territory. Like HIV, it can also be spread through blood transfusions if blood is not pre-screened.
The disease **progresses slowly** over the years, and the cat **loses her ability to fight disease** as the virus destroys her white blood cells. The cat becomes immunosuppressed, catching secondary infections and taking longer to get over everyday diseases.
Affected cats may **lose weight, get fevers, have infections, develop neurological disease and develop some cancers**.
Having FIV is no reason for euthanasia, but **sensible health precautions need to be undertaken** and cats should not be allowed to free roam as they **risk infecting other cats**.
There is a **vaccine for FIV available in the USA, Canada, Australia and New Zealand**, but no licensed vaccine in Europe. This is due to **conflicting reports on how well the vaccine works with European strains** and that once a cat is vaccinated, you can't tell the difference between vaccination or disease with a blood test.

GOOD TO KNOW

Cats affected with FIP can get:
*• Fluid in their chest or abdomen/tummy **("wet" FIP)***
*• Nodular growths (granulomas) on their internal organs **("dry" FIP)***

FELINE CORONAVIRUS

Feline coronavirus is a common virus that infects cats through contact with **infected faeces**. This can occur through **grooming each other, sharing litter trays, sharing food bowls or sharing grooming equipment**.
In most cats, the infection will go unnoticed or may cause a mild, self-resolving diarrhoea. However, in a small percentage of cats, the virus can cause **a fatal disease syndrome: feline infectious peritonitis (FIP)**.
Scientists do not yet understand the mechanism which turns this relatively benign virus into a killer.
The disease is more common in group-housed cats and kittens/young adults.

> There is a vaccine available against FIP, but its effectiveness remains controversial.

RABIES

Rabies is a virus that causes **neurological disease** in warm-blooded animals (including humans).
It is a **zoonotic disease** due to a *Lyssavirus*. Rabies has been eradicated in only a few countries, but risk of re-infection is high as international borders become more fluid. Cats get rabies by **being bitten by an infected animal, by infected saliva contacting mucous membranes** (e.g. membranes in the mouth, conjunctiva in the eyes) or **occasionally by consuming infected prey**.
Signs of disease usually occur about **3-8 weeks after infection**.

Clinical signs include: **behaviour changes, like aggression** ("furious" rabies), or **withdrawal** ("dumb" rabies), **excitation, increased responses to normal stimuli and intense itching at the bite site**.
Cats are more likely to show the "furious" form and they don't show fear of water (hydrophobia) like people do.

PARASITES AND FUNGAL DISEASES

There are a number of different worms that can infect cats.

Roundworms

Ascaris (*Toxocara cati* and *Toxascaris leonina*) are roundworms which infect cats through consuming worm eggs from a contaminated environment (soil and grass), or by eating prey species (birds, rodents, rabbits, earthworms) harbouring encysted forms of the worm.
Once ingested, the eggs hatch inside the cat and the larvae **migrate through the lung and liver, are coughed up, swallowed and then develop into adult worms in the intestines**.

They can also hide out in other body tissues ("encysted larval" phase). This phase can be **reactivated at times of stress**, immunosuppression and pregnancy. The worms produce eggs which are shed in the faeces and then mature outside of the cat in the environment.

Although roundworms in dogs can pass across the placenta into the puppies, this **does not occur in cats.** However, infection can pass into the queen's milk.

> It is recommended that kittens be wormed from 6 weeks old.

GOOD TO KNOW

Vaccination against rabies is recommended in all countries where the disease is endemic.
It is also a legal requirement if you want to take your cat to a different country.

Clinical signs are more common in kittens than adults and can include **diarrhoea, poor coat quality, "swollen tummy"** (distended abdomen) and **poor growth**.
Worms are important as they are a public health risk. People – mainly children – can become infected by the eggs and develop "visceral larval migrans" (causing liver and lung disease), "neural larval migrans" (causing nervous disease), "ocular larval migrans" (causing eye disease and blindness) and "covert toxocariasis", where non-specific signs such as pain develop.

"When the barometer washes behind its ears, the cat forecasts rain."

Léo Campion

Tapeworm

Cats contract tapeworms either by **swallowing fleas when they groom** (*Dipylidium caninum*) or **through eating prey or raw meat** (*Taenia*). Tapeworms are long flat worms that **live in the cat's intestines** and **pass their eggs in segments that look like grains of rice**. They can sometimes be found in the hairs around a cat's bottom or in her bed. They are rarely associated with clinical signs of disease but occasionally cause diarrhoea and weight loss.

Geo-specific worms

Depending on geographical location, there are number of other types of worms which can affect cats. **Hookworms** (*Ancylostoma* species and *Uncinaria stenocephala*) are intestinal worms that measure **between 1 and 3 cm long**, and that **grab on to the lining of the intestine with sharp hooks**. In severe infections, kittens can have bloody faeces and become anaemic.
Lungworms (*Aelurostrongylus abstrusus*) are found in **slugs and snails**, although cats are **more often infected by eating rodents, birds, amphibia** (frogs, toads) **and reptiles** ("transport hosts"). Clinical signs are not usually seen, although in heavy infections, cats may cough and then go off their food, become thin and have breathing problems.
Heartworm (*Dirofilaria immitis*) is present in some regions of the world (USA, Japan, tropical areas). It is carried by mosquitoes and infects cats through a mosquito bite. The **worms migrate to the heart and blood vessels of the lungs**. There is no approved treatment, but there are **effective products that prevent infection**.

Fleas

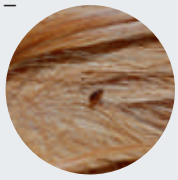
Fleas are **small parasites that live in the cat's fur**. The cat flea (*Ctenocephalides felis*) is the most common flea and will bite cats, dogs, small mammals and people.

Other external parasites

There are other external parasites which affect cats, including lice (*Felicola subrostrata*), **acarids** responsible for **ear mites** (*Otodectes synotis*), **head mange** (*Notoedres felis*) and sometimes **sarcoptic mange** (*Sarcoptes*

GOOD TO KNOW

Great sleepers and heat lovers, our cats are the ideal host for fleas. These insects are designed to thread between the cat's hair before biting the skin and laying their eggs. Fleas are a real problem – they bite people, transmit parasites and disease, cause anaemia and can even kill kittens.



©Pascal Prélaud

scabei) and **demodetic mange** (*Demodex cati*). Cats can also have **harvest mites** (*Trombicula autumnalis*) or **walking dandruff/cheyletiellosis** (*Cheyletiella mites*). All these parasites cause dermatitis, which can be serious, and need a precise diagnosis and suitable treatment *(see chapter Skin and Coat Diseases)*.

Protozoa

Protozoa are **single-celled organisms** that can **cause diarrhoea**. The main parasites we may come across in cats are ***Giardia duodenalis***, ***Tritrichomonas fœtus*** and ***Cystoisospora*** (coccidian). A cat can become **infected by eating the infective form of the parasite** (cyst/oocyst) by **grooming/licking fur contaminated with faeces**, **sharing dirty litter trays or eating an item that is contaminated with faeces**. Some of these parasites are resistant in the outdoors environment, even to moisture.

Toxoplasmosis is usually a mild disease in cats, caused by a protozoa (*Toxoplasma gondii*), but it is particularly dangerous for pregnant women *(see chapter Myths and Realities of the Cat)*.

Fungal infections

The most common fungal infection of concern in cats is ringworm. Ringworm is a fungus, not a worm, that lives and feeds off the surface of the skin, hair and nails. The usual fungus causing ringworm is *Microsporum canis*, and this can infect other species of animal too, including dogs and people.

There are also a number of **"systemic" fungal infections** which will affect different organs. These are usually serious diseases which require an accurate diagnosis and specific treatment *(see chapter Skin & Coat Diseases)*.

PREVENTION OF INFECTIOUS DISEASES

Vaccinations help prevent diseases and are one of the most important tools we have for stopping potentially lethal infections. The principle behind vaccination is to introduce a dead, weakened or highly specific element of the infectious agent, so that the immune system learns to recognise the danger and kick into action.

Simple hygiene measures can also prevent many infectious diseases: **cleaning the litter tray regularly, each cat having her own food and water bowls, regular worming and parasite control,** are just a few of the weapons on your side to keep your cat healthy.

GOOD TO KNOW

- ***Vaccination*** *usually starts when kittens are around* ***nine weeks old. Primary vaccination****, or the first series of vaccination, usually requires several injections at* ***2-4 week intervals****.*
- *If a kitten is vaccinated* ***too early, vaccine-acquired immunity will develop less well,*** *because the kitten will still have some* ***maternally-transmitted immunity from maternal milk (colostrum)****.*
  Studies have shown that ***from three months of age the kitten's own immune system will be completely operational****.*
- *If you adopt* ***an adult cat,*** *you will also* ***need to arrange vaccination****.*
- ***Booster vaccinations will be necessary*** *throughout the cat's life –* ***your vet will advise you on frequency*** *in relation to the local situation and any laws in force.*
  Some vaccines must be given every year, while others may need to be given every 3 years.

BASIC

FIRST AID

FIRST AID

Cats are by nature self-sufficient. When cats are **ill or injured**, they are instinctively aware of being in **a weak position**, at the mercy of a predator, and consequently, will have an **initial reflex of hiding**.
Our pet cats still have that instinct. Unfortunately, they are sometimes victims of accidents, falls, poisoning, or chronic infection.
How should you react to a potentially fatal emergency?

Better safe than sorry!

The ideal solution is to avoid being in such a situation. Quite apart from common preventive medicine such as vaccinations, de-worming, neutering..., **there are lots of good common sense ways to avoid accidents.**

We may not be aware of how many traps there are in our own home, and lack of awareness can be harmful to your cat's safety.

New habits - and perhaps some rearranging - will allow you to protect your pet from domestic accidents.

Cats have the bad habit of settling down in cupboards, drawers, laundry baskets, under furniture, and often in the drum of your washing machine or dryer.

- **Discover where your cat's favourite hiding places** are to limit the risks of accidents.
- **Be careful where you step**, and before closing a door, make sure that there is no little bundle of fur still outside.
- **Remember to close windows when you go out**, and to limit and monitor access to your balcony if you live on a high floor.
- **Take care to follow your vet's advice** on preventing illness.
- **Put any poisonous products well away, and do not have any lilies or other dangerous plants** in your home.
- **Never give any medicine without your vet's advice** (remember that **paracetamol is fatal to cats**).
- If you **live near a road, keep your cat inside**.
- If you **put a collar** on your cat, make sure that **it can unfasten automatically** if she gets caught up somewhere.
- **Do not leave any objects lying around that your cat will see as an irresistible toy**: bits of string, needles and thread, elastic bands, garlands, corks … can all often be a fatal attraction when they turn into foreign bodies.
- **Protect plugs and sockets**.
- **Also take care to prevent obesity**, which is responsible for or else an aggravating factor in several illnesses; not to mention the impact on the quality of life.

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THE MOST COMMON POTENTIALLY TOXIC PLANTS:

Instinctively, kittens do not eat plants which are dangerous for them, but it is prudent to avoid having toxic plants in your home.

For a complete list, consult your vet.
• Aucuba • Azalea • Cyclamen • Diffenbachia Ficus
• Wisteria • Mistletoe • Holly • Oleander • Ivy
• Lily • Philodendron • Poinsettia • Sweet peas
• Love apple • Rhododendron

CAUSES FOR ALARM:

There are several, but they all need to be taken seriously.

Here are several situations which call for you to consult a vet immediately:

- A despondent or anorexic cat
- A cat drinking an abnormally high quantity of water
- Strange sounds: unusual meowing, crying, growling, moaning, but also mechanical purring for no apparent reason
- Any changes in behaviour, even-tempered cats who become cranky or normally grumpy cats who suddenly become affectionate
- Problems in breathing, coughing, running eyes or nose
- Bleeding
- Abnormal colour of eyes or mucosa: yellow, white, bluish …
- Presence of blood in urine, or problems to urinate
- Digestive problems: hyper-salivation, vomiting, diarrhoea, constipation
- Nervous problems: head trembling, staggering walk, convulsions
- Skin lesions, swollen glands, swollen or painful stomach
- Discharge from genital organs
- Excessive licking of certain parts of the body…

> You know your cat, so if her behaviour seems a little unusual to you, then you should be concerned. Our cats' secretive natures mean they won't draw attention to their injuries or ailments, so your expert eye is the best detective!

SOME GOOD HABITS

- Do not leave any plastic bags or objects made of foam around.
- Put the lid on your dustbin, and put the lid down on the toilet (be careful of the string on the plastic bin liner that cats love to swallow…).
- Cover up electric hot plates.
- Be careful of the electric iron, which can cause a lot of burns.
- Shut away medicine, pesticide and other dangerous liquids.

IN PRACTICE

- Whatever the initial problem, there is **a stress factor which will make things worse**, and can have dramatic consequences. This is especially true for respiratory problems or after an injury.

> When dealing with an ill or injured cat, it is better to avoid shouting, panicking, or over-handling…

- **Remember to call the veterinary clinic before going there**. These precious minutes whilst you are on your way will allow the healthcare team to prepare for the arrival of the patient.

- To transport the cat, you can **of course use a transport carrier**, but if you do not have one, **a sports bag with a rigid bottom will do**. The cat will feel sheltered. **Remember to cover the carrier to limit any anxiety**.

- And remember to protect yourself; **when cats are hurt or are frightened they can have a defensive reaction,** which will be expressed by aggression.

- **In the case of a traffic accident or a fall, try not to move the animal too much**. If there is a (or several) fracture(s), moving bone sections will cause intense and unnecessary pain. Any unintentional movements can also risk worsening the injuries, especially on the spine or in the case of haemorrhage.

- **If possible, slide the animal onto a rigid panel and keep her there with the help of a cover or a towel**. The cat will feel "hidden", and this will help her to manage the stress caused by the injury.

> They say that cats have seven (or nine, in some countries) lives let's do all we can to make them keep them!

> "You become responsible, forever, for what you have tamed."
>
> **Antoine de Saint-Exupéry**

CATS AND THE VETERINARIAN

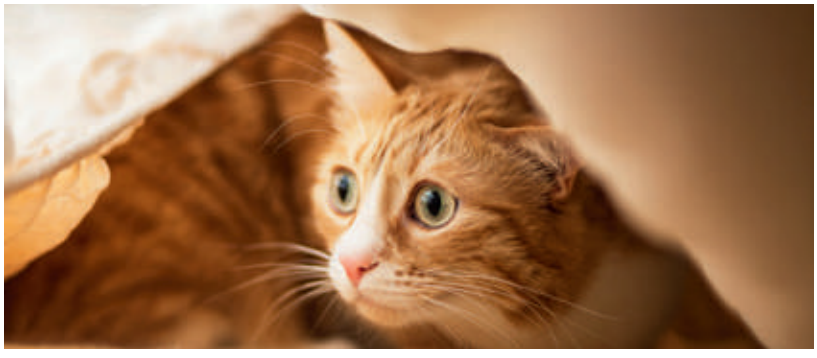
CHOOSING YOUR **VETERINARIAN**

When you first got your kitten, you were probably advised to continue taking her to the same vet. If this is not possible, for whatever the reason, (for example distance, timing, personal reasons,) you will need to choose a clinic for your pet.

> A visit to the vet is stressful for the cat and the owner.

Let's put ourselves in the cat's place for a moment: first of all there is that dusty **pet carrier** which you only take out of the cupboard or the garage when you take the cat to the vet. **Its appearance spells danger and bad memories!** Then, the owner – who is normally so patient and kind – suddenly becomes a merciless hunter chasing down the animal all over the house.

The objective is to trap her before she escapes, and for that, anything goes: adopting a cajoling voice, using the bowl as bait, promising you'll stroke her …. anything to avoid being late for the appointment!



The owner ends up catching the cat, sometimes with great difficulty, especially if she hides under the bed or on the top of a cupboard, before pushing her into that inhospitable pet carrier, which is quickly closed before the prisoner can escape.
Then comes the journey, whether long or short, during which poor pussy is shut in her cage and tossed about, **assailed by smells which are neither reassuring nor enticing**, stunned by frightening sensorial stimuli, and often on view by all, including dogs, who are potential predators.

THINGS TO THINK ABOUT WHEN YOU CHOOSE YOUR VETERINARY PRACTICE:

- *trusting the staff,*
- *the practice's local reputation,*
- *how close to home is it,*
- *how will you get there,*
- *can you park easily,*
- *is the clinic clean and well-maintained,*
- *are the animals' files kept up to date,*
- *do they send out reminders for vaccinations and health check-ups,*
- *are there any preventative medicine programmes,*
- *one man band, or a team of vets and nurses*
- *what equipment do they have,*
- *how do they organise emergency or out of hours services*
- *nutritional advice,*
- *interest for cats,*
- *and most importantly… is the approach suitable for your cat's needs?*

No wonder this sort of treatment often leads your cat to lose her bowel control, or to dribble out of sheer fear.

Once you arrive at the vet's, her sense of smell sends her a range of frightening signals; the scent of dogs, stressed cats, disinfectant, medicine…
And then, most of the time, once you have arrived in the waiting room, **the pet carrier will be placed on the ground**. If there is a dog in the waiting room, he will most probably begin barking, smelling the carrier, or even, in the worst case scenario, cocking his leg on this new object in the room …

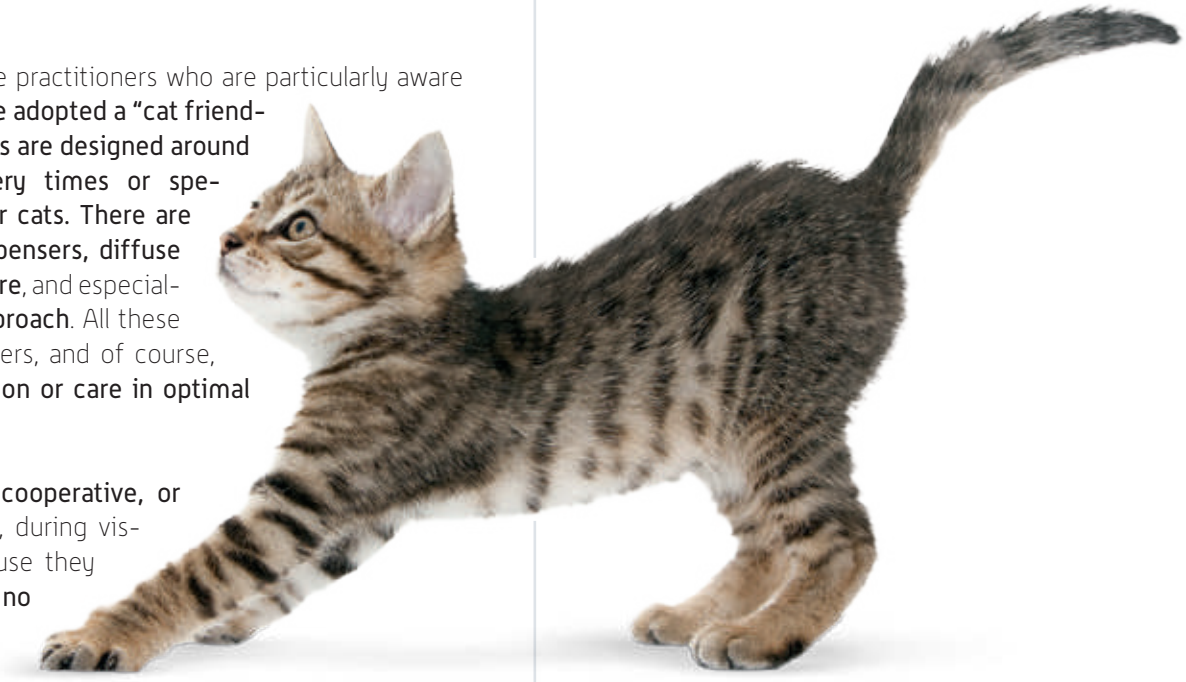
When it's time for the consultation, kitty is often forced out of her basket which of course she is most reluctant to leave at this stage. **She will be placed on a cold table which smells of disinfectant** and unknown hands will **begin pawing her, inspecting her mouth, her ears, palpating her stomach**, and … the height of indignity, **taking her temperature!**

Often the "consultation" ends with one or several injections, and then, without further ado, the cat is bundled back into her basket for the stressful journey home.

> "The key to a successful new relationship between a cat and a human is patience."
>
> **Susan Easterly**

SPECIAL "CAT CLINICS"

For some time now, some practitioners who are particularly aware of cats' special needs **have adopted a "cat friendly" approach. These clinics are designed around cats' needs, with surgery times or special waiting areas just for cats. There are soothing pheromone dispensers, diffuse lighting, a calm atmosphere**, and especially **a patient, attentive approach**. All these elements allow vets, owners, and of course, cats, to **have a consultation or care in optimal conditions**.



When cats are really uncooperative, or perhaps even aggressive, during visits to the vet, it is because they **are frightened and have no other way of dealing with the "threats" they feel assaulted by**.

BEFORE THE VISIT

> Your information is just as important as your vet's clinical examination

Your vet will find your information, as the cat's owner, enormously helpful in making a diagnosis.

Before you visit, **check your cat's Health Record Book** (*see chapter on Preventing Infectious Diseases*).

It can be **helpful to write** some information down, like **your cat's diet** (brand, quantity, etc.) and drinking habits, and whether you have noticed any other eating, digestive or behavioural changes.

Keeping a paper record of your cat's health history and past treatments can be very valuable – ideally, keep it in her health folder.

TRANSPORT

For reasons of safety (hers and yours!), your **cat should travel** in **a specially designed pet carrier**. **Ideally, this should be a familiar object for your cat**. To makes things easier, if you are planning a visit to the vet soon, **take the carrier out several days before the consultation, and leave it open in a corner of the house** where the cat likes to go.

You can spray soothing pheromones and put a blanket inside which already carries the cat's own scent – **this will help her get used to her box, and to feel safe, protected from prying eyes.**

If the cage has an open side, cover it with a towel or a blanket, so that the cat feels less exposed.

A few extra tips

To limit the impact of a visit to the vet, these are some useful tips:

- **In the waiting room, leave your cat in her basket, and put it on a raised surface**

• **Try not to make any sudden movements, and take your cat out gently** to put her on the examining table

• **Some cats feel reassured in their cage**. If this is the case, take off the top part, so that the vet can reach the animal

• **Speak to your cat in a soft voice**, and stay calm yourself! If you are agitated, your cat will feel it, and will become even more stressed

• **You can trust the professionals**: your veterinary team are used to dealing with cats, even the least cooperative ones. If you try to intervene, not only will you be in the way, but you could get hurt.

• **Some vets make house calls**. In this case, shut the cat in just one room, preferably one without too many hiding places! Remember that the vet cannot always bring everything necessary, and that some visits will certainly require you and the cat to go there instead.

• **A frightened cat can make her condition even worse**, especially if she has respiratory problems or has suffered an accident. Staying calm, soothing her by stroking and using a soft voice is the best approach here.

• **If your cat needs to be hospitalised, choose somewhere that takes cats' specific needs into account if you can**. If the visit has been planned in advance, you can usually take her cushion or favourite blanket, or even a piece of clothing that you have worn, and which will consequently be infused with your odour.

RETURNING HOME

Most of the time, cats are delighted to be back in their own familiar environment.

> When you get back
> from the veterinary clinic,
> let your cat settle back in calmly.

Cats (if they are healthy enough to do so) will certainly want to make sure that the furniture hasn't been moved around, that the garden is still there, and that the litter box is indeed theirs.

Very often they will inspect their favourite places and deposit their odour by rubbing their forehead, or sharpening their claws.

However, in homes with several cats, you will need to take a few precautions in order to have a happy and serene return to the feline community.

RE-INTRODUCING YOUR CAT TO THE HOUSEHOLD

In well-established groups of cats, each one knows the others and they have regularly exchanged olfactory signatures.

It can happen that a cat leaves the group temporarily,
and, when she gets back to the household is no longer recognised by one or all of her fellow cats,
which can cause anxiety or even fighting.

It is therefore necessary to take certain precautions when the traveller returns home again.

These precautions can be also used when introducing a new arrival for the first time, whatever his/her species.

• You need to first of all make sure that the atmosphere in the house is peaceful, by spraying synthetic pheromones. (e.g. Feliway ™).

• So that the new arrival has a "local" smell, you can rub her with a piece of cloth infused with the odour of a cat who has not left the household.

• If possible, place a cover used by cats who haven't moved, in the pet carrier, so that the homecoming cat recognises the odour of her fellows, and becomes infused with it herself.

CHAPTER 06

COMMON DISEASES

LOWER URINARY TRACT
DISEASE

316/317

CAT ENCYCLOPEDIA

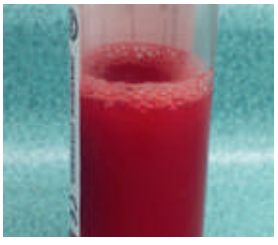
FLUTD

Feline Lower Urinary Tract Disease (FLUTD) affects up to 10% of cats worldwide. In most cats it is characterised by episodes of cystitis (bladder inflammation).

SIGNS OF LOWER URINARY TRACT DISEASE:

© Sarah Caney

- **Difficulty or straining** to pass urine
- **Passing small volumes of urine**
- **Increased frequency of urination**
- **Urinating in inappropriate locations** (called periuria)



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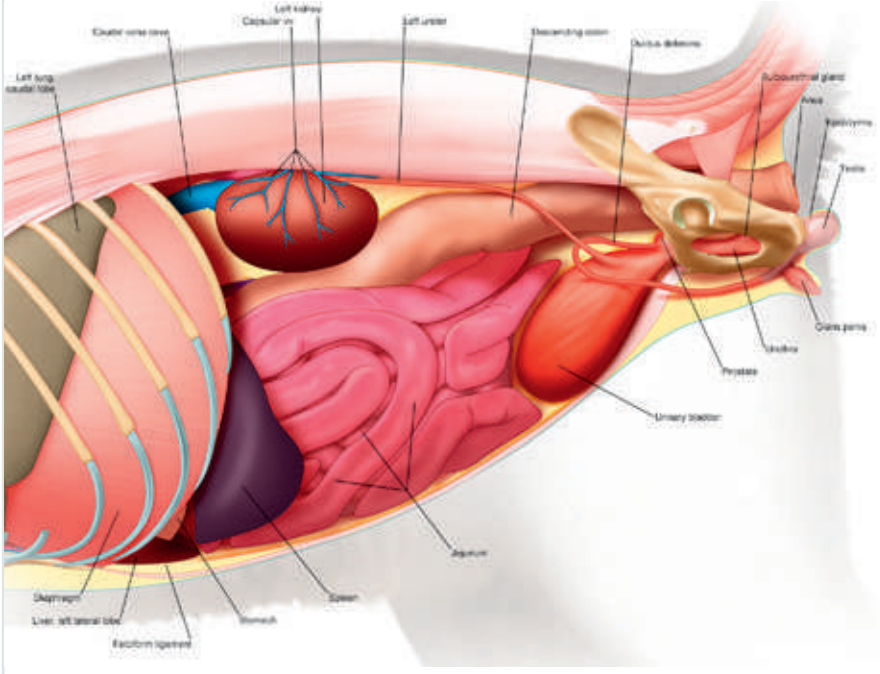
- **Passing urine that looks like blood**
- **Showing signs of pain or irritability** when urinating

Excessive grooming of the perineum. Some cats will also over-groom their belly and inner thighs

Obstructed cats will strain unproductively – do not confuse this with constipation.

THIS IS AN EMERGENCY SITUATION AS IT CAN BE RAPIDLY LIFE-THREATENING



It can be caused by many conditions including **bladder stones and infections**, but **in most cases it is termed as "idiopathic" cystitis**, in other words **FLUTD without an identifiable underlying cause**.

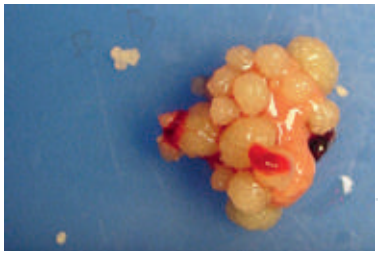
FLUTD is sub-divided into "obstructive" when the cat cannot urinate at all, or "non-obstructive" when the cat can still urinate.
Incontinence is the result of loss of control of the bladder.

However, in most cases (over 50% of cats under the age of 10 years) the cause of the symptoms observed remains unknown.

WHAT CAUSES FLUTD?

There are several causes:

• The presence of **"stones" (calculi) in the bladder**, which irritate the mucosa and **cause inflammation (cystitis) or block the passage of urine**.



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Calculi

• **Bacterial infections**.

• **Development of a tumour** which can cause cystitis symptoms.

• **Plugs of mucus and proteins can block the urethra**.

Some factors, such as the **cat's age**, other **concomitant disease** and **even factors such as lifestyle** can help reach a diagnosis.

Indeed, recent studies have confirmed the important role the environment plays in causing episodes.

IDIOPATHIC CYSTITIS, CAUSE UNKNOWN

A diagnosis of idiopathic cystitis will be reached when other possible causes have been eliminated. However, certain risk factors have been identified: **stress, being overweight, a sedentary lifestyle, cats living exclusively indoors or with limited access to the outdoors, use of a litter tray, or multi-animal households**.

Single cats living in indoor-only situations with little environmental enrichment are also more vulnerable.

Those which are very dependent on their owner, or suffer separation anxiety seem to be more prone than more independent, confident cats.

Finally, in countries with cold winter episodes, there is an increase from autumn through to the start of spring.

> In a study of large numbers of affected cats, black and white ones and Persians were the types most highly represented.

Unfortunately, in spite of more than 30 years of research, no one knows the precise cause of feline idiopathic cystitis. A recent hypothesis has suggested that feline idiopathic cystitis is a condition seen when a

"Spraying" –depositing urine as a scent signal – should be distinguished from periuria.
To spray urine, the cat stands up, spraying a small amount of urine onto the vertical surface behind it. This differs from urination where the cat squats to pass urine onto a horizontal surface. Common locations for spraying include doors, windows, the area by the cat-flap and electrical equipment.
If your cat urinates in an inappropriate location, it is essential that the affected area is cleaned properly. If this is not done, the smell of urine may encourage your cat to think that the area used is an appropriate place to use again.
Do not use bleach to clean up, use washing powder and then rinse with cold water. Leave it to dry and then spray with pharmaceutical alcohol (90%) to destroy the olfactory compounds present in urine.

"susceptible cat is placed in a provocative environment" and that disease results from **changes in the cat's nervous and hormonal systems** leading to an inability to cope with environmental stress. Affected cats are believed to suffer from defective information processing by their brain, meaning that they are vulnerable to developing feline idiopathic cystitis when stressed. Genetic and/or developmental factors are thought to be very important in causing this problem. **Genetic factors** could account for the increased incidence of feline idiopathic cystitis in some families of cats. **Stress in the peri-natal period** is thought to cause abnormal development of the cat's stress management system. The end result is altered processing within the brain and nerve supply between this and the bladder. It is not clear whether these cats have an abnormal stress response system which predisposes them to negative effects of chronic stress or whether being in a state of chronic stress leads to malfunctioning of the stress response system.

"Cats are like paper,
they are quickly rumpled."

Guy de Maupassant

WHAT DOES STRESS MEAN FOR CATS?

There are two types of stress:

- **Acute,** occurring over a period of up to a few days
- **Chronic,** lasting weeks.

Causes of chronic stress and especially those which the cat has little or no control over, are suggested to be the most damaging.

Chronic stress factors include:

- **Living in a multiple animal household**, especially when there is conflict or tension between cats,
- **Moving house,**
- **New additions to the house** – arrival of another pet or a baby,
- **Stress associated with urination:**
  - Competition for using a litter box,
  - **Using a cat litter which the cat doesn't like,**
  - Changing the cat litter from something which the cat has used for years,
  - **Placing the litter box in an unsuitable location.** For example a litter box overlooked by cats outside the house or in a very busy part of the home.
  - **Providing a dirty litter box,**
  - Providing a litter box which is **difficult for the cat to access**. For example an arthritic cat may have difficulty getting into a high-sided box.
- **Sudden changes to the cat's diet**
- **Other cats in the neighbourhood,** preventing a cat from going outdoors ,
- **Building work in the house** – especially if this affects core areas of the house such as the kitchen and areas where the cat spends a lot of his time
- **Changes to the owner's schedule** – for example working away from the home for longer periods, shift-working, etc. Cats that are very "needy" and dependent on their owners are especially vulnerable to stress associated with these changes.
- **Owner stress can also be transmitted** to the cat and if the owner/cat bond is very close this can be very stressful for the cat.

TREATMENT OF IDIOPATHIC CYSTITIS

Successful management depends upon a long-term commitment and **team approach between the cat's owner and veterinary professional**. It is possible to greatly reduce the frequency and severity of episodes of feline idiopathic cystitis for the majority of affected cats.

Ideally, **any potential sources of stress will be identified and addressed**, for example by **ensuring permanent, safe access to the litter tray and limiting as much as possible interaction between cats who don't get on. Anti-anxiety medication** is available, but giving a cat a tablet every day can in itself be a source of stress. **Environmental modifications, soothing pheromone diffusers** and a **therapeutic food** containing specific nutrients can all significantly improve quality of life for these patients.

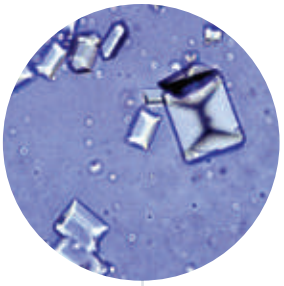
Studies have also shown that increasing the dilution of the urine reduces episodes of idiopathic cystitis. The aim is for the cat to be producing urine with a specific gravity around 1.035 (which can be measured by the vet using a refractometer).

Refractometer

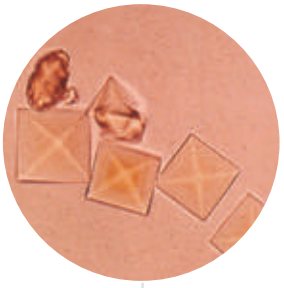
> A more dilute urine increases the frequency of urination, and dilutes any irritant components of the urine. Strategies to encourage the cat to drink more include offering a wet food or encouraging more drinking.

ENCOURAGING YOUR CAT TO DRINK MORE WATER

TYPE OF BOWL	Most cats **prefer glass, ceramic or stainless steel bowls**. Experiment with your cat by offering **different shapes and sizes**. Most cats like wide, shallow bowls but some like drinking out of a tall glass or jug.
FILL THE BOWL TO THE BRIM	Most cats **do not like to put their head** inside the bowl so **fill it to the brim**.
NUMBER OF WATER BOWLS	**Water bowls should be available in all areas of the home** and the cats should be able to access water easily, without competition from other cats.
LOCATION OF WATER BOWL	The water bowl **should not be next to food bowls, litter trays or in busy locations**.
CONSIDER RAISING THE BOWL	**Older cats (over 10 years) often have osteoarthritis** which can make bending over to eat or drink uncomfortable. Water and food bowls can be **placed on an upturned bowl or box to lift them by a few inches**.
TYPE OF WATER	Try offering **mineral water and tap water** and see if your cat has a preference.
TEMPERATURE OF WATER	**Offer water at room temperature**, chilled water tends to be less appealing to cats.
FLAVOURED WATERS	Examples include **the liquid from a defrosted packet of cooked prawns** or a **drained tin of tuna in spring water** (avoid brine as this is very salty). A flavoured water can be created by for example **poaching chicken or fish in water** The water left after cooking can be offered as a drink.
OFFERING "BROTHS"	A broth or soup can be made **by liquidising cooked fish or prawns in water. Check with your veterinarian** that there is no reason why this might not be suitable for your cat.
OFFER MOIST RATHER THAN DRY FOOD	Cats will take in more fluid if eating a moist food compared to what they would voluntarily drink when offered a dry diet. Some "dry food addicts" will eat dry food to which water is added.
THE APPEAL OF RUNNING WATER	**Water fountains, a dripping tap or even a ping pong ball to play with in the water bowl** can encourage your cat to drink.



Struvite crystals



Calcium oxalate crystals

UROLITHIASIS

This is the scientific term for the **presence of stones (calculi) in the bladder or urethra**. These mineral build-ups, visible to the naked eye, can **cause inflammation in the bladder by rubbing against its walls, or an obstruction.**
There are different types of bladder stones from which cats can suffer – common examples are **struvite** (also known as magnesium ammonium phosphate), **calcium oxalate**, and also **urates or stones made of several types of mineral**.
A laboratory analysis is the only way to establish their precise composition.

> Calculi and urinary crystals
> are not the same thing.

The presence of crystals in the urine (crystaluria) is normal when the cat is fed dry food. Crystals are not visible to the naked eye and are only visible by looking down a microscope, unless there are large numbers of crystals in which case a sandy or gritty appearance might be seen in a urine sample. The presence of crystals does not necessarily mean that the cat has a urinary stone, and nor does it predispose the cat to the formation of calculi.
If urolithiasis is suspected the vet will run tests to confirm the diagnosis.
X-rays can be helpful in visualising stones. **Unfortunately, not all stones are radiodense** (show up on a standard "plain" x-ray), although contrast studies can help find these.
Ultrasound is a non-invasive method but not all anatomical structures, such as the urethra, will be visible. Very small stones may be seen in a free-catch or catheter urine sample, particularly in female cats.
Struvite stones can be treated very effectively using special prescription diets. The struvite stones are dissolved in the bladder over a period of a few weeks.
Veterinary treatment should begin at the first signs, and the cat be re-examined after a couple of weeks. **If urolithiasis is still present then surgical removal will be needed in the case of calcium oxalate calculi**.

> It is now possible to prevent
> both struvite and calcium oxalate calculi
> by feeding a specific veterinary diet.

URETHRAL PLUGS

Urethral plugs account for about **20% of FLUTD cases in cats below 10 years of age** and are a potential **cause of life-threatening urethral obstruction**.

