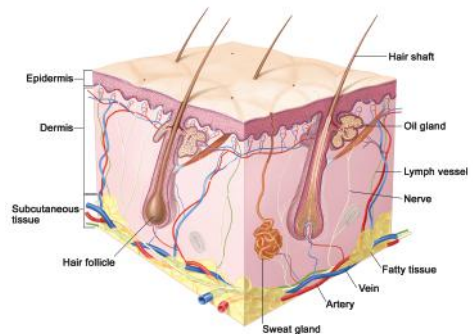
- To re-establish homeostasis of the calcium/phosphorus ratio, the body secretes parathyroid hormone in increased quantities. Parathyroid hormone has a hypercalcaemic and hypophosphataemia effect. When the kidney is in the decompensation phase, it leads to hyperphosphataemia and hypocalcaemia, which exacerbates hyperparathyroidism and sometimes causes bone demineralisation.
- Limiting phosphates in the diet is an efficient way to prevent hyperphosphataemia and hyperparathyroidism. Several studies have shown that the life expectancy of cats with renal failure is significantly longer when they are fed a low phosphorus diet⁽⁸⁾.

A low phosphorus intake is key to help support renal health in cats with kidney disease.

Some skin changes

are obvious, such as whitening of hair and a general decline in coat condition.

Skin is also less pliable and elastic. Oil producing glands do not work very well and the skin and fur may become dry⁽¹⁵⁾. Skin ageing is due to the conjunction of intrinsic (chronological ageing) and extrinsic (fundamentally photo-ageing) factors.



Dental care

Many elderly cats are prone to dental tartar build-up. Tartar causes bad breath and can lead to dental problems - gum disease, tooth loss and even systemic illness.

A complete oral exam, plus the owner's observation of eating behaviour, will elucidate dental problems. Cats with oral pain may be thin, drop their food, chew on one side, eat more slowly, eat less, or show less interest in food.

Failure to treat painful dental conditions such as odontoclastic resorptive lesions, periodontal disease, or broken teeth contributes to diminished quality of life.



v. When and how to make senior consultations?

From 7 years old

From 7 years old a geriatric consultation should be done to define the baseline parameters of the cat. It will help to determine changes through ageing.

Regular check up

Each clinician should decide whether a thorough annual examination and evaluation is sufficient or if it would be best to recommend examination as frequently as every six months for apparently healthy senior feline patients.

Senior consultation:

- Observation of the cat to assess breathing patterns, gait, strength, coordination, vision
- Weight and BCS (comparison with previous visits)
- Thyroid gland palpation
- Oral cavity
- Ophthalmologic screening (fundic examination)
- Skin and hair quality
- Heart rate, rhythm, murmur, blood pressure
- Abdominal palpation (pain, mass, kidney, bladder size and shape)
- Orthopedic examination

Laboratory evaluation as part of the routine yearly evaluation for healthy geriatric patients, the following are recommended:

- Complete blood count
- Serum biochemistry profile with electrolytes
- Complete urinalysis (collected by cystocentesis because bacterial urinary tract infection, although uncommon in cats, is more likely in older patients)
- Serum total thyroxine

The laboratory evaluation also includes the following:

- Urine specific gravity and dipstick chemistry evaluation
- Packed cell volume and total protein
- Blood urea nitrogen and creatinine
- Alanine aminotransferase, serum alkaline phosphatase, and g-glutamyl transferase

Use a questionnaire to define with the help of the owners:

- Changes in the cat's usual behaviors
- Eating, drinking
- Mobility

vi. Royal Canin's nutritional solutions

CHECK FOR AGEING SIGNS

- Osteoarthritis
and/or
- Cognitive signs
and/or
- Sarcopenia
and/or
- At risk to develop
Chronic Renal Failure