The plugs are made up of a protein matrix (a mixture of inflammatory proteins and mucus with cells and blood clots mixed in) with some crystals (usually struvite).
Urethral plugs are often associated with feline idiopathic cystitis and most clinicians believe that this is a subset of feline idiopathic cystitis. It is thought that the cells of the bladder's internal walls become detached due to irritation, and the obstruction may be the "plug" itself or a urethral spasm due to the pain of the cystitis.
After the obstruction is removed dilute urine must be encouraged, the risk of crystaluria reduced through an adapted diet, urethral spasms treated with anti-spasmodic medication, and the primary cause – the idiopathic cystitis – treated in the cat's environment.

URINARY INFECTIONS

Although healthy feline urine is not a good environment for bacteria to develop in, an infection can sometimes occur in the urinary passage. This is **more common in older animals**, who can no longer concentrate their urine so effectively, **or sick animals such as those with chronic renal failure, diabetes, immunosuppressed cats or those on medication** such as corticosteroids.

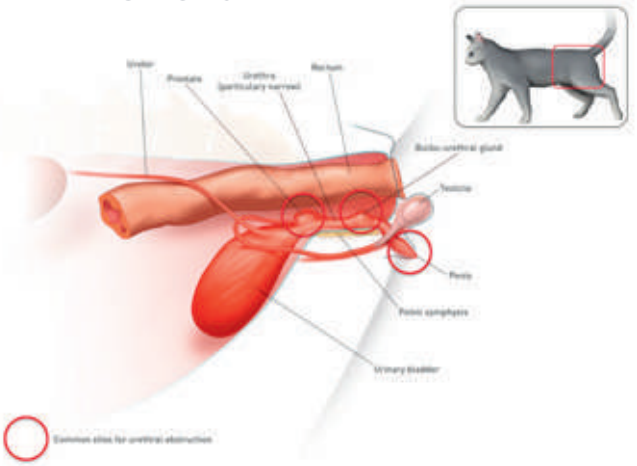
Depending on the type of infection, the vet will prescribe antibiotics, possibly after doing a bacterial culture. **Treatment can take a long time and follow-ups will be necessary to make sure the infection has completely gone**.

BLADDER TUMOURS

Although rare, bladder cancers can be problematic because of their late detection. Indeed, cats are masters at hiding illness.
The best treatment is **surgical removal of the tumour** if its position makes this feasible. If surgery is not possible then palliative care will be required.

In summary, lower urinary tract disease can have a significant impact on a cat's quality of life as well as her relationship with her owners. Progress in recent years has given us a better understanding of the factors related to onset of these diseases, and also more effective therapies.

PREDILECTION SITES FOR URETHRAL OBSTRUCTION IN TOM CATS



SKIN & COAT
DISEASES

PRURITIC DERMATITIS
OR **DERMATOPHYTOSES**

“The cat does not caress us, she caresses herself against us.”

Rivarol

Cats take good care of their coat, and spend hours looking after it meticulously, following extremely precise rituals which are sometimes only understood by them alone. However, even this careful grooming does not protect them from **skin problems**. The most frequent skin infections, sometimes called dermatoses, are: **ringworm (or dermatophytoses)** and **pruritic dermatitis** (which causes itching) due to **an allergy, the presence of parasites**, or **behavioural problems**. The symptoms are often similar, whatever the underlying cause. **A veterinary consultation is hence essential** in order to obtain a precise diagnosis and especially to begin treatment and find an effective way of dealing with the disease.

DISEASES CAUSED BY ECTOPARASITES

II Fleas

The most frequent feline parasites are most certainly fleas (*Ctenocephalides felis*). This parasite is **flat-bodied** and can easily slide around between hairs. **It has powerful legs and can jump up to 150 times its own height**.

It is not always easy to locate fleas on your cat, but there are a few things to know in order to detect them: use a fine **tooth-comb** to hunt them out. If you see little black grains on your cat, it is also a sign of their presence. These little grains are **flea faeces**, and when you put them on a piece of damp cotton wool, they produce a maroon red stain which is in fact the semi-digested blood of your cat.

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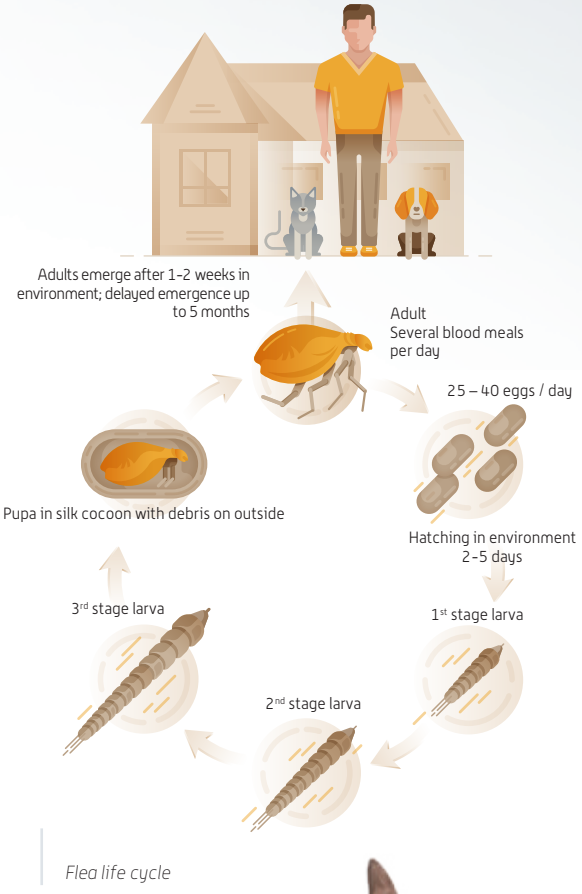
Only the adult parasites live on the animal. The eggs, larvae and the pupae (fleas in a cocoon, ready to hatch) are found in the environment. This is why it is essential not only **to deflea your cat**, but also to **treat your home and her sleeping areas**.

> **N.B.!** Make sure you only use anti-flea products which are made for cats. **Antiparastic products for dogs will be extremely toxic** for felines. Only use products prescribed by your vet.



Flea life cycle

*Many cats seem to coexist quite happily with their parasites, but some develop **hyper-sensitivity to bites,** and this causes intense pruritus (itching) that the cat will try to relieve by scratching, or, more frequently, by excessive grooming.*

*Fleas are also vectors of other infectious agents such as flatworms (Dipylidium caninum), and Bartonella henselae, which causes the **disease called "cat scratch disease".***

Harvest ticks

These are the **little orange-coloured larvae of a mite** (*Neotrombicula autumnalis*) found on plants at certain times of the year, and which can infect humans or other mammals such as dogs and cats. They are found in **contact zones and in skin folds** (fingers, armpits, ears) where they cause intense itching.

> “There is no evidence that the flea that lives on mice fears cats.”
>
> **Henri Michaux**

Ear scabies

Otodectes cynotis is the Latin name of these mites which cause parasitic otitis (ear infection), which is very common in kittens, but rarer in adult cats. This parasite is easily identified by **otoscopic examination or under the microscope**, and once diagnosed, is easy to cure, as long as there is no re-infection from other animals. Nonetheless, in certain cases, cats can develop **allergic dermatitis, an infection or a reaction to ear products**. For this reason, although the problem is benign at first, a veterinary consultation is necessary.

Scabies on the body

Scabies on the body

This disease is caused by a mite, *Notoedres cati*, which is very frequent in Mediterranean countries, and causes **extremely itchy lesions on the cat’s forehead and on the edge of the pinnae of the ears**. It is easy to diagnose, but **specific products must be used to treat it**.

DISEASES CONNECTED TO FUNGI

Superficial contagious fungal infections of the skin are called **dermatophytoses or ringworm**.
They are **very frequent for kittens or animals living in groups** (in cat farms, catteries, shelters …).

> They are **zoonoses,** i.e. human contagion following contact with an infected animal is possible.

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Microsporum canis is the main agent of feline ringworm. **This fungus is highly contagious** and attacks fur. Cats are **infected through direct contact** with a contaminated animal, or else from the environment, where there may be many fungi.
Grooming aids, collars, blankets, toys, and pet carriers are frequent sources of infection, since spores can remain **infectious for several months.**

For an infection to develop, the fungus has to **"enter" the skin**. This means that the slightest trauma can be enough, e.g. bites from fleas, mites, or little scratches from games between kittens. Once the fungus has entered the skin, **the infection develops in the stratum corneum and in hair follicles**.

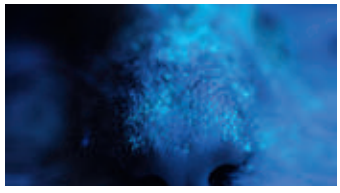
> The cat's immune system is very important in protecting them from disease, and this means that any drop in immunity, whatever the cause (retroviruses, debilitating illnesses, corticosteroid therapy, immuno-suppressive drugs, etc) will mean the cat is more susceptible to ringworm.

Clinical presentation of dermatophytoses is very variable. This is why vets automatically assume it is present as soon as they see skin lesions.
There is frequently **loss of irregular or circular hairs, with or without dander, which look reddish or hyper-pigmented**, and the hairs are generally **broken or abnormal**.

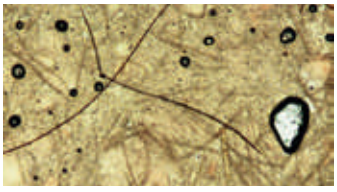
GROOMING BEHAVIOUR IS AN IMPORTANT NATURAL DEFENSE FACTOR.

By grooming, the cat is eliminating the infection before it can develop. However, there are still some lesions on the face, which is difficult to reach, especially for young cats not yet skilled in the art of grooming. The importance of grooming in the mechanical elimination of spores could also explain why long-haired cats (Persians, Somalis) are more frequently subject to skin diseases.

DIAGNOSTIC METHODS



A Wood lamp skin examination: *between 50 and 70% of M canis strains show green fluorescence when lit up with an ultra-violet light. This examination is not always easy to interpret, and also does not detect healthy carriers, and cannot exclude the hypothesis of a dermatophytose.*



Direct examination of hair and dander: *this consists of a microscopic examination of hair collected by gently scraping a lesion. Infected hair looks thicker, destructured, with mycelian elements at the centre, and little spherical structures called arthrospores at the edges.*

Fungal culture: *after taking a sample from the lesion with a toothbrush or a piece of sterile dressing, it is placed in specific environments to develop the culture, to identify the exact type of fungus, via microscopic examination.*

The diagnostic systematically relies on **isolating the fungus through direct microscopic examination or by fungal culture**. It is impossible to diagnose dermatophytoses just from the appearance of the lesions, because they are not really specific, and, because of the zoonotic risk, it is important to have a totally reliable diagnosis.

Treating ringworm

The treatment can be complex, and aims to both **cure the animal and also to prevent contagion**.

> For it to work, three actions are necessary:
> • treating the infection of the hair follicle,
> • destroying filaments and spores on hairs,
> • sanitising the environment.

It can often be **necessary to treat animals which have been in contact with the contaminated cat**. But, despite the effective products which are now available, some cases may still resist treatment. Failure may be the result of insufficient treatment (not enough medicine, or else too short a treatment time).

To limit spreading spores and to facilitate the application of medicine, it **may sometimes be necessary to shave the cat**.

Even if many owners are reluctant to do so, shaving really does **accelerate rapid healing**. Some precautions need to be taken, because clippers can cause micro-injuries and enlarge the lesions.

You also need to be careful to avoid contaminating the environment, by **avoiding spreading hairs, and destroying them by incineration**.

Topical treatment

This means **treatment by direct application on the skin**. This is essential to avoid contamination of the environment, and to stop the infection spreading. **A systemic treatment** is also added (i.e. treatment using substances which go into the blood system to reach all the cells in the body), and administered in **the form of drops or tablets**. It is **essential to disinfect the environment**, not only for the cat, but **also for all the other inhabitants of the house**, both two and four legged ones.

Everywhere the cat rests must be **vacuumed regularly**, and all the objects the cat has touched need to be disinfected with a **fungicide solution** (non-diluted Bleach, diluted Enilconazole). Treatment must last at **least six weeks**, and can only be stopped once you are absolutely sure that the cat is healed by doing **two fungal cultures** two weeks apart which show negative.

> In group environments such as catteries and shelters, prevention of ringworm is of course a major challenge.

Contamination can nonetheless be prevented if the following steps are taken: **removing immuno-depressed animals** and **those with retroviruses, drastic external anti-parasite treatment and isolation** (separation of healthy cats from those who are infected).

BACTERIA-LINKED DISEASES

Abscesses

Abscesses **caused by bites are very frequent** for cats which go outside, especially if they have not been neutered. Lesions caused by bites contain different germs, which can sometimes be very aggressive. The animal displays **swelling**, sometimes with bite marks, and the **skin is hot, inflamed, and painful**. The cat is also often **depressed, anorexic, and has a temperature: so the diagnosis** is relatively easy. **Treatment** is carried out with a **debridement of the wound** (deep cleansing) sometimes carried out under **anaesthetic**, with **antibiotic treatment and pain killers.**

Acne

We normally group under this term any inflammatory lesion on the chin area. **A rigorous diagnosis** is often necessary to determine the exact cause, because this condition is **not well known** in cats. The chin is an area which is rich in sebaceous glands which can become infected. Several etiological agents may be the cause: bacteria, Malassezia, Demodex… Lesions may range from a **simple swelling to the presence of blackheads, scabs, pustules or cysts**. Pruritus is usually present.

Acne for cats

ALLERGY CONNECTED DISEASES

Causes:

The **three main causes** of feline allergies are **fleas, food, and allergens in the environment**. It is impossible to determine the cause of the allergy solely from clinical criteria, such as where the lesions are located, and allergological tests (skin tests or IgE doses) do not give a reliable diagnosis for cats.

So a correct diagnosis can only be obtained by adopting a strict sequential approach: **drastic antiparastic treatment, followed by a strict hypo-allergenic diet**.

"Stroking a cat gives you fleas."

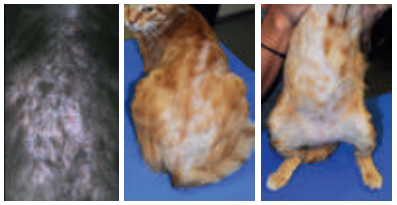
Clinical signs:

Mostly **pruritic dermatitis** (with itching). Sometimes you can see the first lesions which are little scabs you can feel when you stroke your cat (**miliary dermatitis**).

For some cats, there will be macules or red, **erythematous plaques**. Initially, the cat will try and relieve the itching using her rough tongue, but unfortunately even if this sort of "**sanding down**" does indeed relieve the pruritus, it also breaks the hairs, **and can even lead to depilation**.

These lesions are mainly found on the abdomen, outside of the thighs, at the bottom of the back and on the forearms. These eroded patches which can be quite thick are called **eosinophilic patches**, and are on the areas licked, or on the cat's face (the pinnae of the ears, lips, eye-lids).

For facial lesions, all other possible causes of pruritus or infections (*viral herpes*) need to be eliminated, as well as what is called the "**eosinophilic syndrome**" : a clinical entity with widespread lesions and impaired general condition.



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Pruritic Dermatitis

Sometimes the cat focuses all its efforts to relieve itching by scratching her head or neck. We use the term "**cervico-facial pruritus**" to describe these animals who seem to be determined to "scratch their head off", often causing deep lesions.

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II Diagnosis:

The diagnosis of allergic dermatitis is **complex** for cats, because there is **no reliable test**. It is thus essential to **begin by systematically eliminating all the other causes** of pruritus (parasites, fungi, behavioural problems). As far as allergies are concerned, **a strong anti-flea treatment** needs to be applied, both for the animal concerned and any other felines or canines in the same environment. If the symptoms persist, then an exclusion diet will be necessary, to identify likely causes.

An **exclusion diet will ideally last for 8 weeks**. If at the end of that period the symptoms have disappeared or improved then the diagnosis can be confirmed by giving the cat the previous diet – this will confirm that healing is not spontaneous but diet related. If the symptoms reappear that is confirmation that the cat is hypersensitive to an element in the previous diet.

If an exclusion diet is not successful, it is likely that the cat is suffering from allergic dermatitis and needs a prescription for treatment to control pruritus. Negative side-effects from corticoids mean that they cannot be used for long periods, so **antihistamines and cyclosporine** are usually prescribed. However there are some precautions which need to be taken alongside these medications: **they are not suitable** for cats **with toxoplasmosis, FeLV or FIV seropositive** cats. Raw meat consumption is also banned for cats on these medications, because of the risk of infection.

In summary, it is mostly impossible to identify the allergens responsible for the reaction with absolute certainty, and, unlike in dogs, desensitisation by specific immuno-therapy is not a viable option for cats.

BEHAVIOURAL-RELATED DISEASES

In some cats, behavioural problems may generate what are known as **substitution activities: the animal licks or scratches herself to calm down**. This will lead to **skin lesions which are very similar to real dermatoses**. Skin diseases can also lead to behavioural problems: so which comes first? **Like the chicken or the egg... and it is a big challenge for the vet**.

EXCLUSION DIETS

An exclusion diet means that the cat must ***only eat the food which has been prescribed,*** *so she can no longer go outside while the diet is in place. Everyone in the household must also* ***respect the diet conditions****, because just one slip could ruin everything. If the cat is* ***normally fed on household leftovers****, then it is possible to prescribe food based on* ***sources of protein which are radically different*** *from those she normally eats. However, there can be* ***cross-reactions between meat from different sources (mammals, fish, and poultry)****. If the cat is* ***used to eating processed food****, then we recommend* ***diets made from hydrolysed proteins****, which have* ***been treated*** *to lose their allergenicity.*

OBESITY IN THE CAT

OBESITY:
NOT JUST A COSMETIC ISSUE!

The disease of the century also affects cats. Although there are some differences by country, the current prevalence of cats that are either overweight or obese ranges from **34 to 51%, and has almost doubled over the last 5-10 years**. The cat is defined as **overweight when she is 15% over ideal weight, and obese when 30% over ideal weight**. This accumulation of body fat has a negative effect on health. Just like in man, obesity is an **officially recognised disease**.

CAUSES :

Obesity is the result of an **imbalance between calorie intake** (food) and **energy needs required for metabolic functions, thermoregulation and activity**.

The chances of this imbalance arising between one cat and the next vary greatly, because there are several related factors to take into account.

Cat-related factors

There is **no evidence yet to demonstrate a link between genetic factors and weight gain in cats**, although it has been proven in dogs and man. However, it has been discovered that **some cats are able to regulate their food intake** (even if they are fed ad libitum) and therefore stabilise their weight.

Others are unable to do this, and are already overweight by the age of two years. The genetic factors responsible have not yet been identified.

While male cats seem to be predisposed to weight gain, one of the main risk factors is **sterilisation**. Hormonal changes immediately post-surgery influence the feeling of satiety (fullness) and **thus food intake is increased**, so if the calorie content is not controlled the cat will gain weight.

Other health problems can also increase the risk of obesity, because they have an impact on calorie balance, **whether because they increase food intake or reduce physical activity**.

For example, **a cat with orthopaedic problems will move less. Some medications, such as corticosteroids or oral contraceptives can also increase the appetite.**

Environmental factors

Studies have shown that cats **who don't go outdoors or who live in an apartment have an increased risk of obesity**.

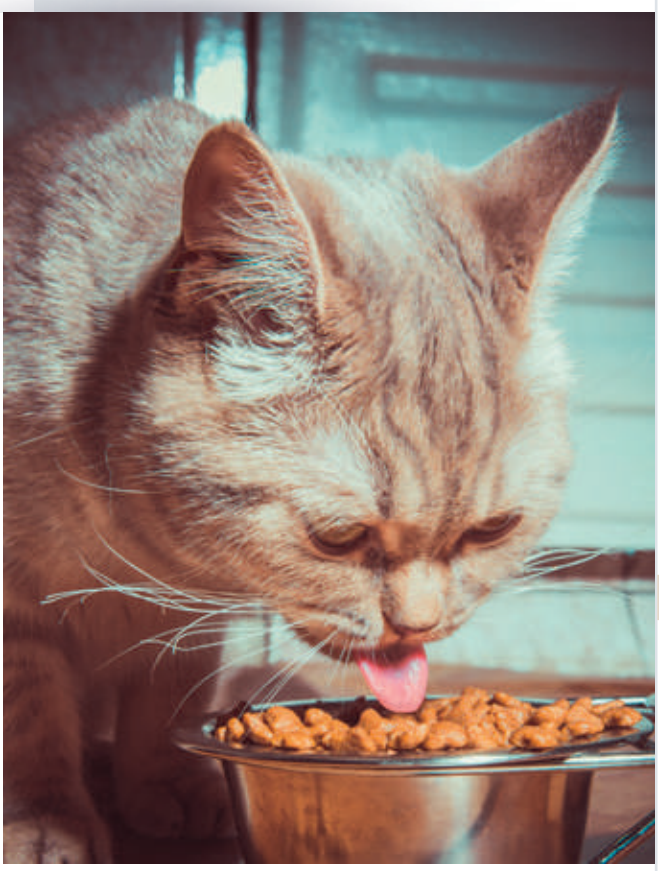
However, there is also an **increased risk in cats who live with up to two other cats**. The causes of the latter are not clear, but it could be compared to the "cafeteria" effect which is well known in man.

"Never trust a cat when there is fish on the menu."

Madagascan proverb

GOOD TO KNOW

Just as in man, excess weight during growth increases the risk of obesity in adulthood. A kitten's diet needs to be closely monitored.



Of course, **diet plays a key role in the development or prevention of obesity**. Studies have shown that **neither manufactured foods nor home-made ones increase the risk**. However, if the amount of food ingested is not controlled, for example **when cats are fed *ad libitum*** and they lack the auto-control mechanism, the risks are increased.

It has been suggested that because cats are carnivores they are unable to digest carbohydrates (starches) and that this increases the risk of obesity.

Research has disproved this theory – **it is in fact the fat content rather than carbohydrates which encourages weight gain, and especially the amount ingested**.

However it is important to check the calorie content of kibbles in particular, because dry foods are energy dense. In comparison, a wet food may contain 90% water (with no calorific value at all)!

> Daily portions should be measured precisely, particularly if the food is left down for the cat all day.

II Owner-related factors

It is known that the children of overweight parents are at increased risk of being overweight themselves. While this is probably genetically-related, behavioural and environmental factors are almost certainly involved too. The same phenomenon has been seen in cats – **those whose owners are overweight are more likely to be too.**

Recent research has shown that the **relationship between the owner and an obese cat is very strong**. Their cat is their companion, and they tend to feed her more often, give treats and watch her eating. In short, the owner is saying "I love you, I feed you, and without knowing about it I am putting your life in danger".

Normal feline behaviour is often misunderstood – the ancestors of our domestic cat were solitary hunters, who lived in an **environment which could often be hostile and dangerous. Eating made her vulnerable**, so a meal was **not a time for social interaction. Prey animals were small** (mice, birds) and as a result, the **cat had to eat frequently** to meet her nutritional needs.

> The cats who live with us in our homes have had to adapt to a different environment and change their eating habits.

Most of the time **we feed them at our convenience rather than at their natural pace**. This can be **a source of stress for the cat**, leading to the development of **eating disorders and bulimia**.

Cats **prefer to eat alone**, and this can be difficult or even impossible in a multi-cat household.

In general, for a cat fed twice a day, **breakfast will coincide with the morning household hustle and bustle, and the evening meal with everyone's return from work**, meaning that there is **little peace and quiet to be had**. Cats have no choice but to accept these social interactions which are the inevitable consequences of family life.

Additionally, **many owners also think that if their cat is around, it's because she's hungry**.

> When a cat looks for contact with her owner it is a sign of affection, rather than a request for food.

However, cats learn quickly, and the result is that they end up interacting with us when they want food.

This behaviour presents problems, especially when it comes to getting your cat to lose weight!

Some cats cause a great deal of fuss, and many owners give in just for some peace and quiet. Fortunately, there are **specific weight loss foods which help the cat feel fuller and keep the hassle to a minimum.**

THE CONSEQUENCES OF OBESITY

We know that **obesity in man is linked to major consequences for health**. Obesity is **involved in numerous diseases, including diabetes, cardiac issues, metabolic problems, arthritis, respiratory problems, renal disease and certain types of cancer**.

As a result, the quality of life and life expectancy of obese individuals are reduced. The risks are the same for the cat as they are for man.

GOOD TO KNOW

An obese cat has an increased risk of developing insulin-resistant diabetes (type II). It is essential that the cat loses weight, because this will improve her sensitivity to insulin, and in some cases it will even be possible to stop injections (see Diabetes chapter).

Hepatic lipidosis is a potentially fatal disease, mainly affecting obese cats, in which, for various reasons, the cat suddenly stops eating.
In dogs, obesity is a major cause for a range of orthopaedic problems. Arthritis, hip dysplasia, cruciate ligament damage, disc problems and some fractures are directly linked to being overweight.

Joint problems are harder to notice in cats unless they are very well-established, and a study has shown that **obese cats have a five times higher risk of lameness than those of normal weight**.

Other diseases are also linked to obesity in man and dogs, for example **lung diseases**, including **asthma, are more frequent in overweight individuals**, and this is very likely to be the case in the cat too.

A recent epidemiological study has **shown links between feline obesity and the risks of developing certain cancers, dental problems, skin disorders, diarrhoea and urinary disease**. It is not yet clear how this is caused, but it has been proven that overweight dogs have a shorter life expectancy and poorer quality of life. It is probable that the same applies to cats too.

OBESITY CONSEQUENCES

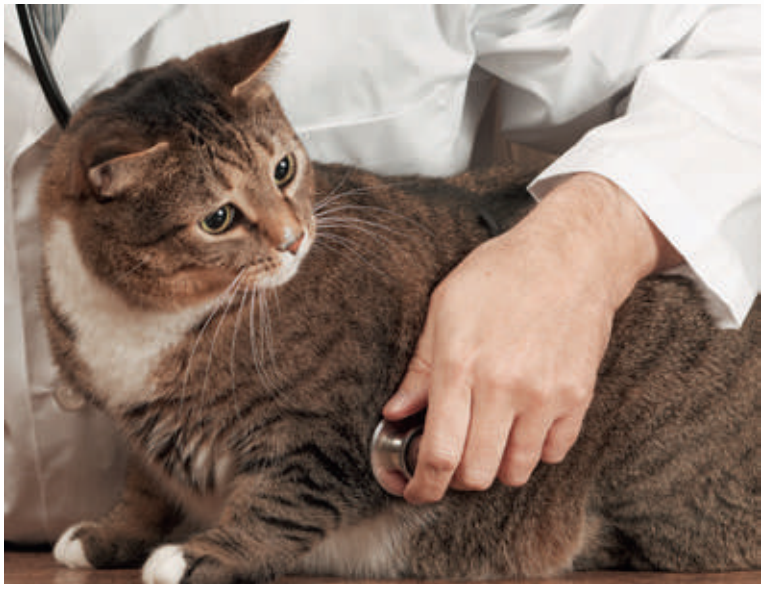
SYSTEM	DISEASE
Endocrine system	Diabetes
Gastro-intestinal system	Hepatic lipidosis, dental problems, diarrhoea
Système cardio-respiratoire	Respiratory disease
Osteo-articular system	Lameness
Oncology	Increased risk of cancer
Urogenital	Dystocia (difficult deliveries), urinary disease

While it is easy to understand that obesity increases pressure on cartilages or makes the heart work harder, **what is the link with urinary or other diseases?**

What happens is that **fat cells, called adipocytes, produce inflammatory agents called adipokines which cause inflammation and interfere with the cells of other organs**. The control of obesity aims to reduce these metabolic malfunctions and thus improve the cat's health.

HEPATIC LIPIDOSIS

Hepatic lipidosis is the most common feline liver disease, and is potentially fatal. An accumulation of triglycerides (fats) builds up in the hepatocyte cells within the liver, and symptoms appear when over 80% of hepatocytes are affected. Obesity is a recognised risk factor, and a period of anorexia will often trigger it. Without treatment, major metabolic problems will occur and death can be the result. The liver is vitally important, performing over 1,500 bodily functions, but if it is saturated in fat it can no longer work. Hepatic lipidosis is often associated with other diseases such as pancreatitis, diabetes, liver infections / tumours or intestinal problems. An obese cat presenting with jaundice, vomiting and who has not eaten for a week is very likely to be suffering from hepatic lipidosis. Veterinary care is needed urgently, and the cat will probably need intensive care. The vet may use a gastric tube to feed her a high protein and high energy food containing the nutrients necessary for her metabolism to function, which will be specifically formulated for cats in this situation, designed to compensate for the deficiencies caused by poor liver function.



OBESITY TREATMENT

Obesity is **not difficult to diagnose**, but a complete health check is needed to establish the level of obesity and any other accompanying health issues.

The vet will determine the cat's ideal weight, and devise a realistic weight loss strategy. This will involve asking questions, examining the cat, carrying out any necessary extra tests, and of course, weighing and body scoring the cat.
These checks will continue throughout the treatment, and the vet will often take photos too – cats are not always co-operative, but photos are an easy way to evaluate progress!

After diagnosis, treatment will be agreed, with the first thing being to decide on a target weight. Quite often, "target weight" and "ideal weight" will be the same, but when a cat is significantly overweight the target weight can be lower than ideal weight.

In older cats in particular, even a modest weight loss will improve the cat's quality of life. Recent studies have shown that **80 to 90% of cats on a dietary regime will go on to achieve their target weight**.

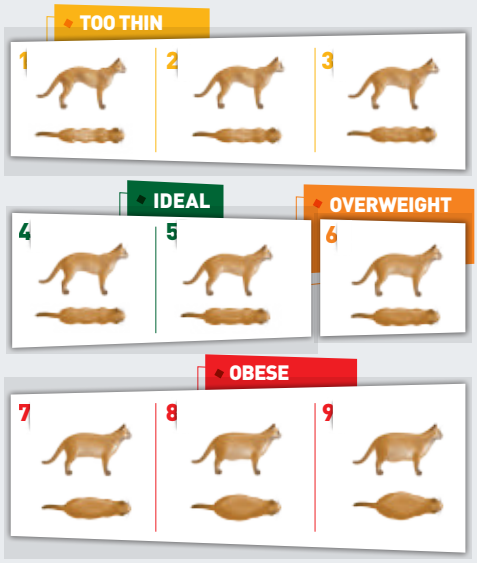
Realistically, losing weight is a challenge for the owner as much as the cat. The excess weight is most often due to bad habits, and **to improve quality of life and longevity, the cat needs not only to lose weight but to maintain her ideal weight. This is where a maintenance diet comes in**.

BODY SCORE	EXCESS WEIGHT %	CATEGORY	IDEAL ESTIMATED WEIGHT [1]
4/9	0 %	Ideal	---
5/9	0 %	Ideal	---
6/9	10 %	Overweight	(100/110) x CW
7/9	20 %	Overweight	(100/120) x CW
8/9	30 %	Obese	(100/130) x CW
9/9	40+ %	Obese	(100/140) x CW

(1) The cat's ideal weight can be estimated from this form by using the current weight (CW)

BODY SCORING

You can evaluate the cat's body score by looking at her silhouette in profile and from above and comparing them to the diagrams.
However, it is harder to estimate body score visually in long-haired cats so palpation is essential.



A REALISTIC PLAN

Everyone knows that "crash" diets usually end up with a quick weight regain.

> It is more realistic to look for a loss of approximately 1% of body weight per week. For a 5kg cat, this is just 50g per week!

It is no surprise that a weight loss programme **usually lasts more than six months**. In the feline weight loss journey, it is not speed that matters but the destination! Treating obesity means reprogramming the cat's energy balance, and **so reducing intake and increasing physical activity**.

Simply reducing the cat's food intake is useless and can lead to nutritional deficiencies, **so specific dietary foods have been formulated.**

These **provide fewer calories** while **still providing all the essential nutrients such as proteins, vitamins and minerals**. The presence of proteins ensures that weight loss comes from adipose tissue and not muscle.

The food must also **satisfy the cat**, so that she is not too hungry and her behaviour does not become too demanding for her owner.

The food must also be one the **cat enjoys**. Studies have shown that **foods containing specific proteins and fibres are better adapted and more effective than standard low calorie foods**.

It is also possible to reduce the calorie content by using a wet food specifically formulated for weight loss. As well as the fact that calories are reduced because of the increased water contents, it has also been shown that these foods encourage cats to become more active – and burn the calories!

GOOD TO KNOW

Foods are complete and balanced when fed in the recommended amounts. Giving less food may mean fewer calories, but also a loss of vitamins, minerals and oligo-elements – and your cat will be hungry!

LEAVE NOTHING TO CHANCE

Foods designed for weight loss provide all the nutrients your cat needs – so no supplements are required, and nor are little extras, titbits or table scraps. Make sure too that your cat doesn't have access to food anywhere else in the house – or at the neighbour's!

Success depends on a precise control of the energy balance, so that the cat uses her bodily reserves and hence loses weight, rather than taking in more calories than she needs. Every gram matters! Rather than using a measuring cup, **use kitchen scales to weigh out her daily ration** – even the odd extra kibble or two on top means you could ruin all your efforts.

> The daily portion should be divided into several meals, and you can also hold a few kibbles back to give as treats.

Some cats also **enjoy playing with food distributing toys**, and this method has **many advantages:**

- **It slows down eating speed and gives the body time to recognise satiety**.
- The cat **expends calories** as she has to be active to get her food.
- **Play is similar to hunting, which cats enjoy**.

It is also important to **find ways to increase your cat's physical activity levels,** by **encouraging her to play** for example. As well as using up energy, this also encourages your cat to use her muscles and is a great way to spend time with her.

The games you play **will also help make up for the treats you used to give her**. Adapt playtime to feline nature: your cat is designed for bursts of intense activity followed by rest.
Two play sessions of two minutes each per day can gradually be increased, and **there are many toys to choose from in the pet shops.**

FOLLOW UP AND MAINTENANCE

Throughout the "shape up" programme it is **important to check the cat's progress regularly, usually with fortnightly weigh-ins**.

This regular programme also means the cat's body score can be monitored and more photos taken! The daily ration can also be adjusted in line with progress.

Once target weight has been reached, weight gain must be avoided – or you will find your cat suffering from the famous yo-yo effect! Normal advice is to **continue to feed the cat a low-calorie diet**, but to adjust the quantity. **Vet checks are recommended every 1 to 3 months.**

At the first sign of new weight gain action must be taken immediately.

CAT TOYS

Favourite cat toys are those which stimulate the cat's interest with quick, unpredictable movements. "Fishing rods" work really well, and you can also build a toy to hide kibbles. Most cats love to perch, so cat trees or other favourite high spots will satisfy their behavioural need and involve effort to climb!

GOOD TO KNOW

A dietary regime must be adapted to the individual cat's character. Recent studies have shown two main types:
- Snackers or grazers, who can self-regulate their intake
- Gluttons, who unfortunately tend to eat without restraint.

PREVENTION IS BETTER THAN CURE...

Although recent progress in nutrition means that obese cats can now lose weight more easily, **it is better not to reach that stage. Your cat's weight needs to be monitored throughout her life and from an early age**.

When you see your cat every day it is easy to not notice weight gain, which creeps on insidiously and slowly. This is why it is **important to weigh your cat regularly (at least every 6 months)** and react quickly if she is more than 5% over her normal weight.

You should also put weight control measures in place straight after sterilisation, and encourage regular physical activity, particularly through play.

TIPS TO PREVENT OBESITY

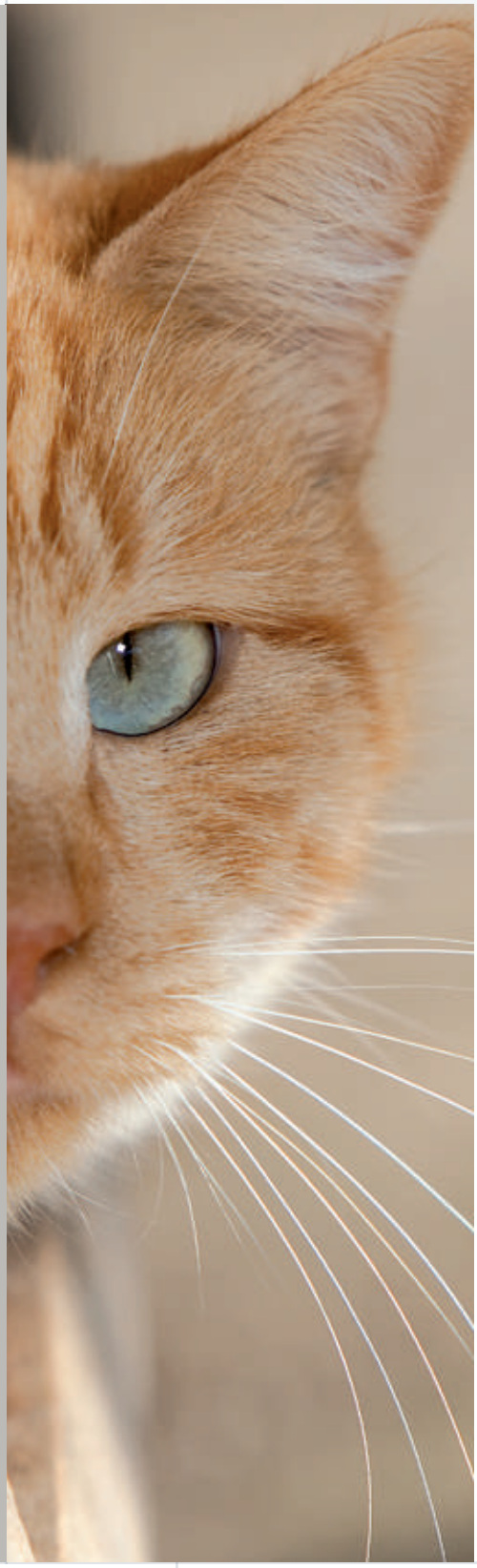
FOOD

- Give your cat a **complete, balanced diet, adapted to her age** (kitten, young adult, adult, mature, senior).
- **Start by giving the manufacturer's recommended amount, adapted to your specific cat**, e.g. her activity levels, and be guided by her weight for any necessary changes in portion size (see below).
- **Always weigh the ration** – measuring cups are not particularly reliable and can often lead to over-feeding.
- **Adapt your feeding strategy to your cat. The snackers and grazers who self-regulate can have their food left down, but portions must be carefully controlled for gluttons!**
- **Sterilised cats** have reduced energy needs and as a result need **a diet adapted for them straight after the operation** if they are not to gain weight.

- **Dry foods (kibbles) are energy-rich; resist the temptation to give more than the recommended amount**. If you think your cat doesn't eat enough or is too thin, consult your vet.
- **Limit extras such as treats or table scraps**. Not only do they upset the diet, but they also provide excess calories. If you like to give your cat treats, limit them to 5% of her daily energy needs, and reduce the size of meals to compensate.
- **If you have several cats, adapt the food to each individual**. For example, if they are all snackers you can leave their food down freely, although this does mean it is difficult to know exactly who eats what. **The ideal approach is to feed each cat separately** and/or use electronically controlled bowls. **If all the cats are gluttons, it is better to divide their daily ration (ideally into at least 3 or 4 meals)** and measure the quantities precisely. The cats should then be fed separately, or by using **puzzle-feeders**. If your feline family consists of both types, the only answer is to feed them separately and keep a careful eye on their intake.
- **Keeping your cats out of the kitchen and dining room** reduces the risk of them having any little "extras"!
- **Weigh your cat regularly**, always using the same set of scales. Most veterinary clinics will allow you to use theirs. **Keep an eye on your cat's weight, and adapt her diet as necessary** – feed a little more if she is losing weight, less if she is gaining it.

LIFESTYLE AND ACTIVITY

- **Regular activity is good for every cat**.
- Many cats will exercise when they go out, but for inactive ones or those who don't go outdoors, r**egular playtime will encourage movement and exercise**. It's not just kittens who need to play, adult cats will benefit too.
- **Playtime must be short (two minutes is plenty) but often (2-4 times a day)**. Using different toys will keep your cat interested, and change them frequently. If you use a laser pointer, let your cat "trap" her prey so she doesn't get frustrated.
- Remember **the importance of three-dimensional space** – give your cat the chance to climb with a cat tree.
- **Always adapt the type of activity to the individual cat**. If your cat has a joint problem (eg arthritis) be careful and avoid over enthusiastic games. Remember that less active cats need fewer calories than active ones.
- **Adapt the food to your cat's activity levels, particularly in summer when they need less food**.



DIABETES

IN THE CAT

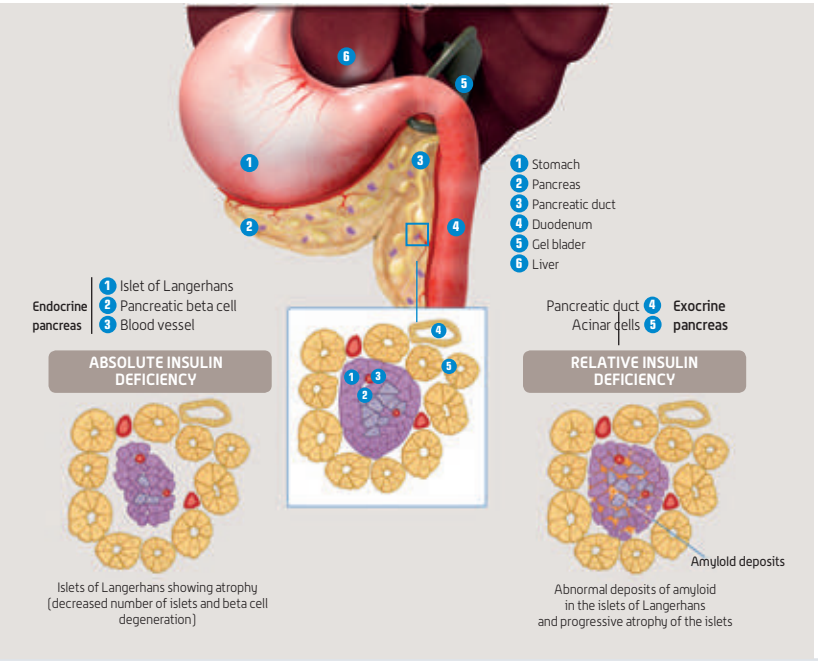
RESEARCH
IS PROGRESSING

After hyperthyroidism, Diabetes Mellitus, "sugar diabetes", is the second most common hormonal disease affecting cats. Unfortunately, this disease is **becoming increasingly common**. The level has **reached around one in every hundred cats** in some areas. When diabetes is diagnosed, many cat owners are concerned that treatment will be complicated. Fortunately, research is ongoing on both the cause of the disease and improvements in treatment. **In some cases, diabetes can even be reversed**.

> Many cats with diabetes are successfully treated and go on to live long and happy lives.

WHAT IS DIABETES?

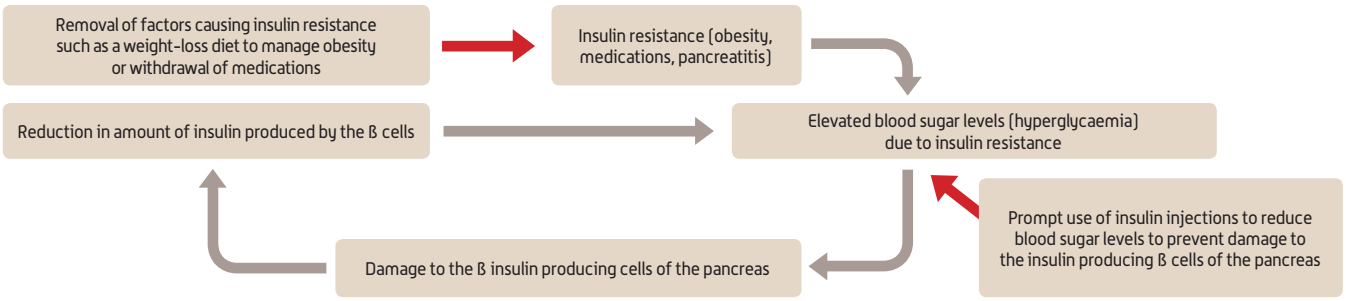
Diabetes is a condition resulting in **high blood sugar levels (hyperglycaemia)** over a prolonged period of time. This is due **either to the failure of the pancreas to produce adequate amounts of the hormone insulin or to the body's failure to respond to insulin**.



Insulin is **produced by an organ in the abdomen: the pancreas**, in response to rising blood sugar levels after a meal. **Insulin is vital for the body to produce energy from the sugar provided by food**; it facilitates the uptake of this sugar (glucose) by the cells where it is needed. **Without insulin, or if insulin fails to work as it should, glucose cannot be used for energy and blood sugar levels rise** resulting in the signs of diabetes shown by the cat.

WHAT CAUSES DIABETES?

A number of factors may result in a cat developing diabetes. The pancreatic cells that manufacture beta insulin may be damaged and therefore produce less or poor quality insulin. Conditions resulting in insulin resistance therefore cause an elevated blood sugar level which **may exhaust the beta cells**, in turn reducing the amount of insulin produced. This damage to the insulin production beta cells is termed "glucose toxicity".



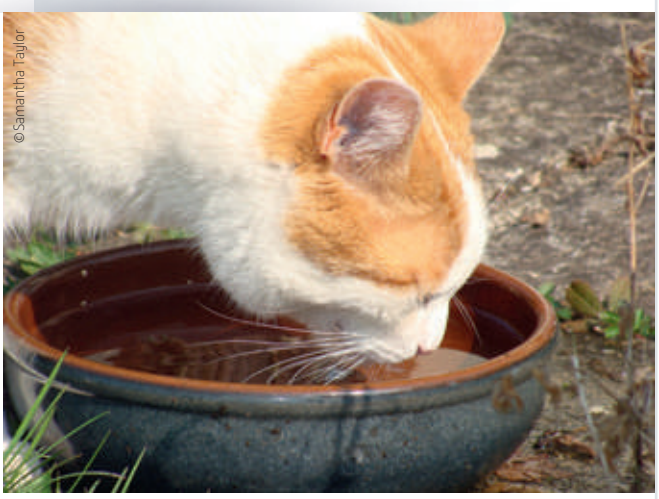
There are many causes of insulin resistance that may trigger this cascade into diabetes, including **obesity, other hormonal conditions, some medications and inflammation of the pancreas** itself (pancreatitis). We know that **certain groups of cats are more likely than others to develop diabetes**. Risk factors include:

- **Age:** the disease is more common in middle-aged or older animals,
- **Breed:** the risk is increased in Burmese cats,
- **Male cats**,
- **Neutered cats**,
- **Obesity:** overweight cats are four times more likely to develop diabetes,
- **Sedentary lifestyle and lack of activity**,
- **Certain medications** (corticosteroids),
- **Hormonal diseases:** hyperadrenocorticism, acromegaly.

Of course, not all cats in these groups will develop diabetes, but it helps to identify "at risk" groups of cats so they can be monitored, and factors causing insulin resistance mitigated as soon as possible. For example, do not allow a Burmese cat to become overweight.

THERE ARE TWO MAIN TYPES OF DIABETES: 1 AND 2.

The majority of cats with diabetes have a disease comparable to human type 2 diabetes. Type 2 diabetes results from a combination of beta cell dysfunction and so called "insulin resistance" causing a relative lack of insulin. ***Insulin resistance*** *refers to a disease state in which the pancreas makes insulin, but due to various factors, such as obesity, the insulin does not work effectively to lower the blood sugar level. Importantly, if insulin resistance can be eliminated then "****diabetic remission****" may be achieved: a situation where a cat that previously needed treatment with insulin injections is able to regulate his own blood sugar levels normally.*



WHAT ARE THE SIGNS OF DIABETES?

One of the most common signs is **increased thirst (polydipsia)**. We don't always notice our cat drinking, but **if you find you have to refill the water bowl more often, it is worth monitoring**.

Affected cats will also **urinate more than usual (polyuria)**, so keeping an eye on the litter tray will help you keep track.

PUPD (polyuria-polydipsia) is due to the increased sugar in the blood "spilling over" into the urine and taking water with it, thus creating a larger volume of urine, and increased thirst to replace the losses.

Weight loss is common, but may be accompanied by asking for food more often and **eating more than usual (polyphagia)**.
Affected cats may **rest more**, and be **less keen to play**.

Cats with diabetes are also **more prone to urinary infections** so may struggle to urinate and pass small amounts of urine, possibly with blood in.

If the disease is not diagnosed and treated, complications can arise. These may include walking abnormally, the cat may develop a "**plantigrade stance**" where they are weak and the hock joint can drop to the floor, and even severe illness with vomiting, diarrhoea and collapse if the cat develops **diabetic ketoacidosis**.

HOW IS DIABETES DIAGNOSED?

Although **the signs shown by a cat may be strongly suggestive of diabetes, other conditions can produce similar abnormalities** (e.g. kidney disease).
The diagnosis of diabetes is made when a veterinarian documents a persistently high blood sugar level (hyperglycaemia) **and sugar in the urine** (glucosuria).
However, **when cats are stressed** – like when visiting the vet – **hyperglycaemia is normal**.

The influx of sugar into the blood is a physiological adaptation: "DANGER! Do something" (the fight or flight instinct) and the cat's body demands instant energy in the form of glucose.

> "I value in the cat the indifference with which she passes from the salon to the housetop."
>
> **Chateaubriand**

For this reason, **repeating measurements of blood and urine sugar at the vet's and at home can help confirm the diagnosis**. Alternatively, a blood sample may be sent to a laboratory and show an elevated **fructosamin; a protein that indicates the average blood sugar levels over the preceding week or so**.
Following a diabetes diagnosis, further tests should be performed by the veterinarian to **look for causes and complications of the disease**. The tests will often involve **blood and urine tests**, to detect pancreatitis or a urine infection.

WHAT IS THE TREATMENT FOR DIABETES?

Treating diabetes is not generally straightforward and certainly requires a commitment by owners, however it can be rewarding and return an affected cat to normal for considerable periods of time.
The goals of treatment for cats with diabetes include ameliorating the signs (weight loss and drinking more), **avoiding complications and, in some case, inducing diabetic remission**. This treatment usually includes a combination of **dietary management and insulin therapy**. Sadly, the drugs used to treat diabetes in humans are not effective for cats.

II The dietary approach

Diabetic cats often **benefit from a change of food**. Importantly **a cat's diet should not be altered suddenly or without the advice and supervision of a veterinarian** to avoid an insulin overdose which can result in hypoglycaemia.

A DIETARY CHANGE

Cats with diabetes may benefit from a change of diet to one with a lower level of carbohydrate. Specific foods have shown to improve diabetic control (stability of blood sugar) and may help in weight management.

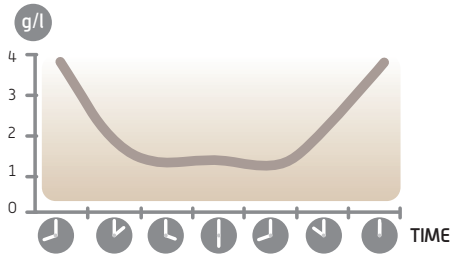
Obesity is associated with insulin resistance and closely managed weight loss may result in better diabetic stability and even diabetic remission. Importantly, weight loss should be slow and closely monitored by a veterinary clinic as drastic reductions in food intake can cause severe illness in cats.
If the cat will accept wet food, this can be fed exclusively, as it generally contains less carbohydrate and fewer calories.

II Insulin

Insulin injections are often **recommended at each meal time**, but what is more important is **spacing injections regularly – for example every 12 or 24 hours**.
An **insulin "pen"** for diabetic cats has recently become available; it allows owners to twist a dial to select the dose and is refilled with vials of insulin.
There are **various insulin preparations** available with different effects and the attending veterinarian will prescribe the most appropriate treatment according to the medication licencing system in the country they practice in. Cats react differently and individually to insulin compared to other species, so the ideal **dosage and type of insulin will vary enormously** between cats with diabetes. For this reason, dosage and frequency must be adhered to scrupulously and no changes made without veterinary advice.

> Insulin should be kept in the fridge at all times, but never frozen as this will render it less effective.

Although daunting for owners, injecting insulin once or twice daily is actually simple and in many cases barely noticed by the cat. Your vet will show you what to do, and after some practice sessions (often using an orange) you will soon be a professional..
Video: www.youtube.com/user/icatcare.



Example of a glucose curve

FOLLOW-UP

As mentioned, no two cats with diabetes are the same. **Some veterinary clinics will hospitalise cats with diabetes** when insulin treatment is started, this allows the cat to be monitored and the dose of insulin to be adjusted. In the clinic, veterinarians managing cats with diabetes may perform "**glucose curves**" to assess the cat's response to insulin. A glucose curve is a **graph showing blood glucose results measured every 1-2 hours over a period of time (often 8-12 hours)** usually following an insulin injection. This allows the veterinarian to see how effective the insulin is by looking at the lowest blood sugar level, and how long the insulin works for. Additionally, it can identify cases where the insulin dose is too low or too high.
Some cats with diabetes do not like to be hospitalised and in this case, they can be treated as an out-patient. Owners can make an enormous difference to the success of treatment by recording several parameters at home and in some cases this will include blood glucose. Owners of diabetic cats are advised to **keep a diary** including the following information: **timing of insulin injection** and **dose given**, the **cat's appetite and food eaten**, the **cat's demeanour**

– particularly noting if the cat is lethargic or sleeping more than usual -, **the cat's water intake, body weight and urine glucose**. A **simple urine-dip test can be used**. If a cat uses a litter tray, urine can be collected either for home-testing under the veterinarian's instructions, or to take to the clinic. Replacing the litter with **non-absorbent litter** available from the clinic or clean, washed aquarium gravel allows urine to be collected easily.
Small, **portable blood glucose meters** allow you to monitor blood glucose levels. There are special ones for cats. A small amount of blood can be taken from the ear, and an immediate reading taken. Dose adjustments should only be made following the discussion of results with a veterinarian.

POSSIBLE COMPLICATIONS AND THEIR TREATMENT

The treatment of diabetic cats is not always straightforward, so regular monitoring is necessary. Emergency complications include:

- **A low blood sugar** (hypoglycaemia) **caused by excessive insulin administration**. This **can be life threatening and owners of cats with diabetes should be aware of the signs of hypoglycaemia and how to treat it**. Signs include **weakness, twitching, disorientation, drunken gait, fits and collapse. Veterinary attention should be sought immediately** and in the meantime glucose syrup or powder can be applied to the cat's gums.
- **Diabetic ketoacidosis is a condition resulting from persistently high blood glucose** and resulting in severe **signs of weakness, anorexia, vomiting, diarrhoea and collapse**. Unfortunately some of the signs are similar to those of hypoglycaemia, and it is essential to differentiate between the two. Again, **veterinary attention should be sought immediately** if a cat with diabetes shows these signs.

CAN DIABETES BE CURED?

In some cases, the answer is **yes**! Some cats with diabetes achieve remission. The chance of this is **increased by prompt treatment with insulin, withdrawal of drugs antagonising insulin** if used, **achieving an ideal body weight** in overweight and obese cats and maintaining near to normal blood sugar levels **.**

> Conclusion: Despite the fact that there is a marked increase, feline diabetes is a disease which can be prevented or treated satisfactorily, both for the cat and the owner.

©Samantha Taylor

Urinary test strips

©Samantha Taylor

Water-retentive cat litters

©Richard Murgatroyd Photography

Portable blood glucose meters

PREVENTION IS BETTER THAN CURE

As the number of cats with diabetes increases, we must look at mitigating risk factors to reduce the incidence of this serious condition. ***Both owners and veterinary clinics should work together*** *to prevent cats from developing diabetes and also to identify cases early to improve the chance of remission.*
Maintaining cats at an appropriate body weight and avoiding obesity is vital, *and must be assisted by regular weight checks at home or at the clinic. Equally, it is important for owners to be aware of changes in their cat's behaviour and to accordingly seek veterinary advice without delay, as cats tend to conceal illness until it is advanced.*
Preventative healthcare in the form of regular veterinary check-ups can also help identify risk factors and early signs of disease.

AGEING PROCESS FOR CATS

CATS
LIVE **LONG LIVES**

Many cats have long lives, and **their life expectancy continues to increase**. Life indoors, advances in preventive medicine and treatments, better adapted and well-balanced diets, and sterilisation are just some of the reasons **why cats who are over 20 years old are no longer a rarity.**

JUST HOW OLD IS AN "OLD" CAT ?

International authorities have quantified domestic feline longevity by giving specific names to different age groups.

7-10 year old cats are "mature", corresponding to 40-55 years old in man.

11-14 year old cats are "senior".

Over 15 year old cats are "geriatric", or 70 plus for humans.

REASONS TO VISIT YOUR VET WITH AN OLDER CAT
(source: www.icatcare.org)

- **loss of appetite**
- **loss of weight**
- **PUPD (polyuria polydipsia), i.e. increased urination and thirst**
- **stiffness, limping, difficulties in getting up or jumping**
- **seeming "depressed", weakness**
- **lumps on the body**
- **seeming unstable**
- **toilet "accidents ", difficult urination or defecation**
- **seeming disoriented, anxious**
- **unusual behaviour such as hiding, seeming aggressive, or making loud noises**

Old age is not in itself an illness, but the ageing process and wear caused by time results in different ailments, some of which may be fatal (kidney failure, for example).

> We recommend that health check-ups be carried out from the age of 7 years.

An annual check-up with your vet should become a six-monthly one once your cat reaches the age of 10. Of course, if there are physical or behavioural changes which occur between checks, then a vet consultation will be necessary.

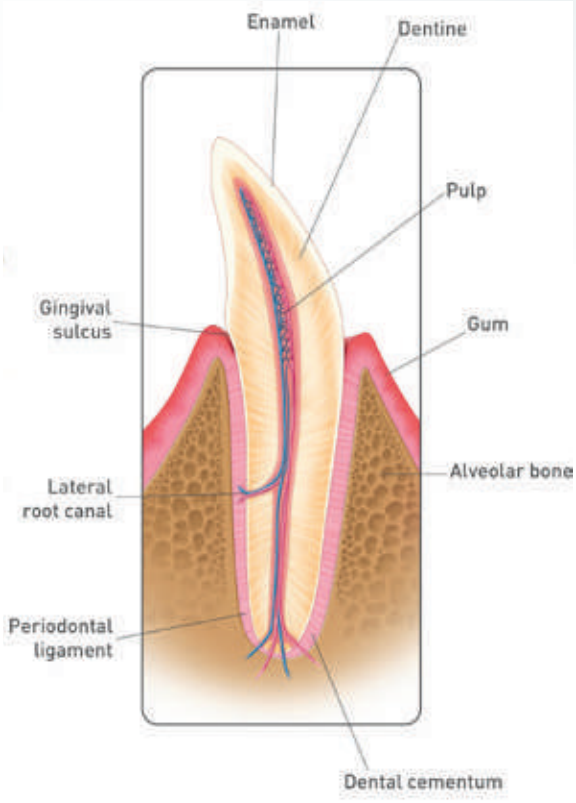
SIGNS OF AGEING

Age-related physiological changes connected to age have several consequences.

Sensory loss accompanies age: smell, hearing and taste all become less acute.
The ability to digest fats and protein decreases, the immune system is less effective, skin loses its elasticity, joints are less flexible, and resistance to stress decreases. Behavioural changes are often noticed, and although this is not really a disease in cats, they are sometimes compared to senile cognitive problems found in dogs and humans (Alzheimers).

Older cats look **after their fur less effectively** than younger ones, so **regular brushing will keep them well-groomed**. This also helps reduce hairballs, which make the cat regurgitate. Checking claws, and clipping them if necessary is also important.

Teeth also often show signs of wearing down ; consequently many cats suffer from oral and dental problems: tooth trauma, tartar, gum disease, FORL (Feline Odontoclastic Resorptive Lesion). These lesions are painful and make eating difficult.



FORL (FELINE ODONTOCLASTIC RESORPTIVE LESION).

More communly known as "dental resorption", this is the progressive disappearance of the tooth at the level of its neck.
This is an extremely painful condition, and affects over 50 % of cats.
The origin is still unknown and there is so far no means of prevention.
Often several teeth may be affected, and regular dental check-ups are essential.
Since the gum may make the problem difficult to spot, an x-ray is often necessary.

In terms of movement, it is now known that cats can **develop arthritis**. The common assumption is that decrease in mobility is just a side effect of ageing, but in fact the **stiffness and inactivity is due to joint degeneration.** This is easy to spot in dogs, when you take them for a walk, but less so for cats!

Cats tend to have **a more discreet nature** than dogs and will hide **their weakness and limit their movement.** However arthritis is both **painful and disabling**, so treatment is required. Keep an eye on your cat and look out for behavioural changes such as a reduction in activity levels.

Current treatment for arthritis is based on a "multimodal" approach, using a combination of different methods to help combat the disease. These will include **medicine, diet, physiotherapy and massage.**

> Adapting the cat's environment so she can still reach her favourite places, especially high-up observation posts, will help her.

"Cats just are. That is the verb which suits them best."

Louis Nucéra

ILLNESSES CONNECTED TO AGEING

As well as arthritis and oral and dental problems mentioned above, illness becomes more frequent with age.

Chronic kidney disease *(cf chapter on kidney disease)* affects over a third of older cats.

Cardio-vascular problems, hypertension, hyperthyroidism *(cf chapter on hyperthyroidism)*, **diabetes** *(cf chapter on diabetes)* or **tumours** are sometimes detected on ageing animals.

> Each of these problems needs to be followed up by the vet.

PRESERVING THE QUALITY OF LIFE

It is of course impossible to stop time, but we are nonetheless able to prevent or limit the impact of certain problems. For example, **obesity** *(cf chapter on obesity)* plays an important role in the onset or worsening of some illnesses, and it is thus **essential to keep your cat at her ideal weight.**

The older cats' wellbeing can be supported by **adapting their environment to take account of the constraints that increasing age imposes, and the new needs they bring. Simple changes can greatly increase your cat's quality of life.**
Make sure the litter tray is easy to access – painful joints can make it difficult for her to step in and out of the box. **A step in front of the cat flap** can also be helpful.
Cats have a really strong need to observe the world around them, preferably from high up. **Adapting her environment so your older cat can still keep watch on her territory from her favourite perch** – by rearranging things so she can hop from step to step rather than jumping – will make her very happy.
In the same way, **if she sleeps on your bed, remember to put a step up there, too.**

Older cats tend to lose their sense of smell somewhat and as a result, often have less appetite. For this reason, **food products have been designed to satisfy older cats' dietary requirements and their often picky appetite.** For some diseases **such as diabetes or kidney disease, which are treated via a special diet, it is helpful to provide suitable food, paying particular attention to palatability.** Remember that food which seems perfect on paper is no good at all if your cat refuses to eat it!

In another example of a constraint connected to age: **giving a cat medicine orally can be a real challenge**. But every illness has its treatment, often in the form of tablets. As a cat owner, you obviously don't want to make this a stressful daily event for your cat, and you know that this simple act can often turn into a nightmare … for both cat and owner.

Our favourite felines like **calm and tranquillity**, and this is even more the case as they get older. **They like warm places**, detest change in their environment, and take pride in **hiding their vulnerability.**

> Take a long hard look at your home
> try and imagine what it's like to be
> your cat. This will help you find solutions
> to make her daily life easier,
> whilst still preserving her sense of dignity
> and her staunch independence.

HOW TO GIVE YOUR CAT MEDICINE

Getting your cat to swallow a pill is often difficult, at times seemingly impossible.

To make things easier, more and more oral treatments are flavoured.

There are also several special treats in which you can hide the pill or powder, which makes it easier to get your cat to take it.

We do not recommend trying to hide pills in your cat's food, for two reasons:

• Firstly, cats are experts in selecting and sorting; so very often you will find the medicine left at the bottom of the bowl.

• Secondly, some sorts of medicine may be so strongly disliked by the cat, that it can create a total distaste for her food.

The best option is to deposit the pill right at the back of your cat's mouth.

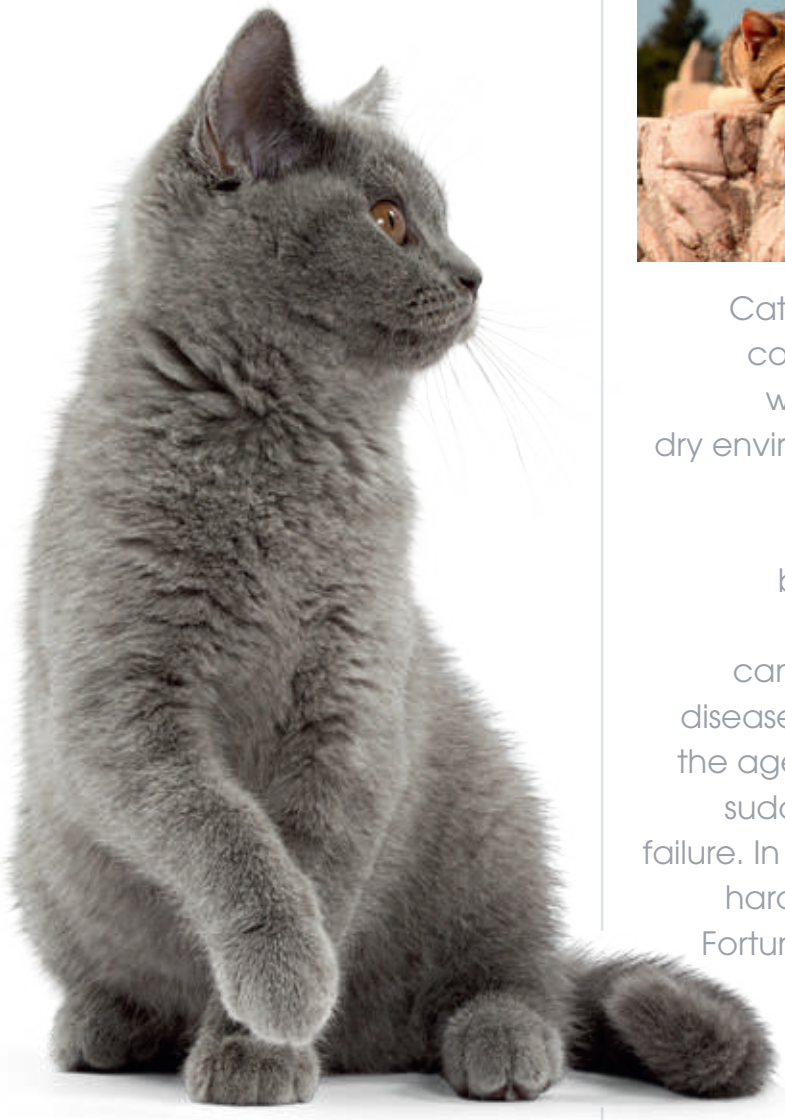
Swiftly dropping the pill as far back in her mouth as possible, then holding her jaw closed and stroking her throat will encourage her to swallow.
Be careful she doesn't bite or scratch you – you may need to wrap her in a towel to keep her paws out of the way.

After administering the pill, remember to always make your cat drink water, so that the pill is swallowed rather than staying blocked in the oesophagus. Gently syringing some water into her mouth will help the pill go down properly.

KIDNEY

DISEASE IN CATS

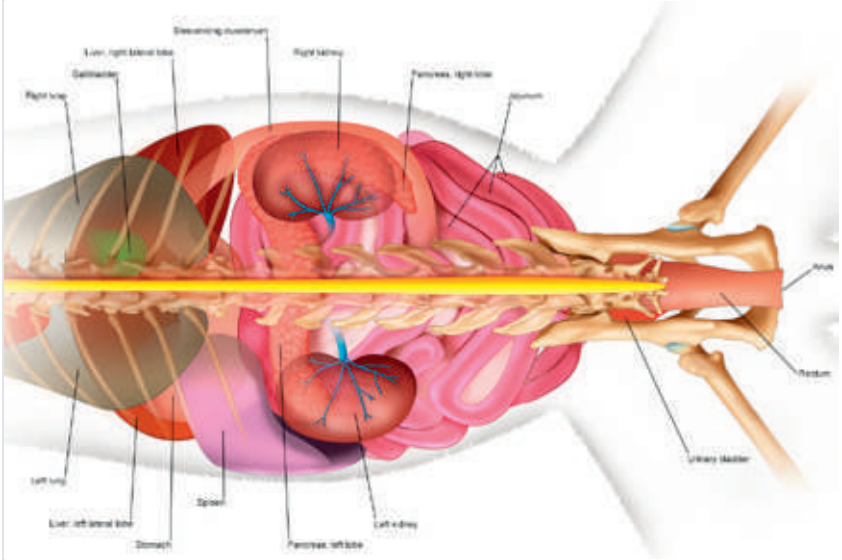
THE KIDNEY:
A VITAL ORGAN



Cats are rather special in that they have highly concentrated urine, and this is an advantage which enables them to limit water loss in hot, dry environments such as the Mediterranean region where their domestication began several thousand years ago. This is a useful feature, but the kidneys also have several other vital functions. Age and other genetic functions can lead to a predisposition for chronic kidney disease, which affects up to one third of cats over the age of 15. In some cases however, the kidneys suddenly cease to function: this is acute kidney failure. In both cases, the clinical signs are sometimes hard to detect, but the end result can be fatal. Fortunately, medical and dietary care can often considerably increase the quality of life and life expectancy for cats.

THE KIDNEY: A MULTI-FUNCTION ORGAN

Both kidneys, on the right and left, are located in the abdomen, next to the spine.
Each one is **composed of a cortex**, the external part surrounding **the medulla**, and **the renal pelvis** at the centre, which collects urine before it flows into the bladder via the urethra.

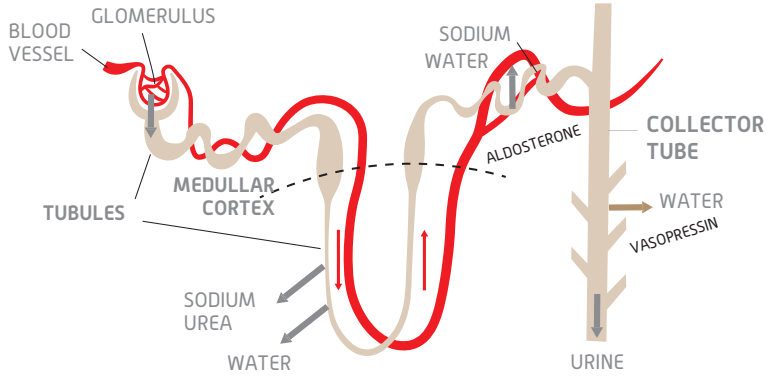


The kidney is an organ which is central to many of the body's regulatory systems:

II Filtering and elimination of nitrogenous waste and minerals

Kidneys consist of **hundreds of thousands of nephrons** (around 190,000 per kidney). Their role is to **filter the urine and make it more or less concentrated as required.**
This is a two-stage operation.
Blood reaches the level of the glomeruli cells in the renal cortex. The gaps in the filter let small molecules of water and minerals (sodium, magnesium, calcium or phosphorus) in.

Larger molecules, such as cells and proteins, remain in the blood. The resulting filtrate is called "primitive" urine and it then passes into the renal tubules where it undergoes several modifications, notably through exchanges with water and other solutions with blood and the surrounding tissue, the medulla. Amongst these molecules is urea, produced in the liver using nitrogen from breaking down proteins. Urea is not toxic, but is a good marker for several other molecules made from nitrogen, "nitrogen waste" which is potentially more toxic (sometimes called ureamic toxins), and also eliminated in urine by the kidneys.



A nephron

> "There is no need for a piece of sculpture in a home that has a cat."
>
> **Wesley Bates**

II Maintaining the right water balance

The kidneys play an **essential role in maintaining hydratio**n.
The body may need more water, or may have lost water because of vomiting or diarrhoea; in this case **the kidneys will reabsorb a maximum amount all along the tubules. Urine will be dark in colour**.
If, on the other hand, **too much water has been absorbed, urine will be diluted and will hence be lighter in colour**. Cats naturally produce urine which is highly concentrated (two or three times higher than humans). The quantity of water absorbed will have an influence on urine concentration. Cats who eat dry food or prey will produce a small quantity of highly concentrated urine. By giving your cat moist diets such as wet cat food, or by adding salt, water consumption will be higher and urine more diluted and abundant.

Maintaining the right water balance in the organism is important in order to ensure that blood pressure is high enough to irrigate all the organs, and supply oxygen and nutrients. Kidneys secrete a substance called renin which helps maintain blood pressure.

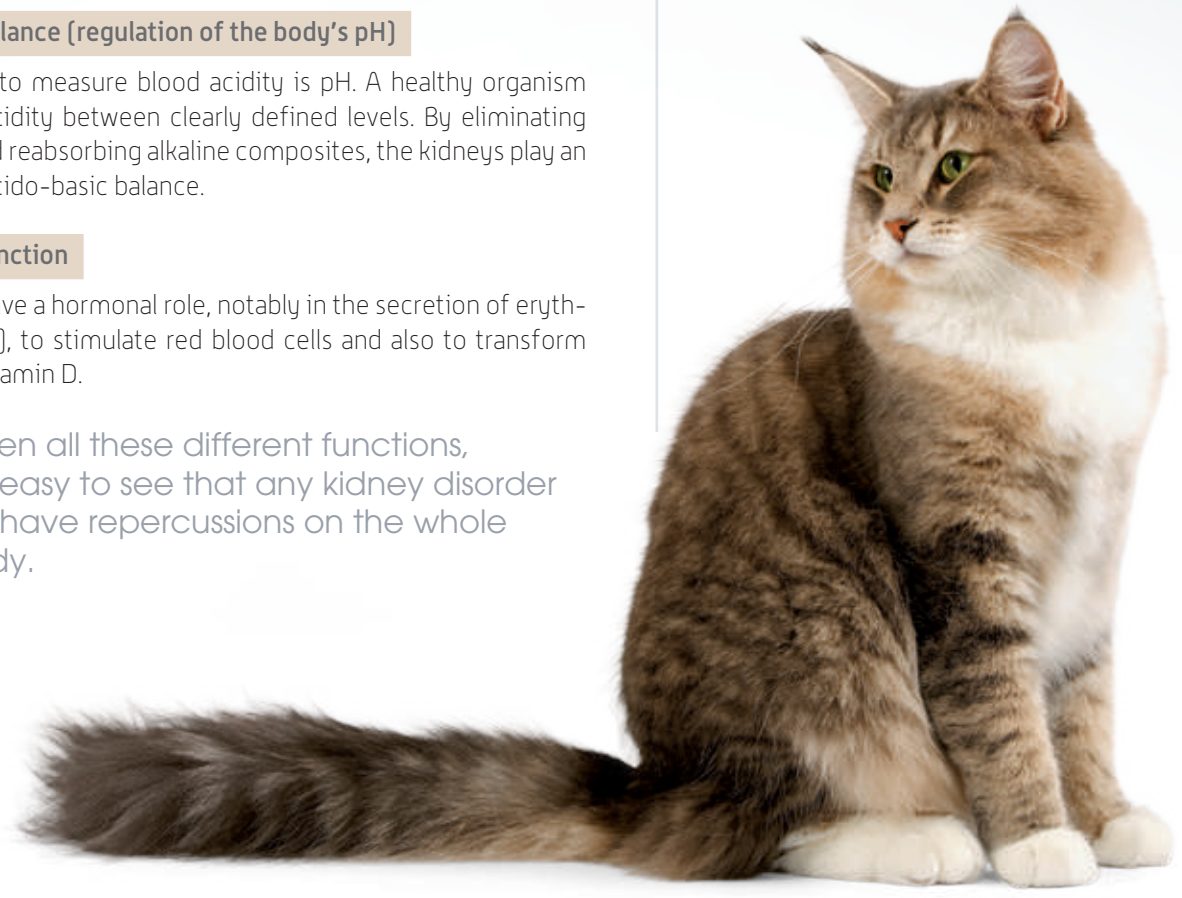
Acid-base balance (regulation of the body's pH)

The unit used to measure blood acidity is pH. A healthy organism keeps blood acidity between clearly defined levels. By eliminating excess acid and reabsorbing alkaline composites, the kidneys play an active role in acido-basic balance.