NO
SENIOR
CONSULT
STAGE 1



STAGE 1



1.5 kg
3.5 kg

YES
SENIOR
CONSULT
STAGE 2



STAGE 2



1.5 kg

vii. References

[1] American Association of Feline Practitioners and American Animal Hospital Association. Journal of Feline medicine and Surgery (2010) 12, 43-54
 [2] American Association of Feline Practitioners - Senior cat guidelines - revised December 2008
 [3] Bennett, D. 2008. Cats do not suffer arthritis, do they? In Proceeding WSAVA, 52.
 [4] Clarke, S.P, and D Bennett. 2006. Feline osteoarthritis: a prospective study of 28 cases. The Journal of Small Animal Practice. 47, no. 8 (August): 439-45. doi:JSAP143.
 [5] Clarke, S.P, D. Mellor, D.N. Clements, T. Gemmill, M. Farrell, S. Carmichael, et D. Bennett. 2005. Prevalence of radiographic signs of degenerative joint disease in a hospital population of cats. Vet Rec. 157, no. 25 (D cembre 17): 793.
 [6] Elliott J. Feline renal chronic failure: Clinical findings in 80 cases diagnosed between 1992 and 1995. J Small Animal Pract. 39: 76-85, 1998
 [7] Elliott J, Rawlings JM, Markwell PJ, et al. Survival of Cats with naturally occurring Chronic Renal Failure: Effect of Dietary Management J Small Anim Pract. 2000; 41-235-242.
 [8] Godfrey, D R. 2005. Osteoarthritis in cats: a retrospective radiological study. The Journal of Small Animal Practice. 46, no.9 (September): 425-9. doi:16167592.
 [9] Gunn-Moore et al. Cognitive dysfunction and the neurobiology of ageing in cats. J Small Anim Pract. 2007 Oct; 48(10):546-53.
 [10] Hardie, Elizabeth M, Simon C Roe, and Fonda R Martin. 2002. Radiographic evidence of degenerative joint disease in geriatric cats: 100 cases [1993-1997]. Journal of the American Veterinary Medical Association. 220, no. 5 (March 1): 628-32.
 [11] Harper. 1998. Changing perspectives on aging and energy requirements: aging and digestive function in humans, dogs and cats. Journal of Nutrition. 12, no.128: 2643S.

[12] Hawthorne, A. 2002. Les besoins nutritionnels du chien et du chat vieillissants. Waltham Focus. 12, no.1: 28-34.
 [13] Head, Elizabeth. Neuropathology in ageing dogs. 2008. Oxidative stress Aging and CNS disease in the canine model of human brain ageing. Vet Clin North Am Small Anim Pract. 1, no.38 (Janvier):167.
 [14] Laflamme D. 2005. Nutrition for aging cats and dogs and the importance of body condition. Vet Clin Small Anim. 35: 713-742.
 [15] Laflamme DP, Hannah SS. Increased dietary protein promotes fat loss and reduces loss of lean body mass during weight loss in cats. Intern J Appl Res Vet Med 2005; 3: 62-68.
 [16] Landsberg, G., et J. A Araujo. 2010. Behavior problems in geriatric pets. Veterinary Clinics of North America: Small Animal Practice. 35, no.3: 675-698.
 [17] Lees GE, Brown SA, Elliott J, Grauer GE, Vaden SL, American College of Veterinary Internal Medicine. [2005] Assessment and management of proteinuria in dogs and cats: The 2004 ACVIM Forum Consensus Statement (Small Animal). JVIM 19, 377-385.
 [18] Lulich J et al, Feline renal failure: Questions answers. Compend Contin Educ Pract Vet 14: 127-152, 1992.
 [19] Lund EM, Armstrong, PJ Kirk CA, Klausner JS [2005] Prevalence and Risk Factors for Obesity in Adult Cats from Private US Veterinary Practices. JARVM Vol 3 #2 p88-96.
 [20] Volpi, E., H. Kobayashi, M. Sheffield-Moore, B. Mittendorfer, et R. R Wolfe. 2003. Essential amino acids are primarily responsible for the amino acid stimulation of muscle protein anabolism in health elderly adults. American Journal of Clinical Nutrition 78, no. 2:250.
 [21] Watson TD. Diet and skin disease in dogs and cats. J. Nutr. 1998 Dec; 128 (12 Suppl): 2783S-2789S