Endocrine function

Kidneys also have a hormonal role, notably in the secretion of erythropoietin (EPO), to stimulate red blood cells and also to transform and activate vitamin D.

> Given all these different functions, it is easy to see that any kidney disorder will have repercussions on the whole body.



Summary: Renal function and consequences in case of illness (Bassert and Thomas, 2014)

RENAL FUNCTION	CONSEQUENCES OF KIDNEY DISEASE	CLINICAL SIGNS
Filters and excretes metabolites and toxins	Accumulation of toxins in blood : azotemia	Nausea, vomiting, mouth sores, anorexia, impact on mental state
Maintains water balance, and blood pressure	Inability to concentrate urine, dehydration, hypertension	Polyuria/polydipsia, sticky or dry mucous membranes, skin folds, constipation
Preserves plasma albumin	Proteinuria, hypoalbuminemia, metabolic acidosis	Loss of weight, ascites, edema
Maintains electrolyte balance	Hypokaliemia, hyperphosphatemia	Muscle weakness, difficult movements, neck ventroflexion, heart problems, muscular distrophy, anorexia, nausea, vomiting
Produces erythropoietin hormone	Hormonal deficit, leading to anaemia	Pale mucous membranes, intolerant to exercise, lethargy
Transforms vitamin D into active form	Hormonal deficit contributing to phospho-calcic imbalance	one abnormalities (rare), mineralisation of soft tissues

KIDNEY DISEASES

There are several different types of kidney disease from which cats can suffer at different stages of their life. **'Kidney failure'** is referred to when the kidney is no longer able to carry out its functions, and this will require immediate treatment (perfusion, dialysis or transplant) if the animal is to survive.
Kidney failure may be "acute" if it happens suddenly **or "chronic"** and hence irreversible, since the nephrons will have been permanently destroyed.

TOXIC SUBSTANCES FOR THE KIDNEYS

Certain types of lilies, for instance the Lilium type, are highly toxic for the cat's kidneys and it only takes one or two leaves to cause acute kidney failure.

II Acute kidney failure

In this case, kidney function ceases suddenly. Because the kidneys have several different functions, the result can be fatal if the cat is not treated quickly by a vet. There are several different causes, and different names are used according to the anatomical location of the problem: prerenal, renal, or postrenal failure.

Prerenal	Decrease in blood supply : heart conditions, haemorrhage, dehydration, certain drugs (anti-inflammatories)
Renal	Damage to kidney tissue : toxic substances (drugs, or others) Bacteria, autoimmune disorder * *Autoimmune disorder : the organism produces antibodies which attack its own cells, for example the cells of the glomeruli
Postrenal	Impossible to eliminate urine : urinary tracts blocked by tumours or kidney stones

II Chronic kidney disease (CKD)

This disorder takes the form of progressive and **irreversible degeneration of the nephrons**. It is common in older cats, but can appear at any age.

In the early stages, the body compensates for the loss of the first nephrons by getting the remaining nephrons to increase their filtering activity. **This overworking of the system will lead to premature and excessive decay of kidney tissue.**

When there are no longer enough nephrons to carry out all normal kidney functions, **clinical symptoms appear**.

The reason for onset of chronic kidney disease is usually unknown, but it is sometimes possible to identify a precise cause.

FREQUENT CAUSES OF POSTRENAL OBSTRUCTION

One of the most frequent causes of postrenal damage for cats is the presence of struvite stones in the urethra. They look like little pebbles, and are responsible for what is called "blocked bladder syndrome": cats find it difficult to urinate, can sometimes cry with pain, and there are visible traces of blood in their urine. If the bladder is completely blocked, the subsequent acute kidney failure may be fatal, because potassium builds up in the blood and cannot be excreted via the urine. Veterinary treatment is required immediately to unblock the urinary tract. One of the reasons for these urinary stones is diet, and it is therefore important to make sure that the formula of your cat's food is totally suitable (c.f. Chapter on Lower Urinary Tract Disease).

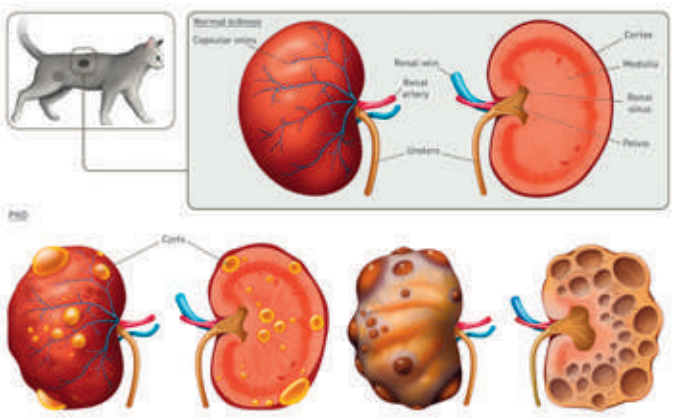
POSSIBLE CAUSES OF CHRONIC KIDNEY DISEASE:

- **inflammation and fibrosis:** interstitial nephritis
- **prolonged or untreated acute renal disorder**
- **genetic illness: polycystic kidney disease** in Persians, Exotics, British shorthairs, or renal amyloidosis* in Abyssinians, Siamese or Orientals.

**The amyloid is a protein which deposits in the glomeruli, destroying them and leading to the loss of proteins in urine.*

- **tumour** (renal lymphoma)
- **chronic bacterial infections** (pyelonephritis)
- **inflammation of the glomeruli** (glomerulonephritis)
- **hypercalcemia:** high level of calcium in the blood, increasing the risk of crystal formation in kidney tissue.

POLYCYSTIC KIDNEY DISEASE



DIET AND DEVELOPMENT OF CKD: WHAT IS THE SCIENTIFIC POINT OF VIEW?

Are dry foods (kibble) linked to kidney disease in cats?

Kibble has a very low water content (less than 10%), and is sometimes accused of causing dehydration, and, in the long term, kidney disorders due to a lack of hydration. No studies have so far compared the effect of dry diets (kibble) versus wet cat food on cats' health, or on the condition of their kidneys, but we do know that cats adjust the amount they drink to the quantity of water contained in their food, in order to maintain a constant water balance. It is also true that cats fed on dry food-only diets are not dehydrated. Of course it is important to make sure that cats always have access to drinking water.

Does a high protein diet "wear out" the kidneys?

Ingesting proteins increases the amount of filtration the kidneys perform. It has been suggested that high protein foods could contribute to "wearing out" the kidneys, by chronically increasing pressure on the glomeruli. There are some early studies on rodents which do indeed seem to corroborate this hypothesis, but on the other hand later studies show that the cause was not the high level of protein, but rather the high level of calories which led to kidney problems for the animals studied. Currently, it has been established that protein rich foods have no role in increasing the risk of developing kidney disease in cats, although limiting protein intake is important if kidney disease is already present.

Is a diet high in salt related to the onset of kidney disease?

Several studies on humans have established a connection between salt intake and high blood pressure – which can lead to kidney damage – or to cardiovascular diseases. Additionnally, in some subjects, reducing salt intake leads to lower blood pressure. However, for cats, long-term studies show that there is no relation between the salt content in food and on blood pressure, heart rate, or kidney function. However, it is recommended that a high salt diet be avoided if kidney disease is already present.

CATS ARE NOT DOGS OR PEOPLE!

Chronic kidney disease in cats is not caused by diabetes or diet.

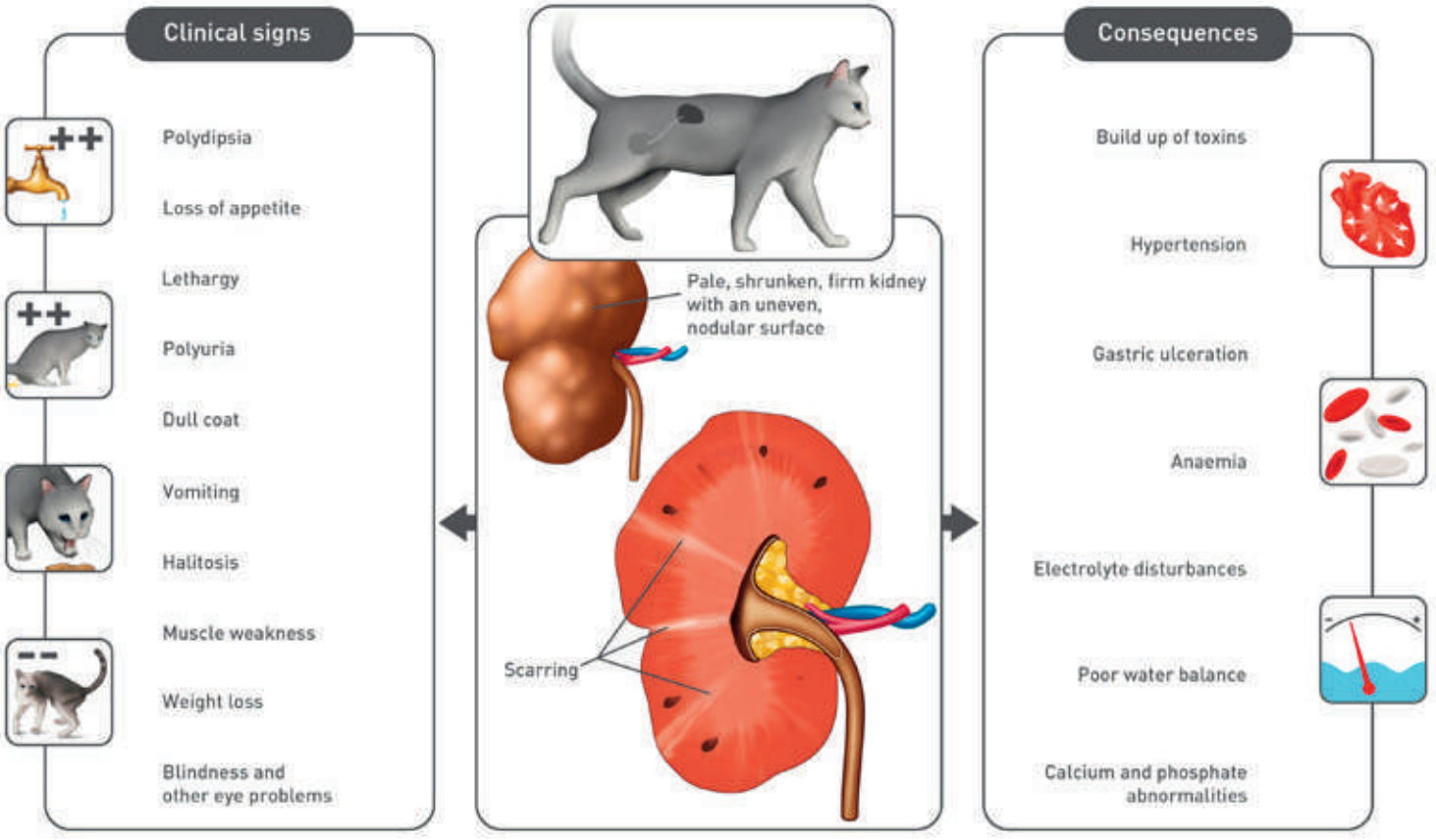
II Signs and consequences of CKD

CKD symptoms depend on how much damage has been done to the kidneys. The body activates compensatory mechanisms in order to maintain most kidney functions; but unfortunately they also hide the progression of the disease, making it difficult to detect.

Nonetheless, there are **some signs which allow a preliminary CKD diagnosis** to be made. When two thirds of the kidneys have been destroyed, the animal can no longer concentrate urine, and measuring urine density with a refractometer will indicate the concentration capacity of the kidneys.

Also, **the cat will have a tendency to drink more than usual**, so her drinking bowl will need to be filled more often, and the litter box will be full of urine and need changing more often. These are all signs that you should consult your vet as soon as possible.

CHRONIC RENAL DISEASE



When three quarters of the kidney have been destroyed, eliminating nitrogenous waste (urea) and minerals is more difficult. These toxins accumulate in the body, causing **nausea, fatigue, vomiting, and loss of appetite**. These signs will become increasingly worse as the disease progresses.

In advanced stages, the cat will refuse to eat. There will be **weight loss**, but also **a reduction of muscle mass**, because she is no longer meeting her minimum prote in requirements. Remember that muscles are actually made of… protein! Anorexia, loss of water and potassium will worsen muscular weakness, fatigue and dehydration.

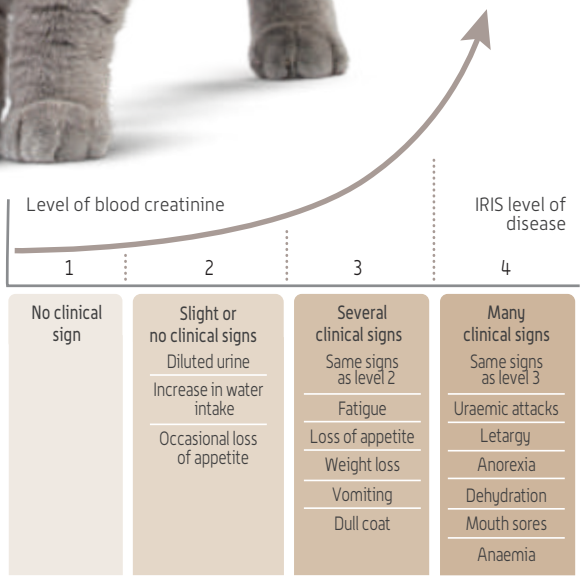
Sometimes, **painful ulcers appear in the mouth and digestive tube**, together **with constipation, and a dull and badly groomed coat**. Hair is made mainly of protein, and cats who are suffering from kidney disease no longer groom themselves.

Metabolic disturbances connected to chronic kidney failure will have consequences on intestinal absorption and on how the bones reabsorb calcium.

This can lead to tissue mineralisation on the kidneys, heart, lungs, or even the skin. The lowered rate of filtering in the kidneys can also lead to an increase in blood pressure, with dramatic consequences for the heart, kidneys, brain, or the retina. Some cats suddenly go blind.

The diagnosis of chronic kidney disease is based on a complete clinical examination, measuring blood pressure, blood and urine tests. Sometimes medical imaging is needed to detect the cause (urinary stones, polycystic disease).

Kidney disease has been studied for many years, and specialists have compiled a specific classification.



"IRIS" (International Renal Interest Society) of chronic kidney disease in cats, according to level of blood creatinine.
Observable clinical signs have been indicated for each level, from the earliest level 1, to the more advanced level 4. Since kidney disease is complex, these signs are given for reference only; cats may display some of the signs only, and in some cases at different levels.

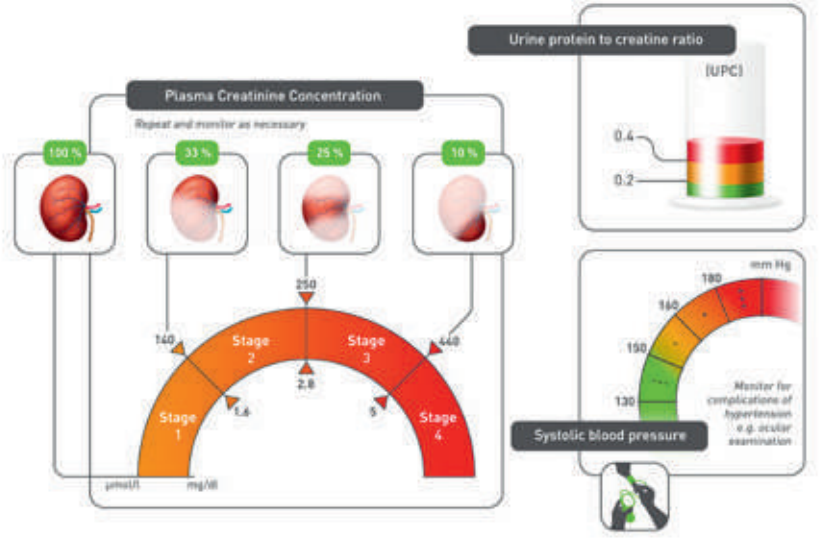
DIAGNOSIS AND CLASSIFICATION OF RENAL DISORDERS IN CATS

Creatinine is a molecule formed in muscles and eliminated solely by the kidneys.

It is hence used as an indirect marker of kidney function. If the level of creatinine in blood goes up, this shows that the glomeruli are filtering less. However, creatinine is not a perfect marker: it only increases late in the development of kidney disorder (once 75 % of kidney function has been lost), and in a way which is non-linear with loss of kidney function.

Furthermore, a loss of muscular mass can lower the level of creatinine "artificially" independently of kidney function.

4 STAGES OF IRIS CLASSIFICATION



Current research aims to identify new markers which could lead to the diagnosis of a loss of kidney function much earlier on than is possible today, in order to treat the cat sooner and thus give maximum quality of life and life expectancy.

Recently, SDMA (symmetric dimethyl arginine) has been validated as a blood marker which intervenes earlier than creatinine, and whose level is not affected by muscular mass loss.

Future research will need to identify new markers, working either alone or in combination with others, but which intervene even earlier on, and give a reliable prognosis.

TREATMENT OF KIDNEY DISEASE

In the case of an acute attack, support for kidney function and the correction of numerous metabolic balances will often require several days of hospitalisation.
In the case of CKD, treatment needs to be adjusted according to the stage of the illness and any possible complications.

> Apart from medical treatment, nutritional care is the basis of kidney failure management.

Diets which are specially formulated for cats suffering from kidney failure must also cover their energy requirements, avoid weight loss, correct metabolic disorders, decrease clinical signs and slow down the progression of the illness. A change in diet makes it possible to increase the animal's life expectancy, whilst at the same time improving quality of life.

Reducing protein in food halts the excessive accumulation of uremic toxins: indeed, any protein intake over and above minimum needs is transformed into energy, with the concomitant production of nitrogenous waste. The objective is thus to provide enough protein to avoid deficiencies ... but not too much.
The quality of proteins (ease of digestion, and production of low rate of metabolic waste) also needs **to be taken into account in the choice of food.**

How can you make sure that the correctly formulated diet is ingested in sufficient amounts?

- ***serve different textures or different types,*** *for example, wet renal food, heated to body temperature to increase its aroma.*
- ***ppetite stimulants,*** *(which are medicinal) are available; some of them, such as cyproheptadine have demonstrated their (limited) effectiveness.*
- ***homemade food may be served*** *as long as it follows a formula provided by a vet specialised in nutrition, since the right balance of nutrients is highly complex. It may also be difficult to prepare food which is palatable, because of the non-protein elements in it, especially mineral and vitamin supplements.*
- ***a feeding tube may be inserted****.*
  There are different types, but the most commonly used on a long-term basis are those which are inserted into the oesophagus, or placed directly in the stomach. Even though cat owners can be reluctant to consider this solution, eeding tubes are in fact well tolerated by cats (who can also continue to eat or drink as usual with the tube in place), and they have the advantage of administering the correct quantity of the formulated food, as well as water in case of dehydration risk, and also all the medicine prescribed orally. These tubes have also proved effective in maintaining the weight of animals suffering from kidney failure, as well as their quality of life, for several weeks or even months.

Studies have shown that **low-protein foods reduce the quantity of urea in the blood** (and hence the other uremic toxins), as well as "ureamic attacks", which are periods of time when the cat decompensates, with a high level of nausea, loss of appetite, and vomiting. So the energy provided by kidney disease diets comes either from fats or carbohydrates.
The advantage of a high fat diet is that they are more energy-dense, providing twice the number of calories. This will help limit weight loss for a cat with no appetite.

Another key factor for **kidney support foods**, compared to maintenance foods, is that **the phosphate content is limited**. Studies have shown that **limiting phosphorus in food slows down the progress of the CKD**, and lengthens cats' life expectancy. In food, most of the phosphorus comes from the protein source, so reducing the protein content, or choosing protein sources which are low in phosphate (such as some plant proteins), will also help limit phosphorus intake.

The effectiveness of phosphate limitation can be measured by a regular check of blood phosphate levels during visits to your vet.

If the quantity of phosphorus in food is still too high, then phosphate binders can be mixed with food before each meal. These composites act by binding with the phosphorus in the digestive tube, so that it is not absorbed, and eliminated in the stools. The problem is that this often makes the food less palatable.

Amongst the other nutrients which slow the progression of CKD are **omega-3 long-chain fatty acids present in fish oil** (EPA and DHA), which have also demonstrated beneficial effects, possibly because of their anti-inflammatory role and their action on blood vessels, decreasing tension at the level of the glomeruli.

Different antioxidants, such as vitamin E, C, carotenoids (close to vitamin A), **or polyphenols, have also been successfully tested** to slow down the progression of the illness.

As far as sodium is concerned, current thinking is that it is best to avoid high levels, which could risk worsening any potential hypertension. Lastly, kidney support foods are formulated to limit side effects of the disease: they are usually phosphate-enriched in order to compensate for the loss of this electrolyte in diluted urine, and to prevent any deficiencies, and they are also alkalising to fight against acid accumulation.

Unfortunately, because of the disease and its consequences, **the appetite of a cat suffering from kidney failure is often limited or irregular.**
Limited protein diets often seem less palatable, compared to the cat's normal food. Furthermore, food aversion may occur if that food is smelt or ingested during a ureamic attack when the cat feels nauseous. So the dilemma is… should you therefore only give your pet specially formulated foods whose effectiveness has been demonstrated; but which may not be sufficient to prevent weight loss, or else serve maintenance foods which can be more palatable, but whose long-term ingestion can worsen clinical signs or even accelerate the progression of the disease?
Certain food solutions can solve this problem with specially formulated diets for cats with kidney failure, which use different aromas to increase palatability.

Sophisticated treatments such as dialysis or kidney transplants are also available.

CONCLUSION

The kidneys are indispensable for life. It is important to detect any kidney disorders early on, in order to slow down their progression and to keep harmful effects to a minimum. When treatment is begun early enough, it can significantly increase a sick cat's life expectancy. Today's research on kidney disorders aims at delaying, or even preventing their appearance, and diet certainly plays an important role.

DIALYSIS AND TRANSPLANTS: SOPHISTICATED TREATMENTS ALSO AVAILABLE FOR CATS

When the kidneys no longer function, after an acute attack or at the end of a chronic disease, the result can very soon be fatal unless those functions are restored quickly.

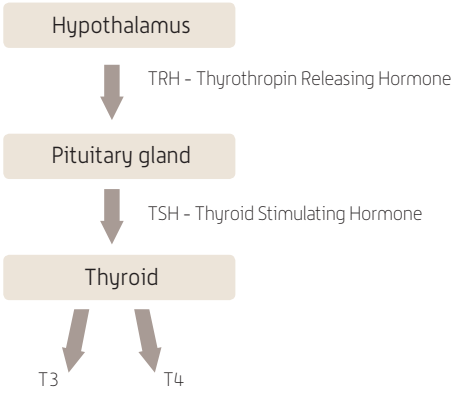
- **Haemodialys**is is a technique which can imitate kidney function: blood is pumped, filtered, and then transfered back to the animal. Each treatment lasts 3 to 5 hours, two or three times a week, or else is carried out continuously over several days. Machines used for cats are the same as those used for humans, but with circuits adjusted for paediatrics or neonatology. This sort of treatment is effective, but expensive and only available in a few places in the world. It also needs special qualified and experienced staff. It cannot regenerate the kidneys, it just takes over the function until such time as the kidney failure issue is solved, or a transplant carried out.

- **Kidney transplants** are an option when both kidneys have been completely and irreversibly destroyed. A kidney is taken from a compatible donor cat (who can survive with just one kidney), then transplanted into the cat with kidney failure. This method is also expensive and needs specialised, experienced teams. It is not risk-free, since the transplanted kidney could be rejected, which would necessitate treatment for life, and there is also an ethical question about the donor cat – who is generally adopted by the sick cat's family - to be considered.

HYPERTHYROIDISM

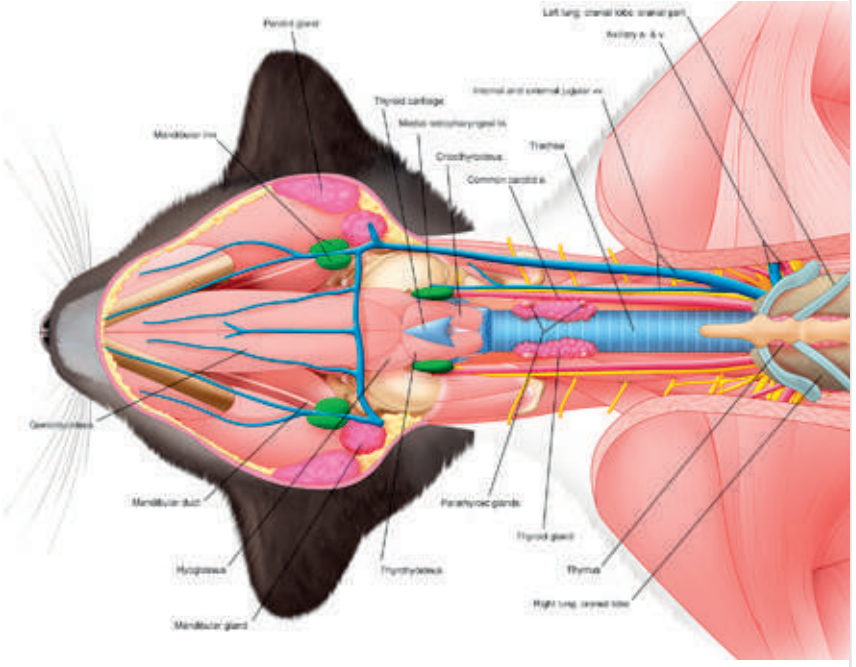
IN THE CAT

HYPERTHYROIDISM
IS A HORMONAL DISORDER



INTRODUCTION

The thyroid is **a gland shaped a little like a butterfly, located on both sides of the trachea at neck level**. This gland **secretes the hormones thyroxine (T4) and triiodothyronine (T3), which have a stimulating effect on the whole organism**.



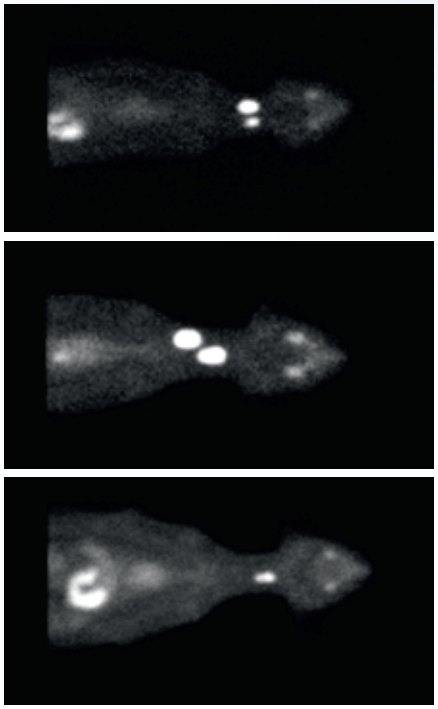
Hyperthyroidism is **the most common hormonal disorder in older cats**. Estimates are that **up to 10 % of cats aged 11 years** or more suffer from this chronic condition, which is caused by a **benign hypertrophy of one or both lobes of the thyroid gland.**
However, in around 2% of cases, the disorder is caused by a malignant tumour, which is **a carcinoma**.

A scintigraphy must be taken to measure the precise size and nature of the hypertrophy. This is a medical imagery technique which consists of **injecting a radioactive component to visualise the diseased tissues**.
In some cases, this examination can reveal the existence of **ectopic thyroid tissue in the thoracic cage**.
Glandular tissue **produces an excessive quantity of hormones and** this over-production, in turn, generates **the over-stimulation of biological functions**.
The excess of hormones causes symptoms which will alert the owner, and the vet.
Even though cats with this problem **have a huge appetite** – sometimes even going as far as stealing food – they will still have a **tendency to lose weight**.

They may also have **digestive problems, such as diarrhoea or vomiting**.
Cats suffering from hyperthyroidism will be **hyperactive**, or have **mood swings**, or **change behaviour for no evident reason**: cats who are normally docile and affectionate can suddenly become cranky and aggressive; and cats who are usually independent will seek out your company.
They also **tend to drink more**, and **hence urinate more frequently**. The scientific term for this is **polyuria-polydipsia (PUPD)**.
The accelerating effect is also visible with an increase of the heart rate, and there is often **tachycardia** (heart beating too fast).
Vascular hypertension can follow, with potentially dramatic results (blindness, kidney failure …).

Your vet will **confirm the diagonosis by measuring the rate of thyroid hormones in the blood.**

Dr Pauline De Fornel, Clinique MICEN VET – Créteil



Scintigraphies

WHAT CAUSES HYPERTHYROIDISM?

This problem was first diagnosed in 1979, and so far, no specific cause has been identified. Several studies have nevertheless attempted to detect risk factors.
Some factors which have **no connection with diet have been highlighted, like age, living inside, contact with fertilisers, pesticides, antiparasites in powder or spray form, and the use of cat litter**.
Other studies have concentrated on risks **connected with diet, such as tinned food, or certain flavours**. However, since most of these enquiries are based on questions which actually list possible risk factors, then there is **always a certain bias**.
The interaction of chemical products such as BPA (a chemical that is added to many plastics) or PBDE (a flame retardant) with thyroid tissues, causing hyperstimulation of gland cells, have also been considered; but here too, **the results are far from conclusive.**

THE ROLE OF IODINE

Iodine is indispensable for the thyroid to function well, since it is the basic molecule of thyroid hormones. Scientists have consequently made the assumption that the big variations in the iodine content in cat food, which have been made over the past ten years or so, may play a role in triggering the illness.
In fact, when a normal thyroid lacks iodine, it will develop nodules to maintain normal production: as if the production department started working twice as hard! But if all at once there is a high intake of iodine, then these hyperactive cells will still continue to work at the same rhythm, and produce an excessive quantity of hormones, i.e. hyperthyroidism. Paradoxically, any supplementation of the food containing iodine actually decreases the risk of developing hyperthyroidism, because when adequate intake is maintained throughout life, the development of hyperactive nodules will be prevented.

HOW TO TREAT HYPERTHYROIDISM?

> Hyperthyroidism is a potentially fatal debilitating condition.
> The heart beats really fast, hunger is never satisfied, digestion is upset, and there are mood swings…, all this has of course a big impact on health, the quality of life of affected cats, and on their relationship with their owner.

Several treatments may be used: anti-thyroid drugs such as methimazole, thiamazole or carbimazole. These molecules will concentrate at gland level, **blocking hormonal synthesis**. This treatment seems to **give good results in 75% of cases**, but **is very demanding** both for the cat and the owner, since it needs **to be administered every day**, and many cats are very uncooperative when it comes to swallowing tablets.
Some animals cannot stand **the side effects of these drugs : anorexia, vomiting, weakness, or, more rarely, self-harming that produces neck injuries**.

Another approach consists of giving **a diet which is extremely low in iodine**, so as not to supply the raw material needed to produce hormones.

Food like this is not very tasty; there will **be daily constraints** such as not going outside at all, and there will be logistical problems in houses where several animals live together - all of which **limit the use of this therapeutic option**. You also need to bear in mind the fact that, despite the treatment, the illness is still present and growing, and consequently benign adenoma could become tumours if they have time to do so.

The definitive solution is that of surgically removing the thyroid. This option is no longer recommended since there is **a risk, both surgically and anaesthetically**, for patients who are already ill. Furthermore, some cases have **extra thyroids hidden in the thoracic cavity** which will **take over from the removed tissue. Diseased thyroid cells use up a lot of iodine**. It is possible **to destroy them selectively**, whilst still keeing healthy cells, **by using radioactive iodine I-131**, which is **administered intravenously, subcutaneously, or orally**.

This treatment, with visible results between 3 and 6 months later, must be administered in a specialised veterinary clinic, because any unabsorbed I-131 will be excreted in saliva and eliminated in urine and stools, presenting a risk of contamination for the environment and staff.

> “Melancholy is a lost cat believed to have been found again.”
>
> **Léo Ferré**

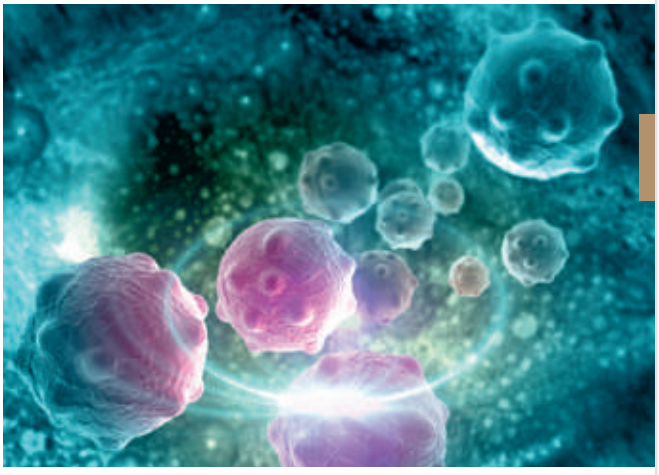
CANCER

IN CATS

MEDECINE
IS MAKING PROGRESS

Cats are not immune to this dreaded disease, which seems to become more and more prevalent every year. Indeed, **our favourite felines do live longer these days, which increases the probability that they will eventually develop cancer in the course of their lives**.

> Veterinary medicine progresses make it possible now to detect, treat, and sometimes even cure cancer.



WHAT IS CANCER?

Normally, for an individual in good health, the tissues are in equilibrium: the production of new cells is equivalent to their rate of mortality. When there is **a tumour** (also called **neoplasia**), **the number of cells which multiply is higher than the organism's actual physiological needs**, and once this cellular proliferation begins, **it is irreversible**.
If the excess cells are confined to one place, then the neoplasia is "benign". However, **if the abnormal cells begin to invade adjoining tissues**, or to **colonise distant organs** (in a process called metastasis), then it is a **"malignant" tumour**.

WHAT CAUSES CANCER?

There is not always a specific cause, and sometimes several elements combine to provoke the disease.

> Cancer is the result of genetic predispositions and environmental factors.

Ageing, for example, is a contributing factor. In fact, age increases the risk of cells dividing abnormally, and, at the same time, the immune system - whose job it is to detect and eliminate biological aberrations - loses its effectiveness.

Cells also become more fragile and lose their ability to fight against free radicals. This is why **the majority of malignant tumours develop later in life.**

Environmental factors have been clearly defined:

- **Exposure to pesticides, herbicides, insecticides.**
- **Passive smoking** (a study* has shown that the risk of lymphoma was 2.4 times higher for cats who live in homes where there are smokers).

**Bertone ER & al. Environmental Tobacco Smoke and Risk of Malignant Lymphoma in Pet Cats. Am. J. Epidemiol. (2002) 156 (3): 268-273*

- **Sun:** weakly pigmented zones, and those which are chronically exposed to the sun, have a higher risk of developing cancer, called squamo-cellular carcinoma. These tumours are frequently found on the ears and muzzle of white cats.
- **Trauma:** for example, postvaccinal sarcoma *(c.f. chapter on Infectious diseases).*

There are also cancers with a viral origin:

- **Papilloma:** this type of benign tumour can be found on old cats. It is best to remove them because they can turn into carcinoma.
- **The virus of feline leukaemia (FeLV) and that of FIV** are clearly connected to the development of tumours on infected individuals whose immune system no longer functions.
- **Hormones:** hormonal influence in the genesis of mammary tumours is well documented. Studies have shown that non-spayed females and those who take progestogens (contraceptive pills or injections) have a higher risk of developing cancer of the teat.

This is another good reason for sterilising female cats early on!

AN EXAMPLE: LYMPHOMA

This term includes neoplasia which come from lymph cells. They develop from lymph cells on the lymph glands, the spleen, or in bone marrow. Lymphoma is one of the most frequent cancers in cats. Lymphoma are classified according to their anatomical location, but also according to histological and immunophenotypic criteria. This complicated word is used to describe the cell line at the origin of cancers (B or T lymphocytes).

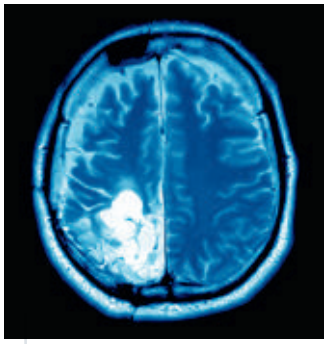
HOW TO DETECT CANCER?

Symptoms will depend on the organ concerned. Skin lesions are easy to detect and must be shown to a vet to determine the origin, and so adopt the best possible therapeutic approach. The smaller the tumour, the easier it is to remove surgically – a tumour the size of a grain of rice, rather than one the size of an egg, will have caused less damage and surgery will be more straightforward!

If neoplasia develops in an internal organ, it is **difficult to detect it before it reaches a size big enough** to interfere with the normal functioning of that organ, when the animal starts showing some symptoms.

Any unusual behaviour, the presence of blood in urine, vomiting, diarrhoea or constipation, anorexia, nervous problems, weakness or unusually pale mucosa can all be the signs of cancer.

Fortunately, present day diagnostic methods can track down most tumours, wherever they are hiding.
Sometimes cancer can cause problems far from the affected organ. This is called **paraneoplasic syndrome**.



MRI scan of brain tumour

CLASSIFICATION OF CANCER

Because tumours can be so different, it was necessary to create **classifications**: i.e. to give different cancers specific names to describe their nature, origin, location and characteristics.

Veterinary names for cancers are slightly different from those used in human medicine. Most tumours are composed of one single type of cells, and their name refers to the type of stem cells. These can be **mesenchymal cells, epithelial cells, or immune cells**.

To describe **benign tumours originating in the mesenchyme the suffix –ome or –oma is added**, so a benign tumour derived from a lipocyte (fatty cell) is called a lipoma. If it is a fibroblast, it is called a fibroma.
In the case of **malignant tumours the suffix –sarcoma is added**, so for example the cat could have a liposarcoma or fibrosarcoma.

In epithelial cell cancers, the name refers to the affected tissue: e.g. the prefix adeno- is used to describe a glandular appearance, whether or not

the neoplasia has affected a gland. Adenoma is the term for a benign tumour, and carcinoma or adenocarcinoma for a malignant one.

When it is **a lymphatic tumour, or a tumour of the blood cells**, the disease is called **leukaemia, lymphoma or lymphosarcoma.**

HOW TO TREAT CANCER?

When the type of tumour has been identified, the vet can identify the best possible therapeutic approach. The first step will often be **surgical excision of the tumour** (it is removed during an operation).

Certain types of cancer respond very well to cytotoxic treatments: commonly called **chemotherapy**. **Chemotherapy drugs target cancerous cells: either destroying them or preventing them from multiplying**.

External radiotherapy is also used **(particle accelerators), or brachytherapy (an ionising implant placed in the tissues)**. More recently, immunological treatments have been developed, and seem to give promising results: these are known as **anti-cancer immunotherapy**.

These methods are comparable to an anti-cancer vaccine. The next step in veterinary oncology will most probably be **genetic**.

Whatever treatment protocol is advised and adopted, **it is important to aim to preserve the cat's quality of life for as long as possible.**

> "A cat by our side: warm, furry, moustachioed, purring, is a reminder of Paradise Lost."
>
> **Léonor Fini**

MEDICAL

GLOSSARY

A

ABDOMEN
Region of the body located between the thorax and the pelvis, containing most of the digestive organs.

ABSCESS
Accumulation of pus in a cavity that forms a shell. It is painful, causes reddening and usually a decline in the animal's wellbeing.

ACUTE DISEASE
An illness that progresses quickly.

ALLERGIES
Exaggerated reaction of the cat's immune system, caused by contact between the cat and an allergenic substance.

ALOPECIA
Hair loss of various origins.

ANAEMIA
A serious decrease in the total amount of red blood cells.

ANOESTRUS
Period during heats in the reproductive cycle of the queen.

ANTIBODIES
Proteins synthesised by the B lymphocytes and plasma cells, capable of recognising an antigen and of binding to it to destroy it.

ANTIGEN
Substance or element capable of triggering an immune reaction.

ATAXIA
A neuro-muscular pathology consisting of a lack of full coordination of voluntary movements, connected to a dysfunction of the nervous system.

AUDITORY CANAL
The ear passage leading from the outside to the ear drum.

AUDITORY
Relating to sound or hearing.

B

BACTERIA
Category of micro-organisms responsible for disease.

BILE
A greenish-yellowish fluid secreted by the liver and stored temporarily in the gall bladder, that aids the digestion of fats.

BREACH BIRTH
The kitten is presented tail-end in the birth canal. This is not unusual and in most breeds is not a problem.

BRONCHI
The main passageway into the lung.

C

CAESARIAN
The use of surgery to deliver one or more kittens.

CARDIOMYOPATHY
Disease of the heart muscle.

CARNIVORE
A meat eater.

CASTRATION
The surgical removal of the testes of a male cat.

CAT FLU
A term used colloquially to describe feline upper respiratory disease.

CLEFT PALATE
Present at birth, this is an opening in the palate that results in a direct communication between the nose and the oral cavity.

COCCIDIOSIS
A parasitic type of infection.

COLITIS
An inflammation of the colon (large intestine).

COLOSTRUM
The first milk produced by the queen after the birth of the kittens, that provides immunity against some diseases.

CONGENITAL
A trait or condition that exists from birth that may, or may not, be hereditary.

CONJUNCTIVITIS
Inflammation of the moist tissues in the front part of a cat's eye.

CORNEA
The transparent part of the eye that covers the front portion of the eye. It covers the pupil, iris, and anterior chamber.

CRYPTORCHID
Where one or both testes fail to descend from the abdomen into the scrotal sacs.

D

DANDER

Scales from the epidermis which are shed from the skin.

DECLAWING

Surgical removal of the claws, banned in most countries.

DEHYDRATION

Loss of water from the body tissues.

DIABETES

Hormonal disease characterised by hyperglycaemia (too much sugar in the blood).

DIFFERENTIATION

The process during the growth of an embryo in which unspecialised cells develop into tissues and organs.

DYSPNEA

Respiratory difficulties with poorly coordinated respiratory movements and altered amplitude. It is referred to as inspiratory or expiratory, depending on whether the respiratory difficulties concern the entry or exit of the air.

E

ECLAMPSIA

Acute convulsive syndrome, usually found in bitches (and more rarely in queens) during lactation, and sometimes at the end of gestation, caused by a reduction in serum calcium levels.

ECZEMA

Dermatitis (skin disease) describing cutaneous inflammations with many different causes.

EMBRYO

The term for an unborn kitten during her early stages of development.

ENTERITIS

Inflammation of the gastrointestinal tract leading to a variety of gastrointestinal disorders. There are numerous origins (infection, immune-mediated, foreign-bodies, etc.).

EPIDERMIS

The outer layer of the skin.

EUTHANASIA

Pain-free medical act consisting of intentionally bringing about the animal's death in cases of extreme suffering or incurable life-altering pathologies.

F

FAECES

Excrement. The waste matter discharged from the bowel.

FCV

Feline Calcivirus. One of the viruses that cause upper respiratory tract disease.

FELV

Feline Leukaemia Virus.

FIA

Feline Infectious Anaemia.

FIV

Feline Immunodeficiency Virus.

FIE

Feline Infectious Enteritis.

FIP

Feline Infectious Peritonitis.

FLUTD

Feline Lower Urinary Tract Disease.

FOETUS

An unborn kitten after differentiation of the organs and tissues.

FOLLICLE

Cavity in which hair is produced.

FPI

Feline Panleucopaenia.

FUNGUS

A primitive form of plant life that can be parasitic as in the case of ringworm.

FUS

Feline Urological Syndrome.

FVR

Feline Viral Rhinotracheitis. The more serious of the two viral causes of feline respiratory disease.

G

GASTRIC

Relating to the stomach.

GESTATION

Period of time during which the female is carrying one or several living foetuses.

GINGIVITIS

Inflammation of the gums, often caused by the presence of plaque and tartar, and usually accompanied by bacterial proliferation.

H

HAEMOGLOBIN

Protein containing iron and located in red blood cells. They have the role of transporting oxygen from the lungs to tissues in the body, and carbon dioxide from the tissues to the lungs.

HAEMORRHAGE

Loss of blood outside of the blood vessels.

HAEMATOMA

Blood clot caused by the rupture of a blood vessel. Can appear on an organ at the level of the tissue situated around these organs or else directly under the skin.

HERNIA

Protrusion of a body structure from its normal position, leading to the compression of another structure. There are several types of hernia with very variable symptoms depending on their location.

HIP DYSPLASIA

Malformation of the hip socket.

HOST

The animal on which a parasite lives.

HYDROPHOBIA

An irrational fear of water.

I

INFERTILITY

Inability to reproduce, in a male or female.

INCONTINENCE

Lack of control of defecation or micturition: loss of stools or frequent urination including during sleep, or, on the contrary, the inability to urinate or defecate without manual assistance.

K

KERATITIS

Inflammation of the various layers of the cornea, which may be accompanied by ulceration. The cornea becomes opaque, painful, loses its transparency and blood vessels start to appear.

L

LACTATION

The production of milk.

LEUCOCYTE

White blood cell.

LEUKAEMIA

Viral infection causing immunodeficiency.

LORDOSIS

The crouched, sexually receptive position assumed by a queen in oestrus.

LUXATING PATELLA

A genetically transmitted condition that causes the kneecap to slip when the joint is moved.

LYMPH

Straw-coloured fluid found in lymph vessels.

LYMPHATIC SYSTEM

The system of lymphatic vessels and nodes.

LYMPH NODE

A mass of tissue found at various points on lymph vessels; these may become swollen in disease.

LYMPHOCYTE

Leukocytes with a key role in the immune system.

M

MAMMARY GLAND

Gland that produces milk to feed kittens.

MASTITIS

Inflammation of the mammary gland.

MELANIN

The main pigment that gives colour to skin and hair.

MEMBRANE

A thin sheet of tissue.

MONORCHID

A male cat that has one testicle retained or hidden in his abdominal cavity.

N

NEPHRITIS

Renal inflammation. This causes irreversible lesions, which ultimately result in renal failure.

NEUTERING

Removal of the testicles or the uterus.

O

OESOPHAGUS

Segment of the tube leading from the mouth to the stomach.

OESTRUS

Period of sexual receptivity seen in the female cat.

OLFACTORY

Relating to smell.

OMNIVORE

An animal that eats both meat and plant foods.

OPTIC NERVE

This transmits visual information from the retina to the brain.

ORGAN

A distinct structure in the body, e.g. heart, lungs etc. that has one or more particular functions.

OVARIES

The female sex glands that produce egg cells and sex hormones.

OVULATION

The release of the eggs.

P

PARASITE

Any animal or plant that lives in or on another (the host), from which it obtains food. The parasite is usually harmful to the host.

PARTURITION

The process of giving birth to one or more offspring.

PERICARDITIS

Inflammation of the pericardium, often infectious in origin. If left untreated, periodontal disease may lead to pericarditis.

PERITONITIS

Septic or aseptic inflammation of the membrane that surrounds the peritoneal cavity. It causes significant abdominal pain, gastrointestinal disturbances, fever and a state of shock.

PHEROMONES

A chemical substance released by an animal that influences the behavior of another animal of the same species; these are involved in territorial spraying and sexual attraction.

PIGMENT

Colouring matter.

PINKING UP

A term used to describe the colouring of a queen's nipples about three weeks after mating.

PINNA

The ear flap.

PITUITARY

A small gland, at the base of the brain, that is one of the control centres of the hormone system.

PLACENTA

The organ by which the unborn kitten is attached to the lining of her mother's womb and through which she receives oxygen and food materials and disposes of waste.

PREGNANCY

The period of reproduction during which a female carries one or more live offspring.

PRURITUS

Severe itching that may cause skin lesions.

PSEUDOPREGNANCY

Also known as 'false pregnancy': a behavioural syndrome simulating pregnancy.

PURULENT

Containing pus.

PYOMETRA

An infected uterus where it becomes engorged with pus.

R

RENAL AMYLOIDOSIS

Genetically linked kidney condition causing kidney failure.

RENAL

Relating to the kidneys.

RHINITIS

Inflammation of the cat's upper respiratory tracts.

RINGWORM

A fungal skin infection.

S

SCLERA
The white part of the outer cat eye.

SCROTUM
A small, muscular sac containing the testicles, located at the rear end of a male cat.

SEPTICAEMIA
Generalised bacterial infection of the blood. It causes severe pyrexia and a risk of septic shock.

SINUSITIS
Inflammation of the nasal passages, often with mucus.

SPAYING
Surgical neutering of a female cat.

STIFLE
Correct term for the knee of a cat.

STOMATITIS
Inflammation of the oral mucosa.

STUD TAIL
Overactivity of the glands at the base of the tail, causing an oily substance to be released and sometimes acne. Mostly seen in entire males.

T

TAPETUM LUCIDUM
The mirror-like layer at the back of the cat's eye that produces a distinct shine when exposed to a bright light in otherwise dark conditions.

TESTICLES
The male sex glands, contained in the scrotal sac, which produce sperm and male sex hormones.

TESTOSTERONE
Male hormones.

TISSUE
A mass of cells performing a particular structural or functional role in the body.

TOXIN
A poison, particularly one produced by a micro-organism.

TOXOPLASMOSIS
Parasitic disease in which parasites lodge in the lining of the cat's small intestine and reproduce.

TRACHEA
A fibrous cartilaginous tube allowing the passage of air from and to the lungs.

TUMOUR
Any growth – not necessarily cancerous – caused by abnormal cell multiplication.

U

ULCER
Loss of substance from the surface of a body structure.

UMBILICAL HERNIA
Occurs when the abdominal wall behind the naval is damaged and may cause the naval to bulge outwards.

UTERUS
Female sexual organ in which gestation also takes place.

V

VACCINATION
Treatment to produce immunity against a disease.

VAGINA
Female sexual organ connecting the uterus to the vulva.

VAGINITIS
Inflammation of the vagina that can result in a discharge.

VASCULAR
Pertaining to the blood vessels.

VASECTOMY
Removal of the testes while leaving the male cat capable of sexual intercourse.

VIRUSES
A class of disease producing micro-organisms, extremely small in size, that cause several of the most serious feline diseases and cannot be treated with antibiotics.

VULVA
The external opening of the vagina or reproductive tract in a female.

CHAPTER 07

UNDERSTANDING THE CAT

BEHAVIOURAL
DEVELOPMENT

BEHAVIOUR IS INFLUENCED BY SEVERAL PARAMETERS

Behavioural development is part of the cat's development and growth process. It is particularly dependent on the development of the central nervous system, the sensory organs, and motor coordination.

Cats are what is called a **"nesting"** species, and contrary to what you may think, this has no connection with birds! It is rather a term used to describe species where females deliver their young in a "nest".

Kittens are very **immature at birth**, and hence need to be hidden. However, their **postnatal development is very rapid**. Their behavioural development is intrinsically connected to their anatomic-physiological growth. The central nervous system, sensory organs, and motor skills need to be operational.

> Many different parameters influence behavioural development, and in particular the prenatal stage, how the delivery went, the age weaning took place, the age of sexual maturity, as well, of course, as all the environmental and social parameters.

Many studies, often carried out under scientific conditions, have led to a better understanding of the behavioural development of *Felis catus*, our domestic cat.

SENSORY DEVELOPMENT

Kittens are **born with their eyes and ears closed**, as if they were deaf and blind. They are equally **unable to maintain their own body temperature**, but right from birth are **sensitive to tactile stimuli**, and **know how to stand upright**.

During the first two weeks of their life, kittens mainly perceive tactile, olfactory, and thermal stimuli. They begin **to respond to noise at the end of their first week**, and then it will take **around a month for their vision and connected behaviour (spatial perception) to become operational**.

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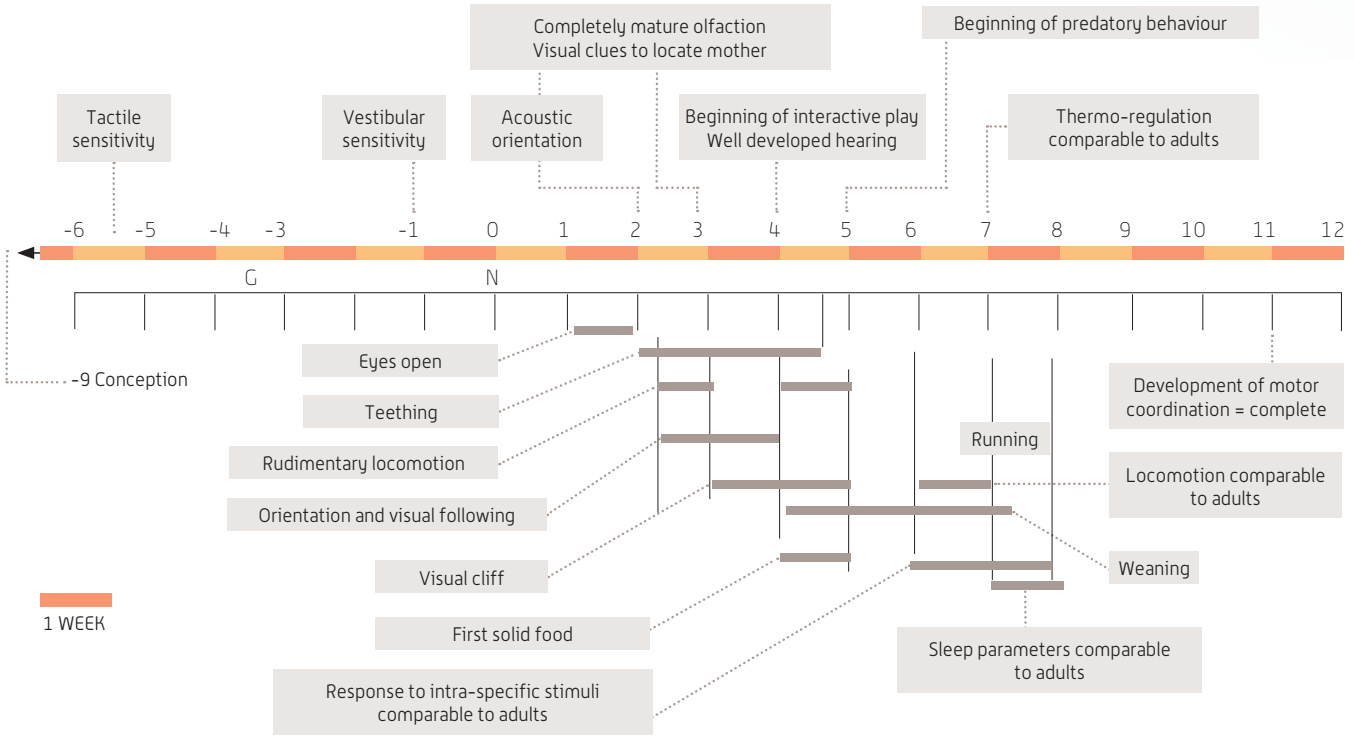


Time course of the appearance of the principal behavioural and physiological changes in the cat, Felis catus : Time-scale = one week. Gestation lasts 9 weeks. B = birth. Sexual maturity appears around 10 months (40 weeks). Martin and Bateson, 1988.

Coordination between eyes and walking is only mature after six weeks. And it is after this age that kittens begin to scoot around really quickly.

Vocal sounds are the manifestation of emotional states, and for kittens, they are triggered by uncomfortable situations: cold, being closed in, isolation, and they set off a response of care-taking behaviour from the mother.

Kittens start vocalising when their mother enters the "nest", but are particularly silent when she leaves, which may indicate an absence of attachment behaviour in the strict sense of the term.

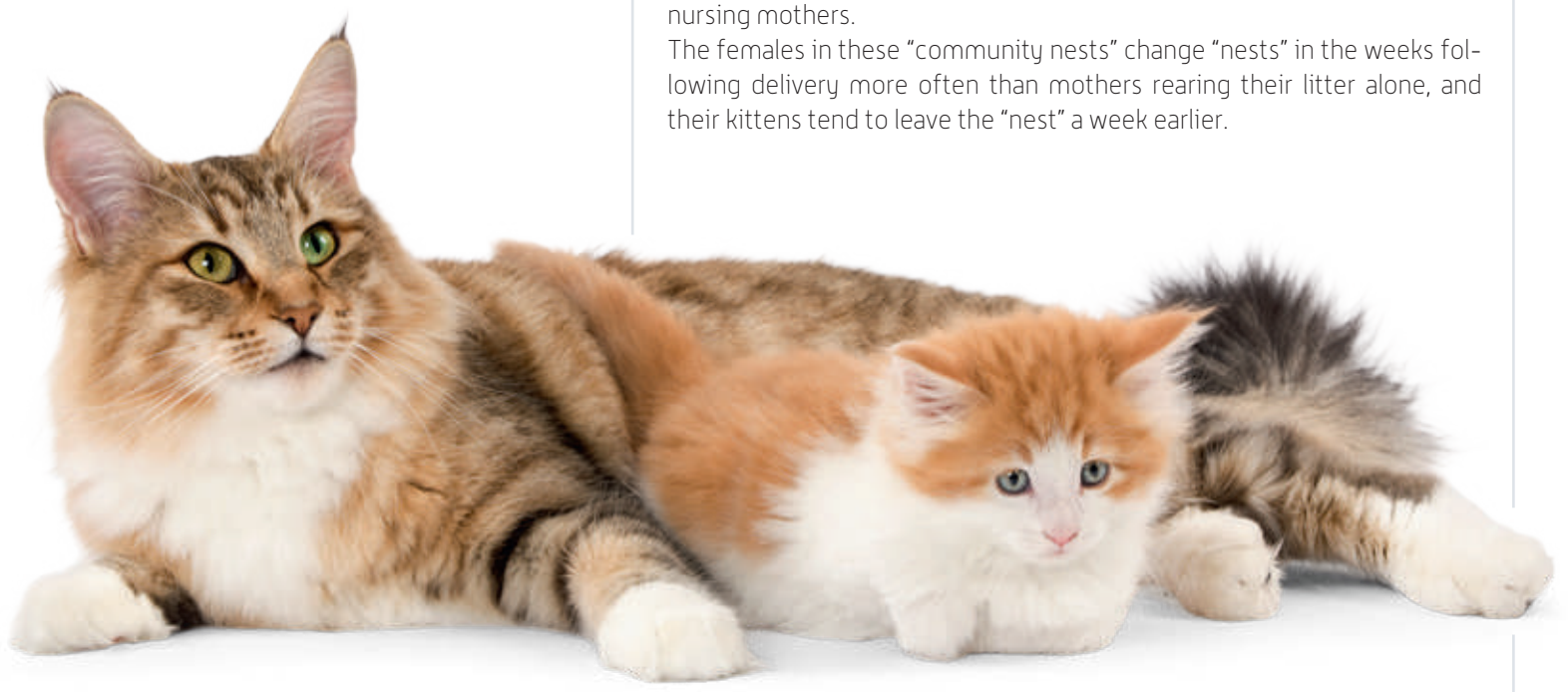
MOTHER – KITTEN RELATIONSHIP

From birth onwards, **the queen carries out all the parental tasks** for her litter alone.

During the first weeks following delivery, the mother mainly assumes a position lying on her side, exposing her teats to the kittens.

From the first week, the kittens choose a teat which is "theirs" throughout the whole suckling period. When the kittens are around three weeks old, the mother spends less and less time in the nest, and abandons them little by little. This apparent lack of interest actually corresponds to the **onset of weaning, which takes place around the 49th day**.

The kittens gradually spend less and less time sucking, partly because their mother begins to change her position in their presence and spends more and more time in a sitting or standing position.
The nest is a **hidden place**, and protects the kittens, since they are unable to see or to hear or even to interact with elements around them. Furthermore, **when the mother senses danger, she will move her kittens to a more protected spot**, holding them in her mouth by the scruff of their neck. For this delicate moving operation, **she may be helped by another female**, often a relative (daughter, sister ...).
This is called **"community nests"**, a term which can also indicate that the "nest" is shared, as is sometimes the case for feeding the litter, by several nursing mothers.
The females in these "community nests" change "nests" in the weeks following delivery more often than mothers rearing their litter alone, and their kittens tend to leave the "nest" a week earlier.



This characteristic, for an animal considered to be solitary, underlines cats' great behavioural flexibility, in relation to several factors such as physiological state, the quantity and distribution of food, and spatial resources (the "nests"). Parental behaviour is exclusively reserved for female cats.

DEVELOPMENT OF PREDATORY BEHAVIOUR

Young cats are solitary by nature, and separate several weeks after weaning, but to do so, they must be able to feed themselves, i.e. to hunt well enough.

> When there is plenty of food around, young cats – especially female ones - sometimes stay together and form more stable groups.

Predatory behaviour needs to develop quickly, so that young cats are ready to be independent after weaning. This is quite complex behaviour, since it requires the mastery of several skills: knowing how to choose the right-sized prey, track it down, capture and kill it.

These different skills are developed step-by-step during the course of the kitten's development: first of all thanks to **"interactive" play** with brothers and sisters, **then through "solitary" activities** which may be with objects, such as prey brought back by the mother or else by itself, as for example when the **kitten tries to catch its own tail**.

"Interactive" play, which is also wrongly – for a solitary species like cats - called "social" play, **takes place between kittens from the same litter**, and not between young cats and adults, **except for "only child" kittens, who spend more time alone**, and play with their mother.

So "only child" kittens are less good at chasing or fighting games, but just as good at hunting games, like stalking. This shows that a specific, adapted environment is particularly important for interactive behavioural development, such as attacking and defending, and that the presence of prey or moving stimuli helps develop predatory behaviour.

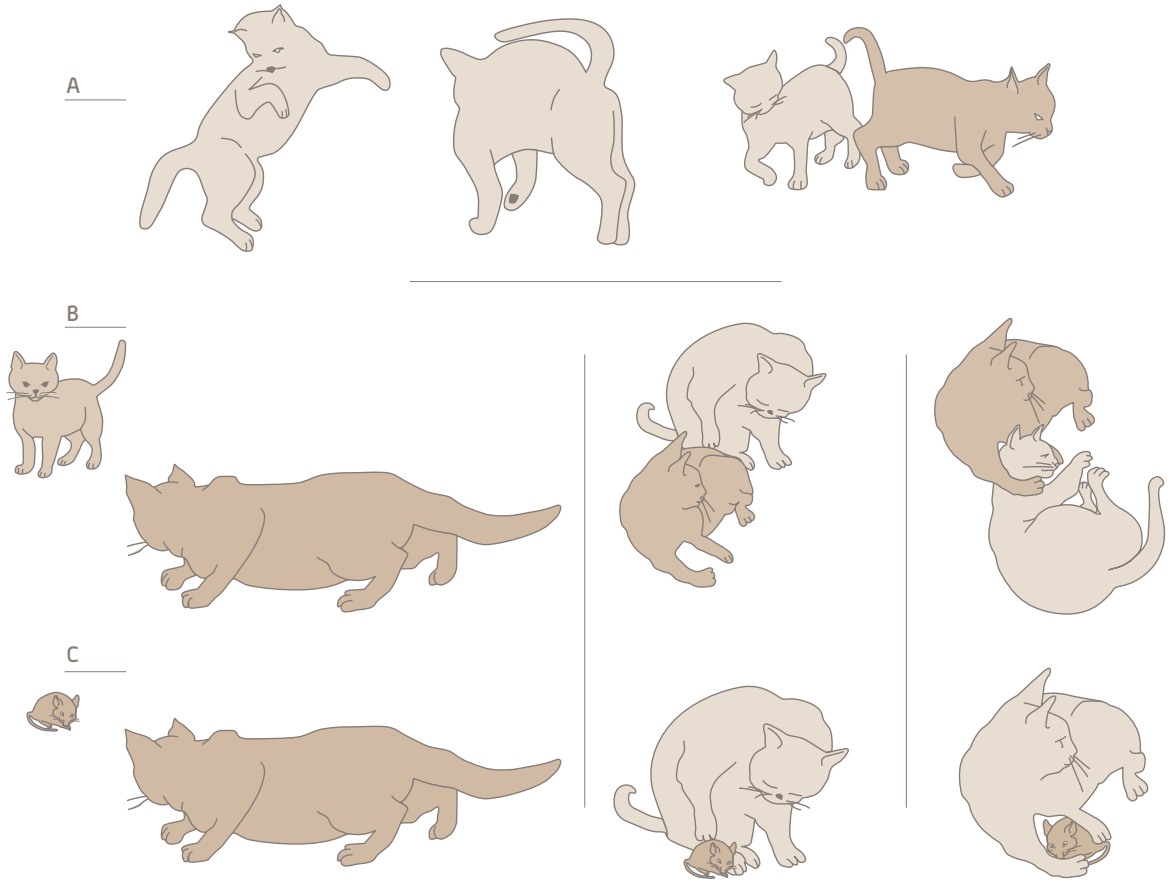
"Don't be like a cat who hides his claws."

Malagassy proverb

When playing, the behavioural expression of young cats includes some characteristics which are absent in adults, such as motor exuberance, constant repetition, and role symmetry during interactive play.

Adults have behaviour which is characterised by its precise functionality.

CATS' PREDATORY BEHAVIOUR COMES FROM INTERACTIVE PLAY.



During weaning, around 50 days of age, interactive play between kittens of the same litter decreases a lot, whereas the same motor behaviour is transferred to a form of play directed towards objects of prey brought back by the mother.

- ***In A different motor forms of play leading to the development of fight and flight behaviours:*** *(from left to right "standing up", "moving sideways with arched back", "running away and chasing").*
- ***In B different sorts of interactive play:*** *(from left to right "furtive approach", "touching with paw", "holding in place").*
- ***And these will be directed towards predatory behaviours (In C).***

Caro 1980, Bateson & Young 1981, Tan & Counsilman 1985.

For cats, interactive play is the first phase of development for predatory behaviour. As the cat grows, this form of play disappears, and **predation becomes the main functional behaviour**.

This predatory behaviour also exists for house cats, via the expression of motor behaviour, and is distinct from any desire for food. Scientists have shown that **around the age of 50 days** (i.e. at the time of weaning), interactive play between kittens becomes less frequent, whereas **play with objects develops**.

Towards 10 weeks, motor behaviours used in play are reorganised: some will become the basis of behaviours used in adult interactions, such as flight or fight, others will change targets, and instead of being directed towards brothers and sisters will be directed towards objects and/then prey that the mother brings back to her kittens.

This play with objects is "individual" play, and, from weaning, it gradually replaces "interactive" play and allows predatory behaviour to develop.

Cats become competent hunters relatively quickly (from 10 to 20 weeks) thanks to their individual experience.

DEVELOPMENT OF COGNITIVE CAPACITY

It has been shown that kittens are able to follow visible movements of objects from 48 hours after birth.

Cats are unable to follow invisible movements of objects, but they are nonetheless efficient hunters of birds, who they hunt by sight, and of rodents, who they hunt by sight and sound during the invisible movements of this prey

We know that cats specialise in certain types of hunting, and it seems that the early experience kittens have had with prey, when their mother acted as an intermediary, conditions their preferences later on, and improves their ability to hunt and kill those types of animals. So when a kitten who "trained" with mice becomes an adult, he will be particularly good at hunting mice. However, he will not be any better at capturing other sorts of prey.

It is each cat's individual experience which allows it to:

- *Discriminate between different sorts of prey, i.e. small animals which provide a high energy contribution, both diurnal (birds, rodents) and nocturnal (rodents).*
- *Gauge the possibility of grabbing and killing the prey, whilst measuring the energy necessary for the predatory effort, in comparison with the energy contribution after eating the prey.*
- *Develop strategies to adapt to the prey's behaviour, and to their anti-predatory defences.*
- *Perfect techniques adapted to the specific type of game: "fox-like" jump for prey on the ground, striking out with front paw, claws out, for birds, for example.*

EMOTIONAL DEVELOPMENT: TAMING OR DOMESTICATION ?

The different stimuli encountered by young kittens will have a strong influence on their individual behaviour later in life. This is particularly true in their relationships with humans.
For a kitten, a human is a very strong visual and auditory stimulus.

> For a kitten to accept to be tamed, the human must make himself as small as possible, stay still, and speak in soft and modulated sounds.

Describing cats as pets is a moot point. When we use the word **"domestication"**, we mean in fact an **"animal genetically attracted by man, whose reproduction he controls"**. But the reproduction of the vast majority of cats is not controlled by man. Cats born in a breeding establishment no doubt satisfy that definition of "domestic animals", but on a global level, this is certainly not the case for the majority of cats.

We can thus describe cats as a "tamed" species. This allows us to understand better why kittens born in a natural environment are usually distant and wary of humans, and sometimes even feral, whereas cats born in a breeding cattery or at home accept, and even actively seek, human contact and company.

This is why it is important to have physical contact with kittens from a very young age, if they are to be part of our lives. This familiarisation process in order to tame cats will be the result of friendly contacts, or just simple repeated passive presence, as soon as the kittens are able to interact with their environment.

Cats born in the street only meet humans at around the age of 6 months, and have the same wary attitude towards them as their mother. Hence they cannot be domesticated, but in some cases can be tamed, and this will depend on their individual character.

> "Cats are like roses.
> They only scratch people who don't know how to handle them."
>
> **Unknown**

THE NOTION OF CHARACTER

We use the word "character" **to describe the individual characteristics of different individuals who are placed in similar situations**. This character is genetically influenced and appears early in life.

It is the emotional structure of an individual which determines, in a predictive manner, the way he/she reacts in potentially intimidating situations: new environment, sudden noises, presence of new objects, learning ability. We can thus describe different personalities, that is to say individual styles of behaviour: active, curious, sociable, happy, aggressive, well-balanced…

The scientific determination of character is very different from the many different articles we can read about cat behaviour, and this knowledge will help create harmonious co-habitation with these feline companions who are so fascinating to observe.

WHEN YOU ARE FAMILIAR WITH CATS' BEHAVIOURAL DEVELOPMENT, YOU CAN UNDERSTAND BETTER HOW EACH INDIVIDUAL PERSONALITY HAS BEEN FORMED.

FEEDING
BEHAVIOUR

WELL-ADAPTED
EATING STRATEGIES

Felis catus, our domestic cat, has retained many characteristics of her ancestor *Felis sylvestris lybica*, the African wild cat, which was a solitary predator. The nutritional value of its dietary intake was far from stable (eating different species, capturing animals of different ages, and experiencing seasonal variations), and so these cats adapted their feeding habits to the unpredictable availability of their prey and their variable nutritional intake. This evolution still influences our domestic felines' eating habits today, in relation to frequency of meals, choice of food and the amount eaten. This is why, for example, a domestic cat can eat several little meals throughout the day.

> Hunting behaviour is also a strong component in cats' nature.
> Even when they are well fed, they continue to hunt without necessarily eating their prey.

THE INFLUENCE OF THE SENSES ON CATS' FEEDING BEHAVIOUR

THE SENSE OF SMELL is particularly well developed, and closely connected to taste. A change in olfactory functions can thus cause a modification in the choice of food. If a cat develops **anosmia**, (the loss or decrease of the sense of smell), **you will notice that she stops eating**.

Kittens can perceive odours right from birth. Head and mouth movements and sniffing are all responses to the smell of food. **Smelling is essential to the mother-child connection, and a kitten recognises her mother's scent**. Studies have shown that kittens are able to distinguish between their mother's basket, and one belonging to a different mother cat.

The cat's olfactory system is described in detail in the chapter on anatomy and physiology.

Cats' broad field of VISION, their **high retina refresh rate**, their **3-D vision**, and **night vision**, all allow them to **clearly distinguish moving objects, and so hunt them by day or by night.**

Of course, TASTE is also important in food preferences. The perception of taste varies from one species to another; **cats have 475 taste receptors** (also called " taste buds"), whereas **dogs have 1,700** and **humans have 9,000**. Cats can taste **bitterness, acidity, saltiness, and umami, but not sweetness**. So, when they lick the bottom of your children's cereal bowl, it is because of the protein content of the milk rather than any sweetness from the cereal.

> Umami is a Japanese word meaning "savoury taste" and is one of the five basic flavours. It was discovered in 1908, and corresponds to the taste of glutamate, which can be found in broth and stock cubes, fish, meat, shellfish, smoked meat, vegetables, soy sauce, green tea, and cheese.

Cats' sensitive sense of HEARING is a key advantage in detecting their prey. Cats can detect **very low-pitched sounds**, and **much more high-pitched ones than we can**, making them one of the most effective functioning mammals in terms of their hearing ability. **The range of sounds they can detect is perfectly adapted to the sound frequencies made by small rodents**, who are amongst their favourite prey. **Their ability to turn their ears in different directions helps them to locate where the sound is coming** from very rapidly. So hearing plays a very important role in feeding behaviour.

DID YOU KNOW?

Cats have a very high level of sensitivity to certain bitter molecules, because they are characteristic of most toxic substances that they need to avoid. On the other hand, they cannot detect sweet flavours. This is most probably due to the evolutionary development of the species, which, as carnivores, have lost the ability to perceive sweet tastes.

Cats have a very broad vocal range: they are able to **miaow in many different ways, and use complex vocalisations**. When a cat wants her owner to feed her, she makes specific sounds which communicate a sense of urgency which we can easily understand. People who have lived and interacted with a cat can interpret different types of miaowing better than those who have not had this privilege.

If newborn kittens are artificially prevented from perceiving tactile stimuli, they can still locate their mother, but are unable to find her teats. They use **thermal signals for directions right from birth. TOUCH** hence seems to be important for feeding, and consequently for kittens' growth. For adult cats, certain whiskers on their face are used for tactile perception: they are called bristles, or moustaches. They have several roles, including helping the cat distinguish different textures.

> "Whether it soothes or scolds
> its sound is always rich,
> always profound. It's his secret
> charm, and his alone."
>
> **Charles Baudelaire**

DEVELOPMENT OF FEEDING BEHAVIOUR

A few days before birth, kittens already have a functioning system for taste, and they actually "taste" the different elements present in the amniotic liquid transmitted through the placenta. **At birth, kittens weigh around 100 grammes. Within a week they have doubled their birthweight, and tripled it at 21 days**. The composition of the colostrum (the first milk, rich in antibodies) and of their mother's milk varies according to what she eats.

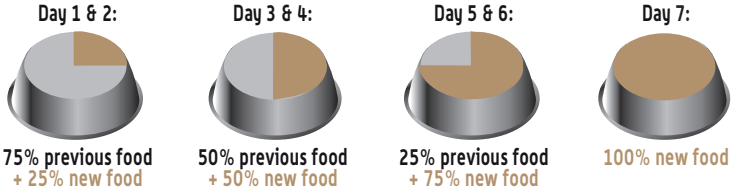
> Just after birth, the kittens get into position, suckling on a teat, and in two or three days, they choose one which they will use exclusively for around two weeks. This behaviour means there is less competition for feeding, and stimulates sucking.

The time spent feeding each day changes according to the age of the kittens: from 6 hours on the first day after birth, **down to 4 hours during the first week, then 3 hours during the second**.

During feeding **there is kneading behaviour which stimulates milk production**. Many adult cats continue this kneading, whilst purring, as a sign of well-being, which is a reminder of their kittenhood.

Early experience of a type of food will play a big role in the creation of later food preferences. This is why it is important to find out what sort of food a kitten was given before you bring her home – she will adapt to a new environment more easily if her food is familiar. In the same way, during the cat's life, **any change in food should be made gradually**.

We advise introducing a new food over a period of at least a week: making it a quarter of the food ration for the first two days, half for the next two days, three quarters for the fifth and six days, and then completing the transition on the seventh day.



FACTORS INFLUENCING FEEDING BEHAVIOUR

For domestic cats, food intake depends on several factors. **Cats prefer eating in a calm place, away from sight or from predators, and with an easy escape route**.

Observing groups of free-roaming cats has shown that kittens have priority when it comes to eating. Among adults, toms eat before queens, and the stronger and the older cats before the smaller or younger ones.

It is important to let cats move around in three dimensions, for example by putting up shelves, but also allowing them to have hiding places where they feel safe, especially when an unexpected event happens which disturbs their routine (C.F. Use of Space chapter).

Disturbing events could be when **strangers arrive in the house, family conflict, agitation, change in lighting, sudden unexpected noises**, and all of them will have **a negative impact on food intake**. In the same way, a **cat who cannot hide or reach high-up places, or who is shut in a small space with no stimulation**, will quickly become anxious and perhaps express this anxiety by **becoming bulimic.**

> Familiarity with the species' specific needs is important to make sure that the cat's environment is a source of well-being.

Faced with a new sort of food, some cats can be wary. This avoidance behaviour is called neophobia. It is believed that this behaviour is a sort of **protection against ingesting toxic or tainted food**. This is why it is better to **introduce new types of food gradually, and to reduce any potential stress factors, to avoid aversion to the new food**.

However, cats are curious by nature and some of them will **not hesitate to taste foods they are not familiar with. This is called neophilia**, and this behaviour may be explained by **the need to compensate for any possible dietary deficiencies caused by a long period of eating the same food**.

In fact, neophilic responses really depend strongly on the nutritional value of the new diet, but also on the circumstances in which it is presented for the first time.

> Nowadays complete well-balanced foods adapted to the cat's age, physiological status and lifestyle can be given all throughout her life with no risk of nutritional deficiency.

Neutering has several positive effects for our domestic cats, **even if neutered cats have lower energy needs but still tend to eat more!** So their food needs to be adapted in order to avoid them putting on weight.

This change of food may be introduced before the operation, so that the cat does not have to experience the double stress of going to the vet's, as well as a change in food.

> “A cat is a puzzle
> for which there is no solution.”
>
> **Hazel Nicholson**

HOW FEEDING BEHAVIOUR DEVELOPS

During early development, **kittens start by playing with their brothers and sisters, and then with objects**. Their mother will then begin to **bring back prey for the kittens, which allows them to become familiar with new stimuli, and directs play towards hunting**. Initially, when kittens are around **six weeks old, they will be presented with dead prey, but from the age of two months, they will begin their hunting training with live prey. For cats, capturing, killing, and eating are all different sequences of hunting behaviour. A hungry cat will eat her prey, but if she is not hungry, the prey will remain uneaten**. Cats use acoustic and visual signals to locate their prey. *(c.f. characteristics in the Chapter on Anatomy and Physiology).*

FEEDING BEHAVIOUR OF ADULT CATS

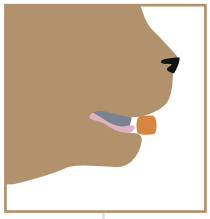
Cats are refined and choosy eaters, and they will have preferences for certain foods while categorically refusing others. Observations have shown that **a cat has around 10 meals per day of about 6 g each. Mealtimes are speedy – estimated at around 5g of food per minute!**

In the wild, cats are solitary hunters. When they capture prey, there are several distinct stages: locating the prey, stealthy approach, capture and, finally, the kill. This behaviour is frequently the same for our domestic cats, even if they are well fed.

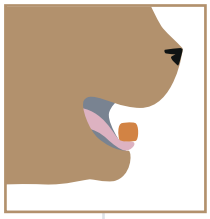
When you give food for short periods of time, the cat will eat bigger meals, less frequently. **In the wild, a cat is able to adjust her consumption in order to meet her energy needs** without putting on weight.

This self-regulation ability seems to be disappearing with the change in lifestyle imposed by humans: neutering, cats shut inside without being able to hunt or take calorie-burning exercise, etc. The lack of physical activity, together with excessive or unsuitable food consumption, leads to excess weight or obesity for a growing number of cats.

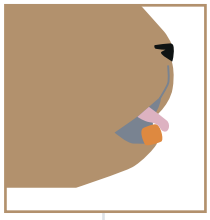
DIFFERENT WAYS OF PICKING UP FOOD



Labial
(most frequent): first contact takes place with the lips



Supralingual:
the cat uses the upper side of her tongue as if lapping



Sublingual
(specific to Persian type breeds): the cat applies the underside of her tongue to the kibble then turns it over towards the back

II There are three types of common feeding methods :

- ***"Ad libitum"*** or self-service: when food is available 24 hours a day. This formula is suited to cats who are not likely to put on weight, who eat kibble and are able to self-regulate.

- **Fractioned feeding:** limited in time and/or quantity. This method lets you control what the cat eats, but is not really suited to cats' ethological needs, since they prefer grazing all day. A food dispensing toy helps solve this problem.

- A combination of ***"ad libitum"*** **food with kibble and wet food served at different times of the day**. In this case, it is important to monitor calorie intake and to control the amount of food given carefully to avoid excess weight gain.

Observation of cats has shown that there are three different modes of gripping food (c.f. the diagram opposite): **labial gripping** which is the most frequent way, and consists of picking up the kibble with the incisors, without using the tongue.

Supra-lingual and sublingual gripping are mostly used by brachycephalic (flat-faced) breeds.

CHOOSING FOOD

There are several factors involved in the cat's choice of food which is suited to her nutritional needs, both in terms of quality and quantity.

ODOUR is a key element in choice. Cats will sniff several times before eating; if the food is familiar, this phase will be very short.

Cats eat both hard, **crunchy, dry kibble and wet food. TEXTURE, and also the SHAPE of the kibble** and **how easy it is to grip** will influence choice. In some cases, easy gripping will be a key factor, particularly for brachycephalic breeds.

Even though meals are eaten quickly, the **TASTE of the food is important** in food selection. **Aroma and taste are often linked (flavour)**, because cats **can smell the olfactory characteristics of the food through the nose and the back of the throat**. *(c.f. Chapter on Anatomy and Physiology).*

Sensations after ingesting food, or all the physiological reactions connected to digestion, will also impact the cat's food choices. In fact, it is a very well-known phenomenon: any food which is involved in digestive problems will generally be strenuously avoided after that!

> Thus, it is the whole set of pre-digestive learnings, connected to the food's sensorial characteristics and post-ingestive information from the consequences of its digestion, which condition your cat's future food choices, and thus food selection.

Macro-nutrients (proteins, fats and carbohydrates) are also involved in food choice. When different foods are available, cats are able to choose those which will allow them to reach a good nutritional balance, which is usually **52 % protein, 36 % fats and 12 % carbohydrates**.

DID YOU KNOW ?

Eating trials carried out with 32 cats showed that the size of the feeding bowl has an influence on food intake.
Cats who are fed in a bowl twice as big will eat a significant amount more than cats who are fed the same quantity in a small bowl.
So, a smaller bowl will help your cat not to gain excess weight.

FEEDING BEHAVIIOUR

Associating a sensory element to consequences following ingestion

DISCRIMINATION
- Involves the sense of smell (ortho-nasal perception) and sight

SELECTION
- Depends on past food habits, the environment, and individual characteristics
- Is influenced by the sensorial characteristics of the food and its post-ingestive effects

GRIPPING
- Labial, supralingual or sublingual
- Ease of gripping depends on the shape of food
- Involves the sense of touch

MASTICATION
- Involves the sense of taste and smell (perception from nose and back of throat)
- Somesthesic perception to assess granulometry and temperature
- Possibility of memorising negative and positive sensory messages (pre-ingestive information)

DIGESTION
- Passage of food from the mouth to the pharynx, œsophagus, stomach, then the small intestine
- Series of physiological reactions for the assimilation of nutrients, and digestion of the rest of the food

POST-INGESTIVE CONSEQUENCES
- The feeling of being "full"
- Works in synergy with sensory messages in the learning process for food selection: positive or negative post-ingestive information

NATURAL PREFERENCES

- **SMELL:** even though cats are carnivorous, aroma is the first criteria for choice. If it is attractive, they will eat it. Cats are selective and careful in this respect.

- **SENSATION IN THE MOUTH:** cats take account of the size, shape, texture and flavour of food. Taste plays a role, even though it is the cat's least developed sense.

- **POST-INGESTION SENSATION:** sensations that cats feel after having eaten will strongly influence their preferences. The more positive that sensation, the more the cat will be attracted to the same food in the future

FEEDING RHYTHMS

Several studies seem to show that food consumption is **higher at dawn and dusk**. There is **a reduction of around 15 % of food intake in summer**, so this seasonal change should be taken into account when you assess your pet's energy needs, especially if there is a risk of her becoming overweight.

> During periods of reproduction, queens need 25 % extra energy to cover their needs in relation to gestation and milk production.

At the end of gestation, when appetite decreases at the same time as the abdomen swells, it is **a good idea to use a high energy food** in order to satisfy the specific needs of the future mother.

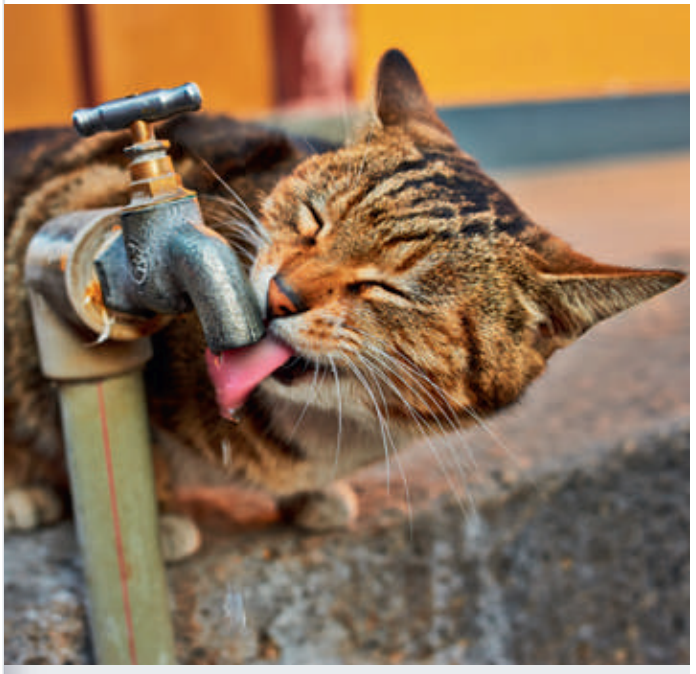
DON'T FORGET ABOUT DRINKING!

Cats don't drink very much: 12 to 16 times a day, several short sessions of lapping which correspond to a little over two teaspoons of water (10 – 12 ml). From an evolutionary point of view, this relates back to cats' wild ancestors who lived in desert areas, and were able to concentrate their urine and avoid water loss.

The type of food impacts the amount of water drunk. Kibble does not contain much water (7 – 8 %), whereas wet food is often enough to cover cats' liquid needs, since **some wet foods contain 90 % water**.

Cats prefer to drink water at a temperature which is not too cold (not less than 10 °C), clear, **and in a wide bowl** made of glass, porcelain or metal.

> Make sure that the water bowl is not too near the food bowl, the litter tray, and of course, placed in a calm place.



DID YOU KNOW ?

Some cats prefer running water from the tap or a water fountain.

HOW CATS
COMMUNICATE

HOW CATS COMMUNICATE
WITH EACH OTHER AND WITH US

Communication signals in a feline context can be divided into four main categories:
- Tactile
- Olfactory
- Visual - postural and facial
- Vocal.

The methods of communication are the result of evolution and specific requirements of the cat's natural habitat, and **each of the communication channels has a slightly different role to play in feline behaviour**.
A combination of each of the channels gives **the best chance of unambiguous signalling and of avoidance of out-and-out conflict.**
This is of particular importance to the cat due to her solitary survivor status.

This means that cats **are not obligate social creatures** and, while they do enjoy social contact with other cats with whom they have a relationship, that contact is not necessary for their survival. Interaction with cats that they are not related to or are not within their social group is kept to a minimum and their elaborate communication systems facilitate this.

TACTILE COMMUNICATION

Communication is vital in maintaining social groupings and affiliative behaviours, such **as allorubbing and allogrooming, are of particular social significance**. Tactile communication only occurs between members of the same social group and therefore, identifying **the presence or absence of these interactions can help owners** to understand the social relationships between cats living in the same household.

Allorubbing

A raised tail will often precede mutual rubbing and the behaviour can show an asymmetry i.e. the behaviour is not always reciprocated. **Rubbing has taken on an importance in human-cat relationships** and is a highly acceptable form of feline behaviour from a human perspective. Conditioning plays a role in this behaviour and **it is commonly misinterpreted by owners as a call to be fed.**
Such misinterpretation is considered to be an important factor in problems of feline obesity.

Allogrooming

Mutual grooming is a reciprocal behaviour and is often seen in post conflict situations as a reconciling behaviour. It is also sometimes seen as a precursor to play.

HOW CATS **COMMUNICATE**

EXAMPLES OF FELINE OLFACTORY SIGNALLING

RUBBING:
cats can deposit scent signals onto inanimate objects within their environment as well as onto cats, humans and other species within their social group.

SCRATCHING:
whilst scratching is perhaps most readily associated with the leaving of a visual message, it is also important in the deposition of scent signals from glands on the base of the pads.

MIDDENING:
faecal deposits can be used as a marker and are often found left in strategic locations within feline territories.

URINE SPRAYING:
the use of urine as an olfactory marker is perhaps the most commonly cited example of feline marking behaviour and the one that presents the most problems for owners when it occurs in a domestic setting.

OLFACTORY SIGNALLING

This form of communication is very important in feline society since it is effective across time and **there is no need for sender and receiver to come into contact**.
However, such communication is open to a large amount of misinterpretation and **the signal needs to be accurate** and is therefore **often factual**.

This is a long range form of communication in which the source location is very indirect and **the signal cannot be easily modified once it has been deposited**. It has been likened by some authors to the sending of an email.

Olfactory signaling is **very effective as a distancing signal and plays an important role in the spacing of cats within highly populated areas.** It is effective as a means of **avoiding unnecessary confrontation, and is useful at night or in situations of dense vegetation**.

Olfactory signalling results in hidden messages that the human nose cannot detect and this can lead to problems of miscommunication when olfactory messages are deposited within a domestic environment.

Olfactory communication **is very important in sexual behaviour**. In countries where most cats of the domestic population are neutered, **this is unlikely to be the cause of problems in a domestic context**. This obviously will vary in other countries where the neutering culture is not so well-established.

VISUAL SIGNALLING

This is a medium range form of communication **in which the source location is direct and the signal is very directional**. Changes can be made rapidly and messages can be modified. However, visual communication **necessitates proximity** and is of limited use in dense vegetation or in low light levels.

This form of communication is **primarily geared toward increasing distance between individuals and involves a combination of postural and facial signals**.

Body posture gives a first impression of the cat's emotional state and demonstrates levels of fear and aggression, but it is the facial expression which allows for fine tuning and gives the first information about a change in the cat's emotional state.

> Learning to watch the eyes, ears and whiskers and interpret subtle changes in their position can be an important skill for those working with cats, if they are to avoid injury.

Cats do not live in a hierarchical society and signals of dominance and submission are therefore irrelevant in adult feline communication. Interpretation of visual signalling relies on an understanding of the underlying emotional state of the cat and an appreciation that **feline signalling is not always entirely honest**.

This is a species that is a solitary survivor and therefore puts a great deal of energy into the avoidance of physical conflict which could jeopardise her survival. **When communicating at a distance, it is advantageous to give an impression of confidence and physical ability**. This may be successful in **keeping the other feline at bay** and removing the necessity for either cat to ever be entirely honest about her capability.

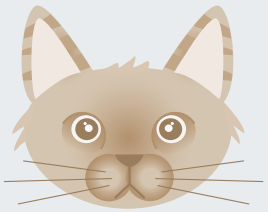
Examples of body posturing

Arched back: this is **one of the most recognised bluffing postures** of the cat and is used to give an impression of increased stature and confidence in a potentially hostile encounter.
It is a defensive body posture which indicates an anticipation of confrontation. It is often associated with a raised and fluffed up tail, which adds to the overall impression of body size.

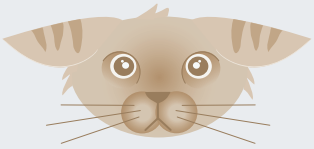
Crouched body posture: as a threat gets closer and **the option to bluff diminishes, a defensive feline will adopt a crouched body posture**.
This posture is associated with bodyweight being shifted onto the paws, **ready for a quick retreat**.

Social roll: cats will **invite social contact** from other felines and humans **through the use of a lateral roll**.
This is distinct **from a defensive roll when the cat rolls completely onto her back to enable her to use all four legs in defence**.

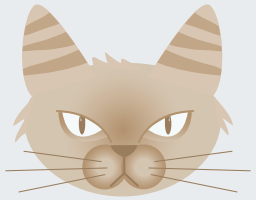
EXAMPLES OF EAR POSITIONS



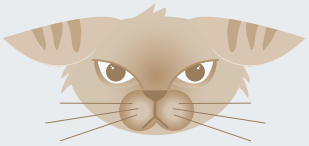
Erect and forward facing - alert



Flattened to the head - fearful



Rotated backwards and erect – confident and aggressive



Rotated backwards and flattened – fearful and aggressive

Oestrus roll: cats spend most of their time telling other felines to keep their distance. However, when **the queen is in oestrus, she needs to actively disseminate her scent signal in order to attract entire males**. The oestrus roll is an important behaviour for the facilitation of this dissemination and is often accompanied by **a characteristic vocalisation pattern**.

Tail postures: the tail is not only important for balance, but is also a **vital tool in feline communication**. Its position is used to signal the extremes of social approach and confident defence and a range of emotional states in between. **The way in which the tail moves is also important in conveying information about the level of emotional arousal of the individual**.

VOCAL SIGNALLING

This is a long range form of communication in which the source location is indirect. **Changes to the signal can be made relatively easily and the message can be modified. The ease of detection can also be altered by changing frequency**. Whilst the majority of feline signals are designed to increase or maintain distance between individuals, vocal signals include greeting signals and signals associated with mating.

There are three classes of vocal signals in cats:

Closed mouth vocal signals:

- Purr,
- Trill/chirrup.

Vocal signals created with the mouth open and gradually closing:

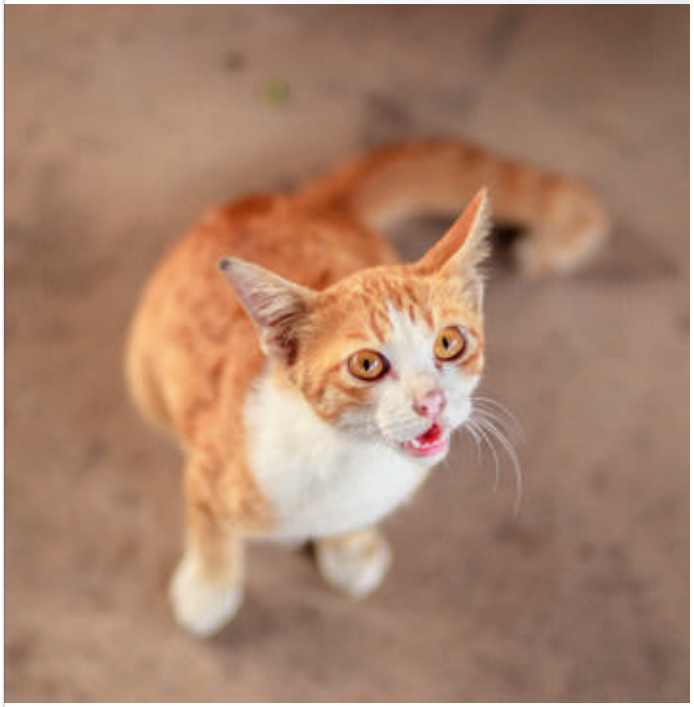
- Miaow,
- Long miaow,
- Female call,
- Male mowl.

Strained intensity calls –made while the mouth is held open in a fixed position by tension within the facial muscles:

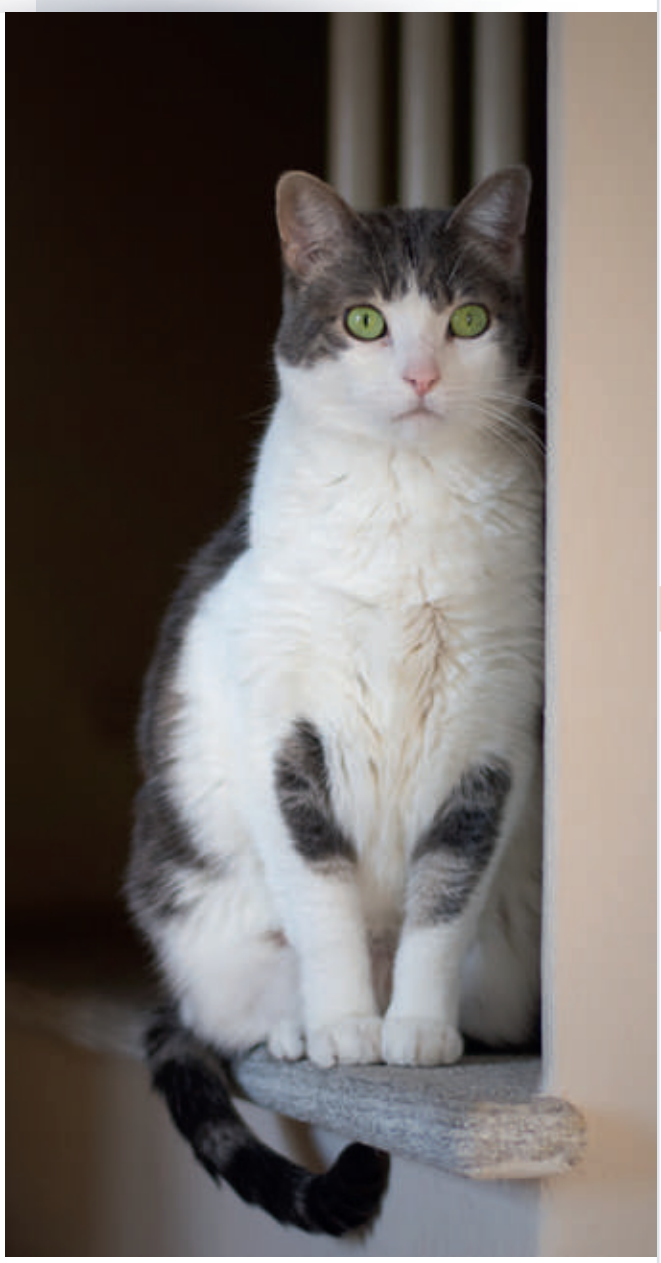
- Growl,
- Yowl,
- Snarl,
- Hiss,
- Spit,
- Pain shriek.

Vocal communication is used extensively in cat to human interactions and is frequently conditioned through the delivery of both intentional and unintentional rewards.
Many owners will report certain vocal signals that are unique to one cat in the household, and this is often the result of conditioning.

> Understanding feline communication and the social behaviour that drives it will offer owners a good foundation for a fulfilling relationship with their pet.



"If cats could talk, they wouldn't."
Nan Porter



SOCIAL BEHAVIOUR OF CATS AND ITS IMPLICATIONS IN A DOMESTIC ENVIRONMENT

In a domestic environment, many natural feline behaviour systems are compromised, and **cats find themselves living in groups of unrelated individuals, being made to share important resources and being denied the opportunity to hide or retreat from situations of potential conflict**. In addition, their human companions place social demands on them, which are at odds with their own natural behaviour and often fail to provide for many of their basic instincts.

Such constraints on normal behaviour **result in stress and tension** in our feline companions and, in many incidents of reported behaviour problems, an understanding of feline ethology not only helps to explain how and why the more common problems develop, but also offers practical methods for dealing with them.
In addition, it is increasingly being recognised that **stress can be a major factor in the onset and progression of medical conditions**.

> Ensuring that the domestic cat is as well adapted to her environment as possible is therefore an important element of preventative medicine.

The challenge of multi-cat households

Over recent years, **the cat has increased significantly in popularity** and at the same time, the number of multi-cat households has also increased. Some of these households are made up of sibling pairs, mothers and offspring and other combinations of related individuals, but in many cases there is no such basis to the feline community, and **cats are being expected to live with total feline strangers**.

Owners have often acquired the cats as companions for one another and when problems of inter-cat aggression begin to surface within the household, they are genuinely dismayed and perplexed by the situation. However, **natural feline ethology provides no basis for toleration between unrelated felines** and, while the high proportion of neutering in the domestic population undoubtedly reduces hostility between strangers and enhances the chances of feline integration, **it by no means guarantees it**.

In some cases, the aggression between housemates may be manifested as outright physical confrontation and the cats may be taken to the local veterinary practice with torn ears and puncture wounds to prove it.

However, **feline tension can also result in more subtle signs** of unease and can result in chronic low grade stress, **which in turn contributes to obvious behavioural issues, such as indoor marking and over-grooming, but may also be factors in medical conditions such as feline idiopathic cystitis.**

Pressures from neighbourhood cats

Multi-cat households are not the only implication of increasing feline popularity, and social tension within local neighbourhoods are also heightened by the ever increasing population densities in urban areas. **In feral situations, the size of feline territories and the density of feline inhabitants will be dictated by the availability of vital resources,** such as food and shelter. In domestic situations however, each cat has both of these resources provided for her by her owner and therefore, **relatively small geographical areas can sustain relatively high numbers of cats without obvious problems**. However, **such populations are often very unstable** and any minor challenge to their stability, such as the introduction of a newcomer, can result in significant levels of inter-cat aggression and an increase in fear-related behaviour problems in many of the individuals.

Human demands on feline companions

Increasing feline populations, both inside and outside the home, undoubtedly influence the incidence and nature of behaviour problems in the domestic cat population. Another very important factor to consider is **the effect of changing human expectations on the behaviour of this ideal modern pet**. One of the reasons for the cat's popularity is her relative independence and her ability to cater for her own needs. However, while most owners are happy to know that their cat is getting on with her life while they are at work, they also expect their pet to provide companionship and social interaction for them when they get home.

This desire to engage in low frequency, but high intensity interaction with cats raises very specific challenges, since the normal pattern of cat-to-cat interaction is one of very frequent, but low key communication. Such a fundamental difference in approach to social interaction **is bound to bring inevitable tension. This is why educating cat owners in the unavoidable restrictions of natural cat behaviour is essential**.

Remembering that the cat's primary defence strategy is flight, it is not difficult to understand why **the acts of being picked up and restrained** are **so potentially threatening. Therefore, periods of lifting**, gently restraining and touching **all over her body** should be routinely incorporated into any programme **of early handling** for kittens.

Even when this has been done effectively, it is important to **respect the cat's natural behaviour and keep highly restrictive handling to a minimum**.

> It is better to learn instead to respond to feline greeting behaviour and to use vocal interaction to enhance the relationship.

"I had been told that the training procedure with cats was difficult. It's not. Mine had me trained in two days."

Bill Dana

Pressures of a domestic environment

In addition to the effects of other cats and people, there are also specific constraints of the domestic environment which lead to further compromising of natural feline behaviours. **The successful integration of kittens into an average human household is therefore something that requires a certain amount of preparation**.

After all, the sights and sounds of human existence are not ones that a cat is innately prepared for. **While genetic influences** will help to determine how an individual reacts to novelty and challenge in its adult environment, adequate exposure to a wide range of stimuli during the early process of behavioural organisation will also be crucial in ensuring that the cat has a broad frame of reference with which to compare her later experiences.

Kittens which benefit from an inherited boldness, a varied early environment and ongoing mental and physical stimulation in adulthood will undoubtedly **benefit most from the diversity of the domestic environment,** and will be less likely to exhibit behaviours which compromise their life as a human companion.

Medical implications of environmental stress

In addition to the potential behavioural implications of chronic stress for the domestic cat, it is important to recognise the interplay between emotional pressure and physical symptoms. It is now well established that **emotional factors play a central role in the condition referred to as feline idiopathic cystitis**. Indeed, cats suffering from this medical disorder have abnormalities in terms of their response to stress.

In addition, there is an increasing awareness **of the effect of chronic stress on immune function and subsequent vulnerability in terms of infectious diseases**, as well as **the effect of unresolved stress** on **specific medical conditions, such as feline orofacial pain syndrome, feline hyperaesthesia and diabetes mellitus**.
Providing a social and physical environment which is compatible with normal feline behaviour is, therefore, not **only essential from a prophylactic perspective in behavioural terms,** but also should be considered **a major factor in the prevention of some of the most important conditions** within the field of feline internal medicine.

MOVING HOUSE WITH YOUR CAT

- **Prepare your cat for moving days in advance:** install a pheromone diffuser (Feliway Classic®) and consider the use of nutraceuticals or a specific diet for one month before the move.
- **Spend time habituating your cat to the cat carrier** by placing it in an accessible location in the house and putting small tasty treats inside as well as some comfortable bedding to encourage your cat to view it as a safe haven.
- When you arrive at the new home, the carrier will be the safest and most familiar location and the cat should come out in her own time, **when she is emotionally ready to face the novelty of the new location**. Do not force your cat to leave the carrier.
- **Place a pheromone diffuser** in the new home, preferably before moving day if you have access to the property, and keep it switched on 24 hours a day for the first month.
- **Continue to use nutraceuticals or a specific diet** for one month in the new home.
- **It will take some time for your cat to establish herself in the new home range**. It can be helpful to allow her to become accustomed to one or two rooms at a time.
- **Take items from the old home**, such as bedding, food bowls and cat furniture, which carry familiar scents – do not be tempted to renew everything to give your cat a "fresh start". Familiarity is important.
- **Provide multiple potential hideouts** and resting places, at various heights, throughout the house.
- **Keep your cat inside for a couple of weeks**, provided that this is not excessively stressful for your cat – especially if you are moving to a new home relatively near to your old one.

> "Cats are connoisseurs of comfort."
>
> **James Herriot**

MODIFYING THE ENVIRONMENT TO MINIMISE FELINE STRESS

Studying the nature of feline territories helps to highlight the qualities that cats value and illustrates the importance **of things like privacy, choice and hygiene in a feline context**.

The need for access to vertical space not only applies in multi-cat scenarios, but **also in single cat households,** and the provision of **elevated hiding places is important** in achieving the feline aim of minimising fear and anxiety within the home. **Failure to cater for the natural feline defence strategies of flight and hiding can result in cats feeling threatened and increase the risk of developing problems** related to **aggressive behaviour**. It can also result in **chronic feline stress** which is manifested in **inappropriate self-appeasement behaviours,** such as over **grooming and overeating**.

Simple alterations to the home, by providing **radiator cradles and pieces of bedding on tops of wardrobes and kitchen cupboards**, can make a considerable difference to the quality of the environment from a feline perspective. In situations where anxiety is causing obvious behavioural changes, the addition of **a pheromone diffuser to the home** will also be beneficial (like Feliway®).

II Changing to natural feeding patterns

The provision of immediate and unhindered access to resources is an **important feature of feline existence** and is equally important in both single and multiple feline households. In order to achieve this in relation to food, it is advisable **to adopt a policy of ad libitum feeding, rather than stick** to a rigid system of two meals a day. This also makes more sense in relation **to natural feline feeding routines as well as feline anatomy and physiology**. **However, this is only advisable if the cat is able to self-regulate.**

Hunting behaviour is a time consuming activity in the wild and cats undertake between **100 and 150 hunting attacks per day over a period of six to eight hours**. These attacks **lead to relatively small meals** and, interestingly, the success rate of feline hunting behaviour is surprisingly low, with **only 10% of them actually resulting in the acquisition of consumable prey**.

Consequently, **the ratio of energy expenditure to energy consumption is high, and this leads to a very effective level of natural weight control**.

However, in the domestic environment when food is provided without any need for feline effort, the ratio of energy input and output is likely to be altered and problems of unsuccessful weight control may result.

In addition, the tendency to provide meals on a twice daily basis over faces the cat's relatively small digestive tract and results in cats failing to eat all of their food in one sitting. Such behaviour is readily interpreted by caring owners as a sign that the cat is not happy with the food. This often results in the selection of more palatable and energy dense diets.

Not only does this increase the tendency for cats to hold out for a more palatable option, but it also further upsets the balance between energy input and output and runs a very real risk of inducing problems of feline obesity.

PREPARING YOUR CAT FOR THE ARRIVAL OF A BABY

- **Consider the impact of the new arrival from a feline perspective!**
- If one of the quiet unused bedrooms in the house is going to become the nursery, try to make this change as early as possible and **restrict your cat's access to the room well in advance of the baby's arrival.**
- **Prepare your cat from a scent perspective** by bringing new items into the home gradually.
- **Consider the auditory impact of the new arrival** and prepare your cat using sound recordings of children related noises (Sounds Soothing sound files available to download free of charge from www.dogstrust.org.uk/help-advice/dog-behaviour-health/sound-therapy-for-pets. A booklet of instruction for using these sounds is available free of charge from the same website).
- Once your baby has been born, **take a few items of clothing s/he has worn at the hospital** back home. The cat's sense of smell is highly developed and this will allow the animal to get to know the new member of the family.
- When you arrive back home, **make a formal introduction, and give your cat time to discover the new arrival**, whose odour she is already familiar with.
- **Consider the installation of a pheromone diffuser** (like Feliway Classic®) and the use of nutraceuticals or a specific diet.
- Supervise interaction between your cat and your baby and never force interaction between them. **Make sure that your cat always has the possibility to get away.**

II Providing adequate mental and physical exercise

Ensuring that cats **expend sufficient mental and physical energy during the day** is not only important **in terms of weight control,** but also in terms of maintaining physical and mental fitness.

Cats are designed **to engage in short bursts of energy consuming activity**, which is often **related to predatory behaviour, and intersperse** these **with significant periods of rest and relaxation**.

HELPING YOUR CAT TO COPE WITH THE ARRIVAL OF A NEW CAT OR DOG

- Remember that **cats are not socially obligate animals, so the arrival of a new pet in the household may be challenging for them.**
- If the new arrival is **a dog**, it is important to **to ensure that any introductions are very controlled** and **your cat always has the option to get away.**
- Consider ways in which **you can provide safe havens within the home that the dog cannot gain access to**. For example, **baby gates at the bottom of the stairs** may enable your cat to have the upstairs of the property as a dog-free zone.
- Cats **do not readily accept the introduction of a new cat**. They are more likely to form a relationship with another cat if they are related or **if they are introduced when both of them are in the first few weeks of life**.
- If you are introducing another cat **when your resident pet is already an adult, be aware that it is unlikely that they will become firm friends**. If they do, that is a lovely bonus!
- Make sure that there are enough resources available (food stations, resting places, water stations, latrines etc) i**n separate locations around the house**, so that your resident cat and the newcomer do not need to share any of these.
- **Do not try to force the cats into contact with one another** – cats always need to feel that they are in control and need to take things at their own pace.
- **Do not try feeding them near to each other** to help with introduction. Feeding is not a social behaviour in cats and feeding them together can be very stressful.

Failure to provide the opportunity for such activity is not only a predisposing factor for obvious behavioural issues, such as misdirected predatory behaviour, but also contributes to the possibility of frustration-related behaviours and an increase in feline stress as a result of unresolved emotional responses.

II Catering for feline toileting preferences

Hygiene is one of the important features of a natural feline territory, and one of the most positive aspects of cat behaviour for many owners is their **fastidious approach to toileting**.

The fact that they are **already house trained** when they arrive in their new home at just a few weeks of age is something that people find very appealing.

However, this reputation for cleanliness leads to high expectations and it is important to recognise that provision of appropriate toileting facilities is a pre-requisite for acceptable and appropriate toileting behaviour.

When litter facilities are going to be provided so that cats can urinate and defaecate within the boundaries of the home, it is important to ensure that the location provides all of the qualities that a cat will search for in a latrine in the great outdoors. Additionally, attention to the provision of adequate privacy is essential.

Cats will naturally eliminate at the periphery of their territory, away from other resources **such as feeding stations and resting areas**, and **select locations where they will be undisturbed**. Indoor latrines must therefore also **offer seclusion**. Sites which make the cat vulnerable or force proximity to other resources must be avoided.

The increasing popularity of the cat as a companion animal has led to a significant alteration in the role that she is expected to fulfil within human society. Whilst the majority of cats adapt well to the challenge, there are others that find the constraints of domestic life difficult to adjust to. **Minimising the discrepancy between feline needs and human expectations is therefore essential if cats are to be relaxed in their companion animal role and if behavioural and physical manifestations of feline stress are to be avoided.**

PROVIDING CARE FOR YOUR CATS DURING HOLIDAYS

- For cats, being away from home can be stressful.
- Making arrangements for your cat while you are on holiday will very much depend on your own circumstances.
- If you have friends and neighbours who are happy to come into the house twice a day to check on your cats in your absence, this may be the best thing for the cats. Alternatively, you can enlist the help of a professional cat carer who will visit.
- If the cats are in need of medication or there is significant risk from the environment around the home, it may not be suitable to rely on visits and the use of a cattery may be preferable.
- Visiting a cattery prior to selection is important to ensure that it is suitable.
- Guidelines on cattery standards are available from International Cat Care.

USE OF SPACE

SPACE
AND TIME

A cat's habitat must contain certain elements essential for survival and reproduction.
These are:
- food,
- places to sleep,
- resting areas,
- areas for raising young kittens, protecting them from predators,
- "sexual resources".

All these resources must always be present in a cat's habitat, during all seasons where adult cats' physiological needs can vary.

> The two essential factors in a cat's habitat are thus space and time.

The "time" factor is represented by 2 types of biological cycle:
- **circadian cycles**, throughout the day – feeding, resting, feeding, sleeping, etc.
- **seasonal cycles** - including reproduction (mating - gestation - suckling).

Cats may have an enormous amount of territory, but they limit their movements to certain sections which they frequent regularly.

The amount of resources available to cats in a particular environment will depend on the size and composition of the local cat population.

> The area of space regularly used by the animal or group of animals, and where all their activities take place, is called the home range.

Cats do not understand the idea of boundaries, so there are no limits to their home range, but they do attach a **great deal of importance to how often and how regularly they occupy all their various living spaces (biotopes)**.

In their home range, cats carry out all their essential activities: **feeding, defecating, reproducing, resting, sleeping, raising their young, protecting their resources from individuals of the same species, and protecting themselves from/avoiding predators**. The **diversity of the environment** gives the animal scope to carry out her essential behaviours either daily/or seasonally; and many of these behaviours require specific ecological features.

> "The ideal of calm exists in a sitting cat."
>
> **Jules Renard**

Places for resting and sleeping must offer protection from predators, and allow the cat to keep her body temperature high enough – hence her love for a sunny spot. Resting and sleeping places must be available at ground level, higher up (in trees for example) or in specific places.
Many carnivores, including dogs and cats, **like to cover up their faeces and urine**, and they cannot do so if the ground is not suitable: they ideally need to be able to scratch the ground to cover their droppings.
Cats also **need to learn,** from experience, **which ecological areas are frequented by their prey**, particularly rodents; these different areas on the ground are often located inside dense vegetation. Birds, however, whose movements are more visible, are hunted in a more opportunistic way.
The "nests" where the queen delivers her kittens will be in sheltered, out of the way places where the litter can be hidden and hence protected from predators.
Generally, there will also be a central area where the cat spends most of her time; this area and the surrounding ones are particularly familiar to domestic cats living indoors.

THE HOME RANGE FOR FREE-ROAMING CATS

In the wild, cats normally lead a solitary life (feral cats, who are not fed by humans, or stray cats). However, there are **sometimes "colonies" of cats wherever there is an area where food resources are concentrated**.

In the first case, cats have home ranges which do not overlap (especially those of toms), whereas, for the second case, there may be a certain overlap, corresponding to the degree of concentration and amount of available resources. When the overlap for home ranges is big in size (no spatial separation), then there will be a temporal separation so that individual cats actively avoid one another, by frequenting the same areas but at different times.

> The size of the home range will vary in relation to population density, the sex and reproductive status of individual cats.

So when **the population is very dense, the size of the home range will decrease proportionately, with a high degree of overlap**.
The size of the home range for toms is always bigger than for queens; and also varies more.

When cats are not fed at all by humans, we note that **the lower the productivity of the environment, the bigger the home range, and, on the other hand, the more the environment is productive, the smaller the home range**.

For stray cats, the size of the home range for queens is governed by how dispersed resources are, whereas for toms it will correspond to the number of queens in the colony, and how much their home ranges overlap: the size of the tom's home range increases correspondingly with the number of queens in it.

THE HOME RANGE FOR PET CATS LIVING IN THE COUNTRY WITH OUTDOOR ACCESS

This category of cats, who are very close to humans, may well be tamed, but are sometimes "half-way between a pet and a wild cat".

For them the household is the most privileged area of the home range. This is the area where they will spend most of their time, especially for resting, and also for eating in a rich and predictable way (which predators are very often unable to do).

Cats will leave this privileged area to explore and especially to use the other special sites of their home range. Some of these sites are used more specifically for latrine use – and covering up faeces – others for hunting, and others still for resting and sunning themselves.

The various special zones where cats carry out certain specific activities **are connected by routes that they follow on a regular basis**, and so that they end up leaving traces which last season after season.
The home range of a pet cat usually goes beyond the boundaries of human territories. The cat's **preferred area** will be inside **the most closed-off part of human territory**.

This is the area where pet cats are closest to human presence, and where human olfactory information is at its most telling. This is probably the area most familiar to the cat, and it is **used in three spatial dimensions**, even though the cat **spends a lot of time at ground level**.

The cat's outside space is 3 dimensional. Cats can climb trees with ease, thanks to their sharp claws, and they can be used as a resting and a hunting area.

Pet cats seek out comfortable resting places near to humans, either directly, or else through olfactory traces that humans leave in the environment which they share with one or more cats.

THE HOME RANGE FOR PET CATS LIVING IN URBAN AREAS

For these cats, who usually do not go outside, the organisation of their home range, which is small and strictly limited, must take into account what has already been pointed out for cats living in less constricting conditions: using the 3 dimensions of space, giving free access to varied, comfortable places, including secluded spots ("hiding places").

> Using the 3 dimensions of the available space makes it possible to maximise a home range, which is small and completely closed off.

THE HOME RANGE FOR CATS LIVING IN CAPTIVE COLONIES

This category of cats shares certain behaviours with free-roaming cats who are fed. For example, there is usually a high density of cats around the places where food resources are concentrated.

There are, however, quite a number of important differences: **the grouping behaviour of cats who live in colonies is imposed, and their environment has been organised** for them. Colonies like this can last quite some time, demonstrating **the great intra-specific tolerance of individuals**, despite the fundamentally solitary character of the species. For instance, there is a very low rate of aggression, despite the high population density.

HOME RANGE AND "TIME-BUDGET": TEMPORAL USE OF SPACE

The diversity of cats' environments allows them to express all their specific behaviours in suitable sites. These actions will last different times: cats will, for instance, spend more or less time carrying out an activity in a given place.

Consequently, hunting zones, because of their variety, the type of hunt (lookout), the behaviour of their prey, will be used for longer than the latrine zones, even though cats spend time covering up their faeces and urination.

> It is important to know how long cats spend on their regular activities: their "time-budget", in order to assess their well-being and hence their adaptation to the environment in which they are placed, especially if this environment could be considered restrictive.

Sleep is so important in the cat's time budget, whatever their life-style, that they must find **a variety of suitable sites** in their environment, especially ones which are **as comfortable as possible**, and which give and **maintain heat**.

HOME RANGE OR TERRITORY?

The same meaning is often attributed to the two terms; the latter being used more often than the former. In fact, **they mean two different things**.
Two criteria seem to be essential in order to distinguish "home range", and "territory": the first being **exclusivity**, the sole use of a spatial area by an individual or a group of individuals, and the second that of **defence of this spatial area** by aggressive behaviour or "claiming" zones.
The concept of "territory" is thus closely connected to aggressive behaviours.

> It would appear that cats are not a territorial species. Indeed, the fact that they group around food resources, and that their home ranges greatly overlap is in contradiction with the criterion of exclusivity.

Even though different home ranges can overlap to a great degree, there may be **temporal exclusion periods**, so that individual cats meet only exceptionally on the home ranges that they seem to share. Furthermore, this temporal exclusion signifies that individual cats share the resources of the same home range, which makes them non-exclusive to one or the other. And finally, the cat's polygynous system of mating demonstrates the fact that **sexual resources are shared and non-exclusive, just like food resources**.
Visual and olfactory markers seem to have a function of providing information to the other cats in the population who share part of the home range.

BEAR IN MIND

- Cats have **home ranges whose size is in relation to population density and the productivity of the environment.**
- Home ranges of free-roaming cats, or cats living in colonies, captive or not, always have a high degree of overlap. This characteristic, associated to other specific aspects, **contradicts any theory that cats have "territories"and display territorial behaviour.**
- Despite the fundamentally solitary character of the species, **cats must be considered as "optionally solitary creatures"** (or conditionally solitary ones), often regrouping to form colonies when food resources are manifold and concentrated.
- Cats use the **three dimensions of space** and it is important to take advantage of this, so as to maximise available space when your cat is forced to live in a small area.
- Domestic cats are characterised by **being extraordinarily opportunistic and adaptable; their olfactory marking behaviour helps them become permanently familiar with any environment where they find themselves**. This environment, being neither exclusive nor forbidden, is not a territory but is, for cats, a familiar space, and is maintained as such through olfactory information. Since areas are regularly used by other cats in the same population group whose home range overlaps with that of other residents, there will be random meetings along the route during the cats' exploratory trips. These meetings generally take on an aggressive nature, and the more meetings there are in the busiest parts of the home range (which will be the most familiar to resident cats), then the higher the probability that they will be aggressive.
- **Having a heterogeneous, familiar environment is really important for the cat's well-being** and it is important to take this into account, particularly whenever your cat is placed in constricting (especially confined) and/or changing spaces. **Individual cats can only adapt so far... and it is important to respect their limits.**

LIFE
IN 3D

The cat species has evolved physiologically, not only to hunt more effectively, but also so that each individual animal has the indispensable equipment necessary to perceive danger, and hence avoid it, and, if absolutely necessary, be able to defend itself and survive.

FOR A CAT, THE SHORTEST PATH BETWEEN TWO POINTS IS A STRAIGHT LINE!

When we enter a room, we cross it avoiding obstacles which may be in our way. To go into the garden, we go through the gate, or out of the back door. What we do NOT do is jump over the hedge to get to the neighbour's, climb on the table or step over the sofa to cross the room.

Neither do we sit on the roof of the garden shed to watch the world go by. So why do cats do this?

EVOLUTION IS THE KEY

To answer this question, we must first understand the true nature of the domestic cat, which differs in many ways from that of man, or even that of dogs. Cats have **unique and specific physical characteristics**, such as **their robust musculature**, and **an extremely flexible spine**. These make them formidable predators.

Cats hunt alone, without the help of a gang of companions. For this reason, cats have **become specialised in catching small prey** which they eat.

The absence of a social network means that cats have to rely on themselves for safety.

PHYSICAL CHARACTERISTICS: STRENGTH AND BALANCE

There is an excellent reason why cats climb on objects and perch high up: it is part of **their survival instinct, and helps them in their role as a solitary hunter. Several species of cats are mainly arboreal** (which means that they live in trees).

The domestic cat's **hind legs are perfectly adapted to capturing prey**, and **their powerful claws** are **a major advantage for climbing trees**, even though, out of all the felines, our domestic cat is certainly not the champion tree-climber.

These physical advantages allow cats **to escape from danger and make exploring and watching out easy**, even if **their forelegs are not really designed for climbing down**! Many kittens and inexperienced adult cats will consequently get stuck up a tree, and stay there either until someone comes to help them down, or else until they have found a solution to get down by themselves, which can take some time.
More experienced cats will get down, often head first, using branches as landing stages, and eventually take the risk of jumping far from the trunk, once they have reached a reasonable distance from the ground.

Their robust and flexible spine, together with their powerful back legs, enables them **to jump without momentum to a height of 2 m**.

Certain animals are not strong enough (or not crazy enough!) to be able to jump up onto the garden wall in one leap. They prefer to use climbing techniques by clinging onto the wall, rather than jumping directly up to the top.

“What if the cat were essentially a question mark moving around on pads?”

Stéphanie Hochet

This three dimensional life-style needs not just strength, but also an excellent sense of balance. Cats use **their tail as a balancing pole** when they walk on a narrow surface, on top of a fence, for example. When they get down, they always land on their feet, by using the righting reflex which they acquired at an early age *(C.f. the Chapter on : Myth and Reality: cats always fall on their feet).*

UNDERSTANDING LIFE IN 3D

> The cat’s unbelievable ability to evolve in a 3D environment is the result of early learning.

Cats always fall on their feet when they fall, thanks to **the righting reflex** which **they develop from the age of four weeks**, i.e. **the moment when, as a kitten, they begin to run and climb over obstacles** whilst leaving the nest.

This skill is **totally acquired by the age of six weeks**. At that time, kittens are still somewhat clumsy, but will joyfully climb up curtains or their owner’s legs. It is an activity which keeps kittens busy, and which seems to amuse them, considering the enthusiasm with which they do it!

More complex operations such as walking and keeping their balance, or turning around on a narrow surface such as stair banisters, are only mastered a little later, towards the age of 10 or 11 weeks, when they have grown more.

When you welcome a kitten into your home you have the duty to give her the best possible start in life.

During **the first two months** of their existence, kittens are **very receptive learners with regard to their environment. The space they occupy should ideally confront them with different sounds, textures, odours and visual stimuli**.
It is important that all **these different experiences are positive ones**, so that the kittens are ready and confident with regard to every situation they could possibly encounter in their new home.
This presupposes that they are not confined just to ground level. They must also **be encouraged to go and explore high-up areas**, such as furniture, upper floors in the house, and cat trees specially designed for the purpose. They allow kittens to learn how to use space safely and well, helping them **to gain strength and skills which will be indispensable later in life**.

Kittens who have never had the possibility of climbing, jumping or exploring will be reticent to try out these activities later on, **and this can lead to deprivation and frustration in their natural behaviour.**

DID YOU KNOW

When kittens play, they are also learning: how to catch prey, how to behave with other cats, how to defend themselves, and how to develop strategies and techniques which will allow them to get out of the most difficult situations later on. So they will explore their environment and understand the limits of the different places they have access to.
For example, it will be easy for them to climb up the curtains... but rather more complicated for them to get down!

The furniture in your home already offers a lot of different possibilities.
For example :
- *Shelves*
- *High-up cupboards*
- *Bookshelves*
- *Doors (you can often see the most agile cats perched up on top of a door)*
- *Tables*
- *Desks*
- *Chests*
- *Pedestal tables*
- *Console tables*
- *Fireplaces*
- *Window ledges*

MAKING A 3D HABITAT

Since jumping and climbing are part of healthy domestic cats' natural behaviour, their owner has the responsibility of making sure they are able to do just that.

If your house has several floors, the stairway automatically gives access to the third dimension; so there is no need to reorganise your home.

> Ideally, in each room there will be a place for cats to perch, and objects they can climb on, and settle down to rest on.

These perches should be **above eye level**, but your cat will most probably be happy with any object over a metre high.

You can also buy **objects suited to cats' needs**, such as :

- **Scratching posts**
- **Cat trees*** (modular, with scratching boards and platforms)
- **Cat shelves** (specially designed for cats to walk along the shelves)

*Big modular scratching boards allow the cat to climb up, but it is important to fix the models which go from ground to ceiling, to be sure they are stable.

HOME-MADE SOLUTIONS

Creative cat owners can also build their own cat fixtures.

For example, **you can fix a piece of carpet on the wall**, so your cat can climb up. Make sure that the wall is smooth before you stick the carpet on using double-sided adhesive and choose **a fairly thick carpet**, so the cat has a secure grip. You can make it safer by screwing wooden planks above and below.

Before you start, **choose the right place carefully. Remember cats can climb up easily, but they sometimes find it difficult to get down.**

If you put the carpet right next to a shelf, for example, it will be easier for the cat to come down step by step.

Whatever the object you make, there are several basic principles for perch design :

- **The surface of the perch and platforms must be non-slip,**
- **The shelves must be wide enough for the cat to settle down comfortably,**
- **A ledge on the perch, or a hiding-place, for example a box on the top of a wardrobe, will allow cats to hide, and to see without being seen,**
- **Respect your cat's need to take refuge on a perch, and do not disturb them when they are there,**
- **Cats must be able to get up and down again easily, not necessarily via the same route.**

In households where there are several cats, it is better to avoid shelves which lead to a dead end (i.e. places where they have to go up and down via the same route), because this means one cat could possibly prevent another from coming down. This situation can be avoided by making sure that there are different routes for going up and down.

IMPORTANT POINTS

Not all cats are agile enough to be able to perch. And those who no longer use their favourite lookout point often have mobility problems.
Old, handicapped, or obese animals will no longer be able to enjoy the joys of perching without the help of their owner.
So an older cat who can no longer jump, who used to enjoy looking outside from a perch by the window will now need steps to reach their favourite lookout spot.
Later on, a system will be needed to allow these older cats to climb on to the bed.
Obese cats often have problems in jumping or climbing even if they still like perching.
Don't forget to help them, too!

THE 3D GARDEN

The best place for practising climbing and jumping is, of course, **the outdoors**. Most of the time, outside space gives cats everything they need to explore and perch as much as they like. However, **they do not have any understanding, nor any respect for ownership boundaries**. That means that they roam around just like their wild relations. However, it will sometimes be necessary to shut a cat in the garden, or to prevent other aggressive cats from coming in. Knowing how clever cats are at escaping from seemingly secure places, it is no good building higher fences. There are some systems which can help you keep your cat in your own garden – these are brackets with a 45° angle slanted towards the garden, fixed onto the fence posts and then netting attached. This turns your garden into a secure enclosure.

Terraced gardens in hilly areas give a good example of **how important it is for cats to be in high-up positions**. When a cat is in a garden located higher than another one, this cat will have a strategically dominant position, compared to the feline residents in gardens lower down.

Consequently, being in a garden below the others will be a real challenge, even if the garden is right next to the house. In this case, it will sometimes be necessary to give cats a perch (if there is no suitable tree available), which will allow them to be on the same level as the neighbour's garden.

DANGERS OF 3D LIFE

Open windows

Cat owners must be aware of all the potential dangers generated by the excellent climbing ability of their cats.

> An open window is an irresistible invitation to jump on the window-ledge, flair the air, and is often used as a way to go outside.

This may not be a problem, **unless the window is upstairs**, when it becomes more of **a danger than an advantage**. Some windows are fitted with a system which allows them to be slightly ajar to let fresh air in, with too small a gap to allow the cat to get through. You still have to be careful, since cats are so flexible that sometimes they manage to squeeze through the narrowest of gaps.

Traps in garden sheds

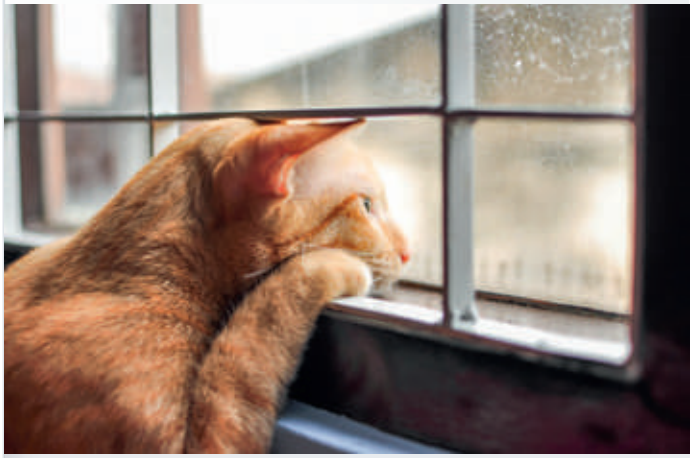
Cats are **curious by nature**, and thanks to their jumping and climbing ability, **they can get into garden sheds or any other building** via a window which happens to be slightly open. This is of course quite amusing… until someone closes the window, **shutting the cat inside**. If by any chance **your kitty doesn't come home at the usual time, the first thing you should do is to ask your neighbour to make sure she is not shut in** somewhere in his garden, in the shed or garage.

Domestic dangers

Kitchens are dangerous places for cats, who are never content with just staying at ground level, especially if there are **work surfaces and cupboards to explore**, and even more so if there is **a window with a view**.
They particularly like cupboards which are high up, and from there they can keep guard on everything from a high position. Many owners do not particularly enjoy seeing their cat strolling around places where they are preparing meals, and try several different ways to discourage kitties from jumping on the table or the work surfaces.

But let's be realistic : **they will stroll anywhere they wish once their owner's back is turned**.

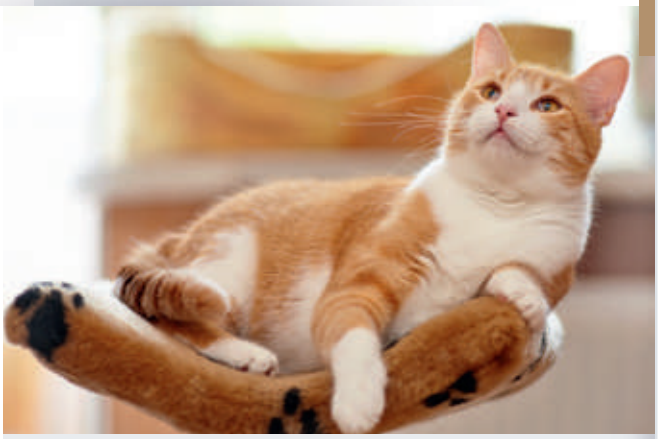
But these places can be dangerous : **there may be boiling liquids or hot-plates which stay hot for a long time**.



IMPORTANT TO KNOW

If their head can get through…
all the rest of the body can!
If it is not possible to lock the windows,
you can use mosquito nets with
a semi-open window so that fresh air
can come in, but your cat cannot escape.

There are also **the cleaning products and disinfectants**, not to mention **the spaces between cupboards**. It is important to consider all the different risks, especially if your cat is particularly inquisitive. The best is to find a compromise situation which allows the owner to use the kitchen, whilst at the same time respecting the cat's needs, and protecting her.



If you place a cat tree at a strategic point in the house, your cat will not only be able to watch what is going on inside, but also keep guard on the outside. If her natural curiosity is satisfied, then the work surfaces in your kitchen will no doubt appear less attractive!

THE FOURTH DIMENSION

In science, **time is often described as the "fourth dimension"** alongside length, width, and height. In the world of pet cats, **time allows a flexible use of space**.
So a cat can not only choose which length, width, and depth of the room he will explore, but **can also decide when a specific activity will take place**.
This organisation is very subtle.
To understand its meaning, it is important to explore cats' social structures.

> The feline species is not a biologically social animal, which means that cats do not need their fellow animals in order to survive.

Groups of cats tend to form naturally in streets or in the country in places **where there is a lot of food**. This food is usually supplied by humans, either directly – when people deliberately feed these cats – or else indirectly, when food can be found in dustbins, for example. **These groups are generally made up of queens who are inter-related**, and who **will coope-rate to bring up the kittens**.

If food becomes scarce, the colony breaks up, and the cats split up to find food elsewhere.

Cat lovers often have several cats, and so **tend to group together cats who are not inter-related** in the same home, thinking that they will get on well together. And **it is indeed possible** that cats in these circumstances **do get on well, but only if they have the impression that there are enough resources** – food and shelter.

Another element which plays an important role is **the cat's individual temperament and degree of tolerance to-wards others**.

WHEN YOU HAVE SEVERAL CATS UNDER THE SAME ROOF

Cats often use **time-share rules** when they live in groups, so that **they can get on together**. Cats who do not get on, or who seem to think that another cat does not belong to the same social group, will cope with the situation **by trying to occupy strategic places at different times**.

Owners often do not realise the avoidance behaviours cats have in relation to one another, but they can easily decode behaviour simply by observing how cats share space, and at what times of the day or night they occupy places. This behaviour does not necessarily pose any sort of problem: if there are enough resources, separated from each other by a reasonable distance, then all the cats will have access to them.

UNDERSTAND CATS: LOVE THEM BETTER

It is essential to understand why cats jump up onto obstacles rather than going round them, or **why they perch above our heads** rather than joining us and being sociable. As a responsible cat owner, we need to get to know cats and their needs, so we understand them better and thus allow them **to live in an environment which is well suited to their nature**.

That means that, all of a sudden, an untidy room full of books and boxes will seem much more attractive than a minimalistic, tidy living-room : **you just have to see things through the eyes of a cat!**

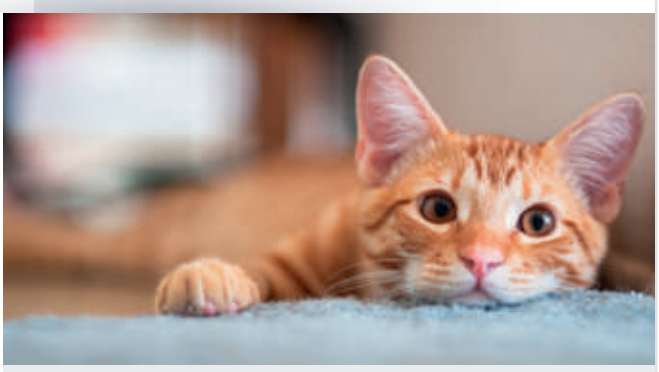
THE SPACE WHICH CATS HAVE A NATURAL TENDENCY TO PROTECT IS CALLED THEIR "HOME RANGE". CATS FIND EVERYTHING THEY NEED TO SURVIVE AND PROSPER IN IT

Cats use several different ways of marking their home range: urine, faecal matter, and the secretions from special glands located all over their body.
The main objective of this marking is in fact to indicate their presence to other cats, so as to avoid meeting them.
We often use the term "time-sharing" (the 4th dimension).
The basic principle is that, when cats discover another cat's marker, they will be able to assess how old it is, and hence how far away that cat is.
If these markers are deposited at regular times, this will allow cats to avoid one another.

ENRICHING

THE **ENVIRONMENT**

ENRICHING THE CATS' ENVIRONMENT: AN ESSENTIAL PART OF THEIR WELL-BEING



In France, around one in four cats live in flats, with no access to the outside. Although cats do sleep a lot, they still need mental stimulation and encouragement to expend energy – both are essential to their well-being! If cats cannot play or have any social interaction (for example if they are alone most of the time), then they will seek to alleviate their boredom by spending more time grooming, feeding, and sleeping.

Cats who are too sedentary may develop a tendency to put on weight, and sometimes even have behavioural issues. To maintain your cat at her ideal weight and contribute to her well-being, you can of course adapt her diet to her lifestyle, but her environment also matters a lot.

Even if her primary needs are satisfied, you need to organise the space around your cat to encourage her to move around and play.The objective is to encourage her to express her natural behaviour; she will thus spend more energy than if she lounges around on the sofa all day.

It is not only about giving her some toys to play with, but also about adapting the environment to her natural needs.

MAKE THE MOST OF THE AVAILABLE SPACE

Cats are designed to move: if you have a garden, it would be a pity to confine your cat inside. **Letting cats come and go freely** is more suited to their natural behaviour; studies, using GPS beacons, show that most cats do not **travel more than 500 metres away from their home**.

To avoid becoming just your cat's doorman, **install a cat flap**: there are several models to choose from, ranging from a simple swing door to an electronic microchip pet door.

BOREDOM: A STRESS FACTOR AND A POTENTIAL CAUSE OF URINARY PROBLEMS

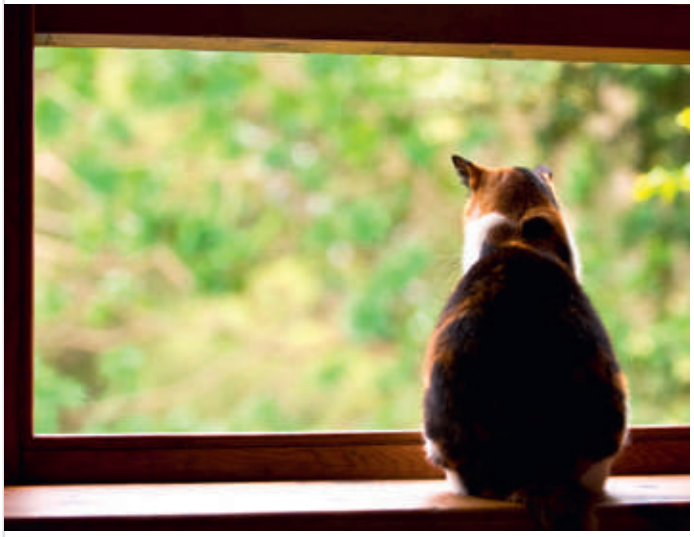
A cat can easily spend 6 to 8 hours a day hunting outdoors. When a cat lives indoors all the time, without being able to express natural hunting behaviour, this can cause a state of chronic anxiety. Cats will be more "zen" if they can exert themselves physically. Anything which can be done to limit cats' anxiety will be good for their health, because stress encourages illness. Some stressed cats develop an inflammation of the bladder (or cystitis), which can lead to the same symptoms as urinary stones.

> Automatic electronic pet doors have the big advantage of letting only your own cat come in, and thus prevent all the toms in the area from getting into your home!

A balcony can be a good outdoors option: your cat will love to listen and observe everything going on outside. **Take care however: falls can happen when a cat tries to catch a passing bird or insect**. The younger the cat, the greater the risk of falling. **A mosquito net or a net strung up midway will help you make the balcony safe and prevent** your cat from trying to go from one flat to another via the balcony rail.

A THREE-DIMENSIONAL LIFESTYLE

Cats will always feel safe when they can observe the world from up high: they must be able to take refuge in places where they feel protected from noise, smells, dogs, or other cats who might live with them. **They love being able to access places high-up**, especially if they live in an environment frequented by other animals. **Jumping or climbing to get up high is also excellent for the muscles**.



Try to "think like a cat" when you arrange your interior: one of your objectives will be to set up **some places where your cat can come and rest or observe the environment**. If your cat can settle down on a cushion by a window, you can be sure that she will spend many long hours just keeping watch on all the movements around. **Put a comfortable chair by a radiator, put your cat's food up on a piece of furniture, install a cat tree** so that she can climb up and play with the toys hanging on the different levels…

Some cats are better at climbing than others: among the most agile are the Norwegian Forest cat, the Maine Coon, and the Siberian cat... All these cats have **a powerful musculature, and you must not deprive them of the possibility of climbing**, or else they would be deeply unhappy. These robust cats also need space.

Be careful, however, if the cat is old or has painful joints: if you see that your cat seems to be having problems in jumping up to places she used to go, then set up some steps so she can climb up without injuring herself.

> "Any cat that misses a mouse pretends it was aiming for the dead leaf."
>
> **Charlotte Gray**

MAKE YOUR CAT "EARN" HER FOOD

Cats who spend their days alone at home need stimulation to make up for the activities they would otherwise do if they could go outside. **Even inside, cats still have a strong hunting instinct** which you can use to make them want to exert themselves.

Playing is a good substitute for predatory activities for cats who cannot go hunting.

> Having to wait and find the solution to reach their food creates what is called "positive frustration".

Once the cat has reached her objective, she will reward herself. Lots of different feeding systems, often known as **"food puzzles"**, can be found in pet shops.

One example is a **"food maze", bowls which have tunnels on the top forcing the cat to poke and jab the kibble inside, in order to be able to eat it**.

You can also find **balls that the cat has to roll to release the kibble through holes**. Once the cat has understood how to use the object, you can make things more difficult for her by choosing a model where you can decrease the number and/or the size of holes which are open!

At first, you will have to make the cat's task as easy as possible: don't discourage her by making the problem too difficult to solve. For example, **cats will learn to use the object faster if it is transparent and they can see the kibble inside**. You can start using non-transparent objects later on, if you wish.

The rounder the ball, the greater the challenge for the cat, who will be obliged to manipulate it more. You can also make your own toys that the cat has to nudge and pick up or knock over in order to obtain her food. And of course, there are more complex game you place on the ground or hang up, where the cat can activate certain mechanisms in order to be able to reach the food inside.

It is important to adapt things to the skill and degree of motivation of each animal. Some cats even manage to release the kibble from a double level puzzle: the balls are placed inside a cylinder which is pierced with holes!

If the cat enjoys the game, it is possible to distribute most – if not all - of her daily ration in this way.

These food games also have the advantage of slowing down the speed at which the cat eats. In fact, she will eat her **kibbles one by one**, replicating her natural foraging behaviour. **This "multi-meal" behaviour is indeed closer to the cat's true nature**, whereas serving them a meal twice a day in a bowl does not really correspond to their natural feeding habits.

GIVE YOUR CAT TOYS TO PLAY WITH

Toys help to amuse a cat who stays alone at home, and manufacturers display lots of creativity in designing toys they like. Shopping for the latest model is always fun!

> Swap the toys around regularly so your cat doesn't get bored.

Toys are generally designed to **trigger three types of feline behaviour**, and they are all connected to potential hunting activities:

• **Cat and mouse**: any small ball can play the role of the prey. The cat "stalks" it, rolls it around, runs after it, jumps on it, grabs it, throws it in the air, holds it between her paws, bites it, and starts all over again … tirelessly! All these instinctive gestures are a great source of satisfaction.

• **The bird game**: the cat tries to catch a moving object just above her head.

• **Fishing**: the cat moves her paw as if she wanted to make a fish jump out of the water. Some cats like playing with water and will enjoy the idea of "fishing" for ping-pong balls floating on the surface of the water, for example in a basin you can set up for them in the bathroom.

CATCHING THINGS: AN OLD FAVOURITE!

If you **just tie a cork on a piece of string to a chair leg**, your cat will soon lose interest, unless you waggle the cork around in front of her.

There are more sophisticated alternatives: you can get cat toys **with a plastic-covered clip to fix in the door frame. These often consist of a cuddly toy, such as a bird, designed to resist the cat's claws, which is hung at the end of an elastic cord**.

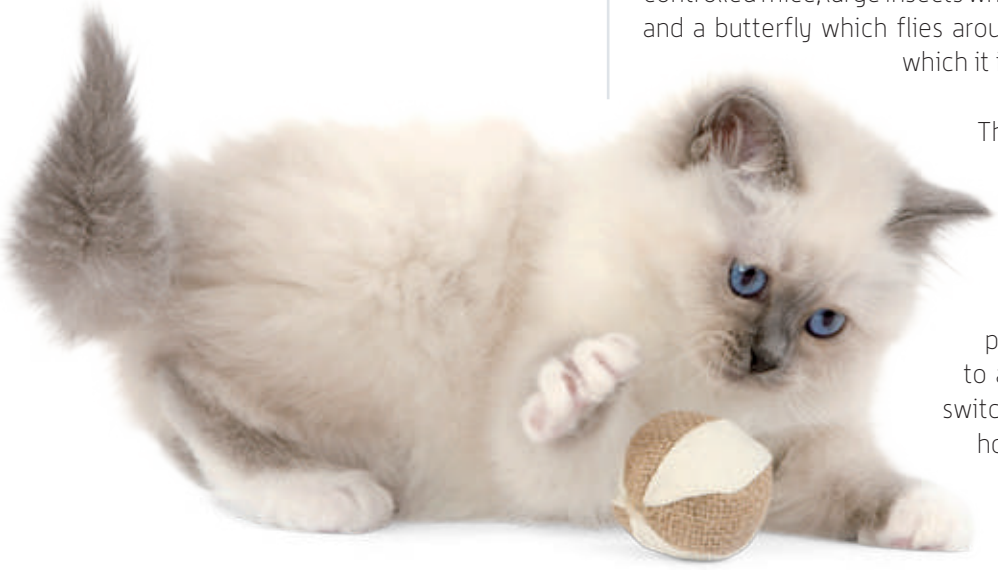
To stimulate the cat even more, these are sometimes filled with cat-nip. Every time the cat goes through the door, she will want to try and catch the object.

Other "independent" toys that cats can play with by themselves **are scratch pads that you place on the floor and which have a vertical spring with a fuzzy toy which moves** about, as soon as the cat moves its stand. You can also buy a merry-go-round with a moving ball inside. When the cat tries to catch the ball, the toy spins round like a top.

And lastly, there are **"cat game circuits"**. Some of these have **transparent tunnels with a ball inside**, that the cat can hunt or push through the openings. This type of game has add-ons, which means that it can be made bigger or smaller, depending on how much space you have, with a more complex circuit for the ball.

MORE ENERGY INTENSE TOYS

There is a whole range of battery-operated toys, such as remote-controlled mice, large insects which move around the house by themselves and a butterfly which flies around, seeming to float above the stand to which it is attached by a metallic wire.



The random movements of the butterfly and its beating wings attract the cat's attention, and she will try in vain to catch it.

The system of the mouse on the end of a piece of string has been updated: attached to a stand which moves automatically once switched on, the mouse can move around the house by itself!

With each movement of the stand the mouse's "tail" wags, and the cat's hunting instinct is aroused.

The only problem with these toys is the fact that you have to recharge or change the batteries regularly, and, of course, you have to be at home in order to switch the toy on, and to stop it at the end of each game sequence. Additionally, not every cat appreciates the noise that these motorised toys make, and some will simply refuse to go near them!

CAT WHEELS

We have all seen hamster wheels, but there are now cat wheels on the market! They work exactly the same as the hamster wheel, except that the wheel is at least one metre in diameter. Cats who have been filmed seem to be visibly very interested in the wheel: they get inside, and try to climb upwards. Of course the wheel starts to turn, and the cats accelerate! Some videos available on the web even show two cats together inside the wheel, with other cats watching them attentively, waiting for their turn. Be careful to only use these wheels if your cat's age and general state of health allow it.

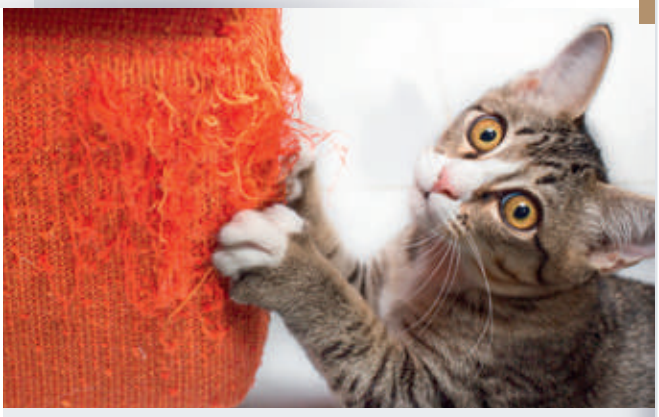
RUSTLING TUNNELS: "HIDE AND SEEK TOYS"

Cats are animals who are always on the look-out. So they love places where they can hide: cat tunnels appeal to this characteristic to stimulate their curiosity and encourage them to explore.

GOOD TO KNOW

Cats can be tempted to play with objects which are not meant for them, especially when they are young. To avoid accidents, be careful not to leave any potentially dangerous objects in reach: balls of wool, bobbins of thread, pieces of yarn, electric wires. For the same reason, we recommend that you replace any damaged toys.

These are flexible tunnels, usually made of nylon, and lined with a rustling material which stimulates the cat. The shape of the tunnel is defined by rigid rings, and some models are 3 way (or more) so there are several different ways in and out. This type of toy can be folded for easy storage.



If your cat always takes a nap in an armchair, do not be surprised if she scratches the seat or the feet of the chair: for her, it is totally normal to show that she is the owner of a comfortable nest!

SET UP A SCRATCHING POST FOR YOUR CAT

When they are outside, cats love to scratch tree trunks, especially if the ground at their feet is soft, so they can also trample it down whilst scratching. In the right conditions, **cats can have this scratching routine at least 4 times a day**.

When cats are inside, it is very important **to provide a scratch post** which they like enough to use regularly. **Cats are attracted to vertical objects, which they can sit down in front of. They prefer some textures to others, but tastes will vary from one cat to another**: some cats love wooden logs, others will adopt a piece of door mat or carpet fixed onto a piece of wood… You can buy scratching posts which are specially designed to appeal to cats, and it is easy to help a cat get used to scratching a suitable surface, especially if training begins at an early age.

To have the best chance of success, **choose the place to set up your scratching post carefully**: the location is just as important as the sort of pad you choose. Indeed, two thirds of the time, cats will always do their scratching at the same place: **they like busy passages, such as the front door or the living area of your home.**

They also like to mark a sensitive zone in their territory: around their feeding bowl, their litter box, or the place where they sleep. Placing an attractive scratching pad near that place can be a way to protect your furniture.

WHY NOT ENRICH YOUR CAT'S OLFACTORY WORLD?

We always talk about dogs' sense of smell, but we seldom mention the fact that cats also live in an olfactory world which is much richer and more complex than our own.

The sense of smell plays an important role in stimulating territorial exploration. Several studies have shown that stimulating

the cat's sense of smell can be very beneficial to cats who cannot go outside, and consequently live in a world which is relatively poor in olfactory stimuli.

Bringing different sorts of olfactory stimuli into the cat's environment may be advisable to improve their well-being (this type of olfactory enrichment of the habitat has been successfully employed for captive felines). **Aromatherapy in particular can fight against some problems connected with anxiety**, thanks to essential oils which are reputed for their calming properties. When animals breathe in this odour, their level of stress decreases.

Catnip

Try putting a plant pot with catnip (Nepeta cataria) out for your cat, so that she can bite it or rub up against the plant. Catnip plants generally have a stimulating effect on cats, since they **contain an active ingredient which acts on the central nervous system (Trans-nepetalactone)**. Catnip can also be used to encourage cats to explore their territory or to attract them towards the area reserved for scratching. When in contact with catnip, **some cats become so aroused that they adopt behaviours similar to sexual displays**.

The smell of mice?!

For cats, **any new element generally leads to exploratory behaviour**, but this is even **more pronounced whenever there is an odour of a prey**. This phenomenon has been shown in several experiments; in one essay*, cats' behaviour was first of all observed in their usual environment.

Then a large wooden crate with no particular odour was placed on the ground. Then the crate was placed in the same place, but this time it was covered in material bearing the odour of rats. In both cases, introducing the crate into the cat's environment led to exploratory behaviour.

However, in the second phase, all the cats explored the crate more rapidly. They rubbed up against it more often and sprayed it with their urine more.

** Machado JC et al. Influence of olfactory enrichment on the exploratory behaviour of captive housed domestic cats. Australian Vet J 2014; 92: 492.*

GOOD TO KNOW

*A study showed that catnip could have a beneficial effect on kittens placed in a new environment**: kittens aged from 4 to 10 weeks were placed in turn in a circular enclosure, in the middle of which was a cylinder containing catnip, or not. With catnip, the kittens were very interested in the cylinder and spent little time grooming (excessive grooming is often a sign of anxiety). When there was no catnip, the kittens' behaviour was more concerned with exploring the walls of the enclosure. Toys containing catnip can hence help cats to better withstand the constraints of living in a closed area.*

*** Marchei P et al. The effect of Nepeta cataria on kitten's behavior. J Vet Behav Behavior Clin Appl & Res 2010; 5: 50-51.*

Scents to diffuse or spray

Aromatherapeutic products are sold for pets: **you just spray the scent on the different surfaces** in contact with the cat: **basket, cushion, transport bag, car, etc**. Inside your home, you can also use a scent diffuser plugged into an electric socket.

The variety of products you can use lets you alternate different odours (aniseed, essential oils, spices, etc.) and means that they remain effective, because the animals will not get used to the product.

> "Dogs come when they're called; cats take a message and get back to you later."
>
> **Mary Bly**

TAKE TIME TO PLAY WITH YOUR CAT....

Cats need to move, **but also seek interaction with their owner**. When you get home and your cat wants to greet you, make her happy by playing with her: **ten minutes or so at a time will be enough**. To attract her attention and get her moving, **a feather duster, a fishing rod with a foam object on the end, or a crunched up ball of aluminium foil will be enough to stimulate her**!

Do not overuse the laser pointer: the cat will not be satisfied because all her efforts to catch the moving object will be in vain, and this can indeed be very frustrating. If you do want to use a laser pointer, follow on with a "real" toy, which will reward your cat in a more concrete manner.

If your cat displays any behaviours which cause you concern, do not hesitate to consult a behavioural veterinarian, who will be able to give you practical advice about changes you can make in your home, and any possible treatment to give to your cat so that she feels better in her environment.

CATS ARE NATURALLY CLEAN

This is true in most cases:

It is very exceptional to have a cat that urinates outside of her litter box. If that should happen, **it is important to find out if it is a case of marking behaviour, or normal urination**.

SHOULD IT HAPPEN AGAIN, IT MAY BE THE SIGN OF A PATHOLOGICAL PROBLEM: CONSULT YOUR VET.

Cats do not behave in the same manner when they want to mark their territory, or when they are simply emptying a full bladder.

- **When a cat simply needs to empty her bladder, things usually go quite slowly:** she will begin by scratching the ground, squatting, urinating and then scratching again to bury the urine, if the ground is not too hard.

- **When a cat is marking, the sequence is quicker:** the cat will choose a vertical surface, turn around, raise her tail and spray a small jet of urine. Spaying does not always stop marking: the behaviour persists for 5 % of sterilised queens and 10 % of neutered males.

  This behaviour also appears when the cat is anxious, because of cohabitation problems or because her environment does not suit her.

CHAPTER 08

FACT OR FICTION

DEMYSTIFYING
CAT MYTHS

CATS ALWAYS FALL ON THEIR FEET

Cats are real acrobats. They will often chase their prey to high or seemingly inaccessible places. Their ability to perch is also indispensable for their survival, especially if pursued by a potential predator.

Climbing up to the top of a tree or jumping off a roof may sometimes be **the only way to stay alive**, especially if you have a dog right behind you. Not being afraid of heights is a great advantage for cats, and that means that they have no problem in taking a nap on a cliff ledge, or trying to catch a bird by jumping through the window of a sky-scraper.

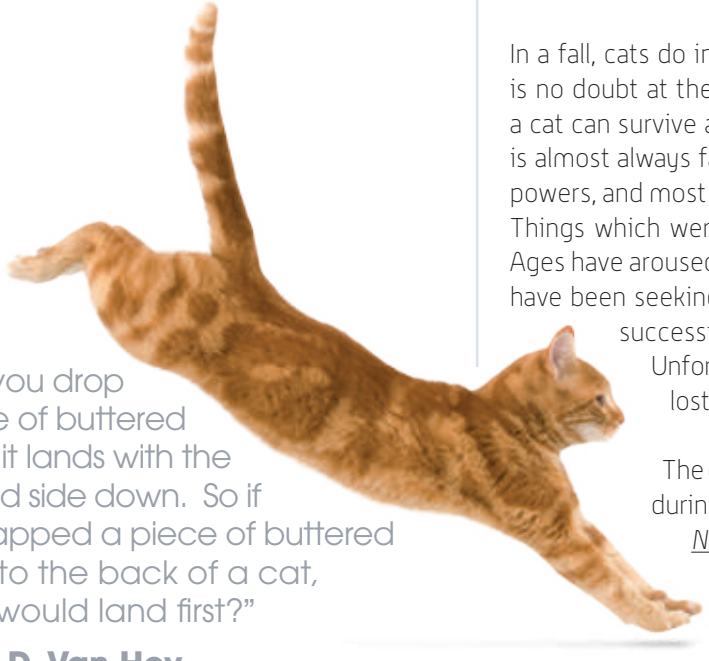
A free fall from several floors high will generally not end well. This type of accident is relatively frequent, and we usually refer to it as **"high-rise syndrome"**.

Sometimes, these falls can of course have dramatic consequences, but a study of 119 cases published in 2004 quotes **a survival rate of 96.5%**. These figures are similar to those quoted in an older article (1987), which mentioned a survival rate of 90% for a study of 132 animals. The chest wall is almost always injured, since the impact damages the lungs.

In a fall, cats do indeed have a tendency **to fall on their feet**. This ability is no doubt at the origin of several different superstitions: how is it that a cat can survive a fall from several floors up, when this type of accident is almost always fatal to humans? Could it be that cats have supernatural powers, and most certainly have nine lives?!
Things which were considered as witchcraft or evil spells in the Middle Ages have aroused the curiosity of scientists, who, since the XIXth century, have been seeking to understand how cats manage to land on their feet successfully.

Unfortunately, many physicists who tried to solve this mystery lost their own lives during experiments.

The discovery of photography meant that different sequences during falling could be analysed. And in 1894, the review *Nature* published an article written by the French scientist and photographer Étienne Jules Marey, illustrated by photographs taken with his chronophotographic gun.



"When you drop a piece of buttered bread, it lands with the buttered side down. So if you strapped a piece of buttered bread to the back of a cat, which would land first?"

Daniel D. Van Hoy

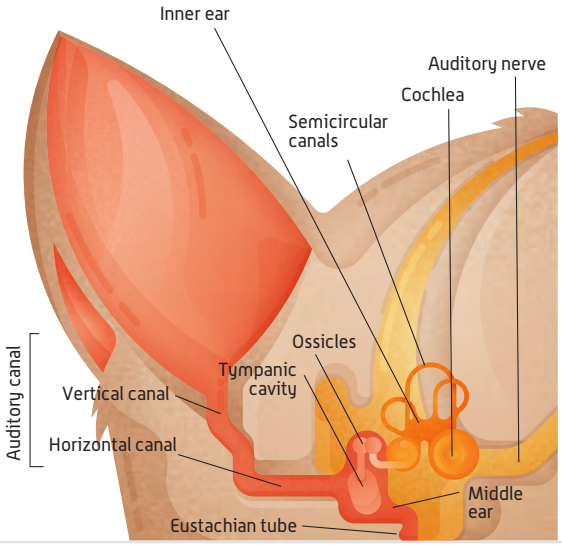
> Still, it took over 100 years for modern physics to model this feline physiological peculiarity.

When you view the film of a cat falling in slow motion, you can deconstruct the movements into **three distinct sequences:**

- Cats begin by **distinguishing up from down in a fraction of a second**, thanks to information supplied by their eyes, but more particularly from the vestibular system in the inner ear, which controls balance;
- Next, they turn to face the ground and **bend the middle of their back**, so as **to disassociate the front and hind parts of their body**. Tucking the forelegs underneath the body reduces the moment of inertia for the front part of the body, and by simultaneously stretching their hind legs, they increase the moment of inertia for the hind part of the body;
- Then, **by stretching out their front paws and folding back the hind paws at the same time**, they arrive at the opposite result, **which allows them to carry out a 180° turn**, and consequently land on their paws!

In some cases (depending on the height but also on their position at the beginning of the fall), the animal will need to repeat the whole sequence. Manx cats, who have no tails, also have the same reflex. Other factors also contribute to limiting the injuries for sky-diving cats: **they are light in weight, their thick fur slows them down**, by stretching out their legs they increase air friction (their skin acts as a parachute) and their **natural flexibility**, all of which help them to absorb the impact.

THE CAT'S INNER EAR



FREE FALLING CATS

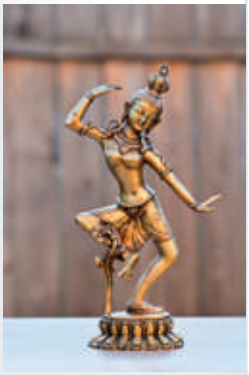
Physical studies have determined that the theoretical maximum speed of a free falling cat is around 100 km/h. In comparison, in identical conditions, human beings would reach a speed of around 210 km/h.

Paradoxically, when cats fall from a height of less than 1.50 m, they do not have time to activate the reflex that they have all mastered since the age of seven weeks.

So a fall from this low height will often end badly...

CATS HAVE 9 LIVES

Or 7 (or 6 depending on the country and the culture…). This popular expression probably comes from the feline species' resilience. Their flexibility, sense of balance, ability to fall on their feet, discretion, love of hiding in the most surprising places, speed, reflexes, their food self-sufficiency, physiological adaptation to a hostile (desert) environment where water is scarce… are just some of the cat's **abilities which go some way towards explaining their incredible survival skills.**



A HINDU LEGEND SAYS THAT SHIVA MET AN OLD CAT IN A TEMPLE *who said that she was a great mathematician. Shiva asked the cat what she could do and the cat replied that one of the things was to be able to count up to infinity. So Shiva asked the cat to prove it. The cat began to count, and when she had got to 7, began yawning. By the time she had got to 9, she was snoring mightily. Shiva began to meditate and understood that this thoughtless, nameless kind of sleep was no doubt the beginning of infinity… And so Shiva decided to grant the cat 9 lives, and said that at the end of the 9th life, all cats would reach the state of supreme bliss.*

It's true that cats fall off buildings, are buried in accidents and … survive! And furthermore, for thousands of years, despite multiple incarnations (massive destruction, witchcraft, and epidemics) there are still lots and lots of cats! Since they are so prolific, this is yet another reason to believe they have several lives.

But why 9? (or 7 or 6).
In fact, this is just the translation of mystical numbers from different cultures. For the figure 9, this is 3 x 3 which refers to the Holy Trinity. In Oriental civilisations, it is number 7 which is sacred.
In reality, the cat's average life expectancy is **around 15 years**.
Factors such as their status as a pet, medical progress, and better nutrition all strongly contribute to the long life (sorry, lives …) of our favourite feline. **So do take care of her health.**

BLACK CATS ARE UNLUCKY

After having been **worshipped** (whatever their colour) **in Ancient Egypt**, cats were associated with the devil and witchcraft from the Middle Ages onwards, particularly in Europe. Several superstitions present in Judeo-Christian imagination claim that black cats are the devil incarnate, with evil powers, or at least consider them to be **a bad omen**.

For this reason, many cats were exterminated in particularly cruel ways, including mutilation, burning and boiling alive, being impaled, ripped to pieces, and walled up alive…

> “A black cat crossing your path signifies that the animal is going somewhere.”
>
> **Groucho Marx**

The bad reputation of black cats still persists, since cat shelters often note **a lower adoption rate** for black cats, compared to that of their differently coloured colleagues.

Luckily, in some other cultures, black cats are worshipped, and are **synonymous with good fortune and luck**. In Scotland, for example, the arrival of a black cat in a household ensures that it is prosperous. In the Midlands, giving a black cat to a bride guarantees a happy life. In the UK, a black cat crossing your path means good luck, although in the USA, superstitious people will have quite the opposite view. In Japan, black cats bring good luck. They also have the reputation of attracting suitors and so are consequently very much sought after by single women.

> Black cats’ so-called magic powers were prized by sailors.

Black cats were considered to have the power to protect boats and to forewarn of storms, giving sailors time to seek shelter. This superstition no doubt originates from one of the cat’s physiological characteristics: their internal ear, which is very sensitive to variations in atmospheric pressure, warning them of the imminent arrival of disturbances. Sailors were quick to learn how to read signs of nervousness or changes in behaviour in animals before the weather got worse.

For Feng Shui fans, cats – no matter what their colour – are a symbol of harmony. It is recommended that you place a miniature black cat facing northwards to preserve your home from evil. According to Japanese tradition, Maneki-neko (lucky cats) are indispensable in every company. They can be found in most shops in Asia, easily recognisable by their waving arm, and may be any colour. White cats have the reputation of bringing good luck and prosperity, and black cats have several charms, depending on which way they face: if they face north, then they bring wealth; east, they protect and improve health; south-east, they make your investments grow; and to the south-west, they are good for sales and protect the women in the household.

A 16TH CENTURY LEGEND…

…recounts that, one moonless night, a father and son were frightened by a black cat who ran off between their legs. They threw stones at the cat and the poor injured animal hid in a nearby house, belonging to an old woman thought to be a witch.
The next day, when they met that woman in the village, they saw that she was limping, had bruises on her face, and her arm in a sling.
That was enough for every black cat in the region of Lincolnshire to be considered as a witch in disguise.

CATS SMOTHER BABIES

This fallacy has unfortunately been confirmed by some badly informed health professionals, and is **difficult to dislodge from common lore.**

It is by no means a new belief, since in the 18th century, a coroner in Plymouth wrote in the death register that the cause of death for an 18 month old child was a cat stealing the air it breathed!

These deaths were probably caused by sudden infant death syndrome, but common lore loves to find a guilty party, and once again, our favourite feline is the handy choice.

Cats have a great sense of comfort, and love cosy places to snuggle down for a good safe nap. A cradle fits the bill and is often tempting for any expert in good places to sleep!

Another reason which is sometimes mentioned is that of **the smell of milk on the baby's breath**. No study has proved this claim, and even though the cat's sense of smell is over 100 times better than ours, they do not seem to be particularly attracted by milky breath. Still, parents should remain vigilant.
Of course, these folk tales do not stand up to scientific or even historical analysis.
On the contrary, **contact with cats during the child's first 12 months of life have recognised benefits**. One theory states that certain people have a genetic predisposition to allergies, which may be activated, or even increased, by exposal to allergens.

> If this hypothesis is true, then if very young infants are exposed to dogs or cats, the risk of developing an allergy should be higher… but in fact the opposite is true!

GOOD TO KNOW

In the same way that children who grow up on farms have fewer allergies than children from the city, children who spend the first few months of their life with a cat at home have a lower risk of developing allergic reactions or asthma later in life.

WHY DO CATS EAT FISH?

Cats are predators. In general, a given individual will be specialised in one sort of prey. Certain cats like to catch voles, whereas others are champion bird or insect catchers.

> So where does their love of fish come from? Cats originated in the desert where there really aren't many fish… so how did they learn to fish?

There are several possible explanations

Cats are carnivorous, which means that **certain nutrients are indispensable for them**, and these are naturally found in exclusively animal preys. This is the case **for taurine, an essential amino acid which is essential to cats**: necessary for **growth in kittens**, **for combining bile acids** (an essential process for the digestion of fat), **for heart function and sight**. Cats know how to find indispensable nutrients instinctively.

When the Pharaohs ruled Egypt, the river Nile burst its banks and flooded the plains, fertilising them by depositing alluviums, but also making some areas swampy. Fish were swept away by the water and became trapped in the swamps. They of course attracted the attention of cats when they struggled in shallow water, and our nifty hunters - attracted by the slightest movement - could not resist giving a swipe to this **scaly source of protein**.

Ports are often infested with rats and other pests, and they of course attract cats. Cats are opportunists, and quickly learn how to enjoy the fish guts thrown out by the market fish sellers.

HAIRLESS CATS DO NOT CAUSE ALLERGIES

Understanding allergies better

The prevalence of allergies in mammals is part of the price we pay for our present day hyper-sanitised life, and is constantly increasing. It is estimated that most of the population in the western world spends **as much as 90% of its time inside**, which is exactly **where most allergens are to be found**. Textiles, furniture, and dust in general form the reservoir and the motor for allergenic particles.
Allergies to cats (or/and dogs) are considered as a high risk factor in the development of problems such as **asthma, rhinitis, and conjunctivitis, and also atopic dermatitis**. This phenomenon poses serious problems for public health.

WHEN SAILORS SAILED THE OCEAN WAVE,

voyages were long and there were no refrigerators to keep food fresh. So sailors' meals were generally composed of cereals.

As a result, ships' holds were usually infested by mice and rats, and it seemed totally logical to call in an ad hoc rodent control service!

This very effective system usually ended badly, when protein - indispensable to felines - became rare once all the rodents had been eaten.

The story goes that the kind-hearted sailors began fishing and shared their catch (or at least the guts) with the rat-catchers.

Contrary to popular belief, people who are "allergic to cats" **are not allergic to cat hair, but to proteins secreted by their sebaceous glands (perineal and salivary)**. So far, **eight different allergens** have been identified in cat dander. Their scientific name is **Fel d** and the main one is **Fel d I.**

They are usually found **on the skin and hair follicles**. During grooming, cats distribute this allergen on their coat. Hairs and dander contaminate the environment when they fall out, especially on rugs, carpets, seats, and clothes.

A hairless cat produces just as much **Fel d I** as a cat with hair, and the allergens are spread everywhere through direct contact or via skin cells which are shed **during epidermal regeneration.**

Studies carried out mainly in the USA and in Europe have measured the quantity of allergens present in people's homes.

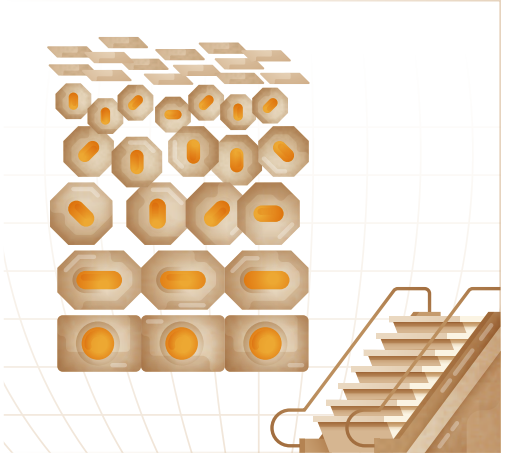
Of course, there are more when a cat lives or has lived in a household, but **Fel d I** has been found in places where there have never been cats: hotels, cinemas, hospitals, offices, and in public transport.

This confirms **the ubiquitous nature of this allergen** which is transported on our clothes and also by flying dust. In the country, with a more "outdoor" lifestyle for many felines, there is a lot less **Fel d I** in houses.

> Apparently toms produce more Fel d I than queens.

Recent studies show that living in an environment with a high level of **Fel d I** (i.e. living in a home with one or more cats) does not increase the risk of sensitivity. Furthermore, a large proportion of people who are "allergic to cats" **don't have one at home**!

EPIDERMAL ESCALATOR



II Long hair, short hair, or hairless?

Fel d I is principally produced by the salivary, anal or sebaceous glands. This process is thus totally unconnected to **the presence, absence, or length of fur**. The main sources of environmental contamination are of course the cat hairs which often get all over the place, but more particularly skin flakes which are constantly peeling off.
These allergens are in fact very small particles, since **Fel d I** only "weighs" 38 kilo Daltons (a Dalton is the unit of molecular weight). In order to avoid dispersing allergens in the environment, **limit skin flakes and brush your pet regularly** to get rid of the dead hairs.

Any condition which accelerates epidermal cell renewal or an excess of sebum production by the sebaceous glands (called seborrhoea) **will increase the quantity of allergens released into the environment.**

Some breeds, such as the Siberian, Balinese or the Devon Rex have the reputation of producing less de Fel d I. Some American laboratories have even sold (at a very high price!) cats they call "hypoallergenic".

The studies they announced to validate this lineage of cats were never forthcoming, and so far there is no DNA test to measure the allergenic potential of a given cat. Investigative journalists have established that, even though the company selling these so-called "hypoallergenic" cats had appeared in TIME magazine, the whole business was a swindle.

The production of **Fel d I** varies from one cat to another, even though, for the moment, it is impossible to calculate in advance. Studies have also determined that **spayed cats produce less Fel d I**

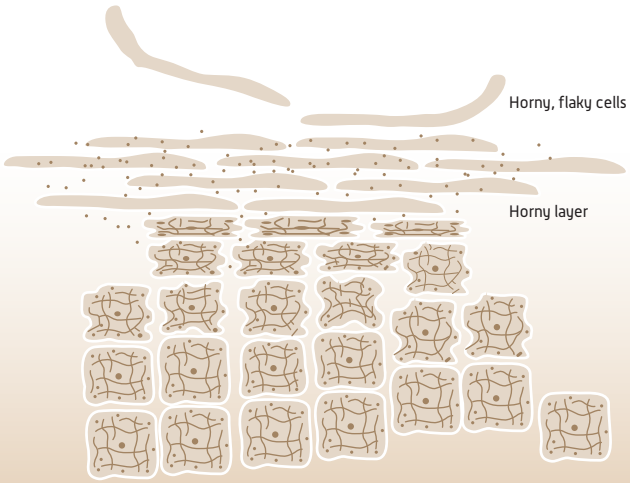
What is the practical solution?

Limit the number of hairs dispersed in the environment by brushing cats every day and regularly vacuuming the places where they sleep.

Cats spread allergens when they are grooming, so it is a good idea to "rinse" them regularly. You can do this with a daily rub-down with a damp towel, or by giving them a bath. **Bathe kittens right from a young age**, so that they get used to it.

Be careful of any skin infections and treat accordingly. One of the skin's defence mechanisms against attacks (parasites, infection, allergies) or against deficiency (poor quality food) consists of increasing the frequency of cell renewal within the upper layer of the epidermis (the *Stratum corneum*), which frees more skin flakes and consequently **increases the quantity of antigens in the environment**.

EXFOLIATION



TOXOPLASMOSIS : DO WE HAVE TO KILL EVERY CAT TO AVOID CATCHING IT?

Toxoplasma gondii is the protozoan parasite which causes toxoplasmosis.

> All mammals, including humans, can be infected, but the cycle of the parasite is different according to the type of host.

There are **entero-epithelial cycles**, or **extra-intestinal cycles**, according to the case.
Members of the cat family can disseminate the parasite in the form of **oocysts**, since cats are the only species in which *Toxoplasma gondii* can develop the entero-epithelial cycle.
Cats are infected by drinking water or **food contaminated by faecal matter**, by eating **prey which is a transmitter of the parasite**, or else from **raw meat**.
Kittens can also be infected **through the placenta**, or **through milk.**

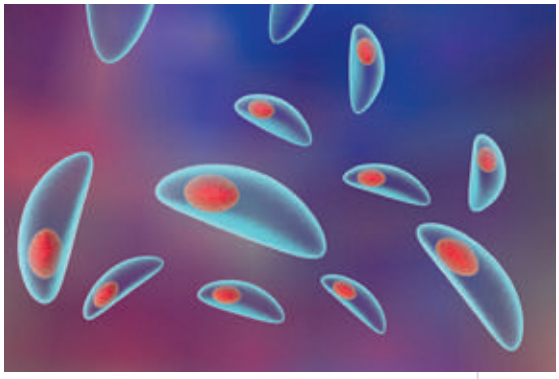
The entero-epithelial cycle (unique to felids)

Cats can ingest an infectious oocyst (parasite egg) when absorbing contaminated water or food. **The parasite infects the intestinal cells**, reproduces there, and oocysts are **released and eliminated** in faeces. **The parasites can then reproduce and spread** into the environment.

The extra-intestinal cycle

This can take place within the bodies of all mammals including cats and humans. After ingestion, the parasite enters intestinal cells and is **transmitted throughout the body through the blood** or **via the lymph glands**. The immune system of the host slows the parasite down, and cysts can appear in the brain, liver, lungs, muscles… **The parasite stays alive in these cysts, throughout the host's lifetime.**

In the case of a pregnant queen, **the foetus will be a favourite target**, since the parasite travels **through the placenta**. As the immune system is immature, it is unable to slow down parasitic reproduction. Prenatal infection can have **dramatic consequences for kittens**.
Infected litters have **a high rate of mortality**, and **surviving newborn kittens often have infections of the nervous system, heptomegaly** (enlarged liver), respiratory failure , or **eye problems**.



Toxoplasma gondii as seen under the microspcope

II Toxoplasmosis in humans

Toxoplasma gondii infects millions of people all over the world, even though **most of the time the disease is not noticed**, or merely causes slight symptoms, leading to a slight decrease in overall condition for a few days.

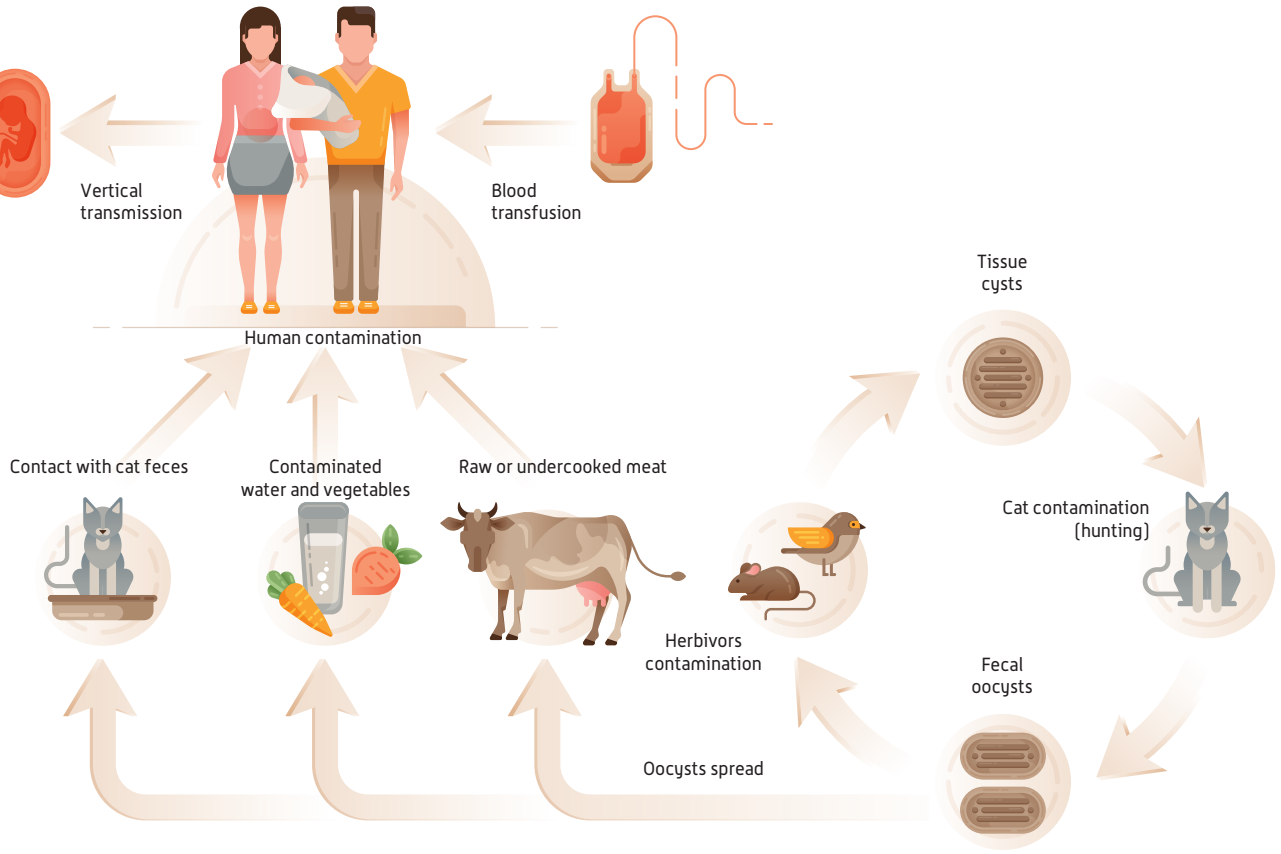
The consequences are **more serious for immunocompromised patients** (HIV or transplants) who can develop **neurological or eye trauma**.

For **pregnant women**, any contamination during pregnancy can have dramatic consequences on the fœtus.

DETECTING TOXOPLASMOSIS

Most western countries have set up systematic screening programmes. Serological testing will show if the mother to be is immune.
If not, monthly blood tests make sure that there is no seroconversion which would indicate contamination during pregnancy with an associated risk for the baby.

TOXOPLASMA LIFE CYCLE



What about cats?

Our feline pets are often accused of a whole host of evils, and some doctors continue to prescribe evicting them from all homes, or even quite simply killing them all off! In fact, **the risk of contamination is mainly connected to the consumption of insufficiently cooked meats** (we know that for mammals like pigs or sheep, parasites are encysted in muscles), or else badly washed vegetables, which have been in contact with contaminated soil.

Seronegative women are advised to wear gloves when gardening and, in the case of pregnancy, it is better to ask someone else to clean out the litter box, or else to wear gloves. **Serological tests can be carried out on cats** to determine if the cat has been in contact with the parasite.

Since cats bury their excrement, they can sometimes inadvertently bring back oocysts present in the area of ground chosen as a latrine. They stick to the cat's hair and can also contaminate those around, or even contaminate the cat who swallows them during grooming.

Cats only eliminate the *Toxoplasma gondii* oocysts several weeks after a entero-epithelial attack. However, it is possible to verify the presence of anti-*Toxoplasma gondii* **antibodies** for an estimate (according to the type of antibody measured - IgM, IgG) of the date of contamination, and hence of the probability of the animal eliminating oocysts.

> The best form of protection is never to give any raw meat.

QUEENS MUST HAVE AT LEAST ONE LITTER BEFORE BEING STERILISED

This particular dogma has absolutely no scientific justification, yet it is difficult to dispel and is indirectly responsible for the birth of thousands of unwanted kittens, with well-known and dramatic consequences: **abandonment, overpopulation and sometimes even euthanasia** in overcrowded animal shelters.

Cats reach puberty **very early** on (as from 3 months) and their "libertine" temperament unfortunately very often results in pregnancy at adolescence.

A recent publication showed that around half of cat owners were convinced that a queen must have had at least one litter before spaying.

Several studies have shown the impact of prepubescent sterilisation on the cat's growth or development. The most frequently shared conclusion, which has led to the publication of international recommendations (http://www.sheltervet.org/assets/docs/vtfasn_javma_guidelines.pdf), **is to sterilise cats before the age of 4 months**.

It has also been proved that sterilisation **before the age of 8 weeks does not lead to any complications**. The widespread use of paediatric anaesthetic procedures, and the availability of effective painkillers which can be used on cats have removed the last barriers to this kind of operation.

> Sterilisation is a responsible way to limit the proliferation of free-roaming cats, and increases the cat's life expectancy. Do not hesitate to have your kittens spayed before they are 4 months old.

DO CATS HAVE WORMS IN THEIR TAIL?

In country regions, this fallacy is hard to dispel and has unfortunately led to terrible, futile, disabling mutilations.
Cats' tails are **composed of 17 to 22 vertebrae called coccygeal**, of decreasing size towards the tip, and are indispensable to normal animal life. **They act as a balancing rod** for our outstanding acrobat, and **are also an important means of communication**.

It is difficult to find a rational explanation for these out-dated practices, but it is true that kittens often play with their own tail energetically. Are they bothered by a parasite?

Tail injuries are relatively frequent (they can get shut in a doorway, run over by a car, or entangled in a fence …). The nerves and blood vessels which run all along the tail bones could lead us to believe that they are worms. The association of these two ideas and the country superstition do the rest. It is probably not necessary to point out that cats are not lizards, and **if their tail is cut off, it does not grow back.**

CATS DRINK MILK

Traditionally, in fairy tale books, cats are often shown facing a bowl of milk. If by any chance a couple of drops of milk are spilled on a work surface in the kitchen or left at the bottom of a bowl of cereal,

your cat will lap it all up greedily. Cats like dairy products and can't resist the temptation to taste cream, lick the butter, or finish up a pot of yoghurt.

For cats, **milk is a source of protein, fat, and calcium**. Lapping up a couple of mouthfuls does no harm, but swallowing **a large quantity of milk will have a big effect on digestion** (flatulence, diarrhoea). During the first three weeks of life, kittens drink their mother's milk. At that time, lactase activity is high, and so there are absolutely no digestion problems.

Most adult cats have **lost their ability to synthesise lactase**, i.e. the enzyme which allows lactose (sugar in milk) to be digested. Some cats continue to drink milk with no apparent problems, but in fact, the presence of lactose has an impact on protein digestibility **(it is reduced by 5%)**, since it accelerates transit, leaving less time for full digestion.

GOOD TO KNOW

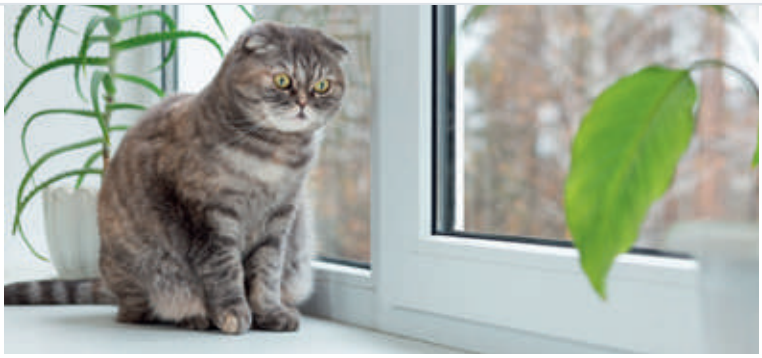
Avoid giving any milk from a ruminant (cow, goat, ewe) to an orphan kitten. Only cat's milk corresponds exactly to kittens' needs, whereas the others are less rich in protein, fats, and minerals. There are some substitute milks which are specially made for kittens.

CATS HAVE TO LIVE OUTDOORS

All animals originally lived outdoors. They use the resources of their environment **to find a shelter in case of bad weather, to give birth, to tend their injuries, or at the end of their life.**

They now live more and more inside, thanks to their contact with man, the process of domestication, but also through the necessity to adapt their natural habitat to urban development (bears, foxes, or wild boars are sometimes found in town).

Felis silvestris catus has lived with man for thousands of years, and has found a place in our home.



Rampant demographic growth and the emergence of megacities, have little by little taken inexorably more space. Nowadays, many cats live with their owners **in smaller and smaller homes, with no access to outdoors**.

> To be happy, cats must be able to satisfy their basic needs.

Apart from drinking, eating, and sleeping, felines **have a vital need to observe** (or indeed spy on) their environment, **preferably from high up**. Cats patrol their domain, mark its limits and strategic points, regularly verify that everything is still in place, and are always ready to seize any opportunity for hunting. **These activities are essential to their well-being** (remember that freedom to express normal behaviours which are peculiar to any species is one of the five points recognised by WOAW in its basic criteria for animal well-being) and are of course possible in a garden or a farm!

"Outdoor" life

Unfortunately, **"outdoor" life can be dangerous**. Cats who go outside sometimes pay the price **in road accidents, falls, poisoning, theft, unexplained disappearances**, not to mention meetings with fellow cats or unfriendly dogs which end up badly.

And of course, cats run the risk of **catching infectious diseases** which can be serious, even fatal, as well as being **infected by the many parasites outside**.

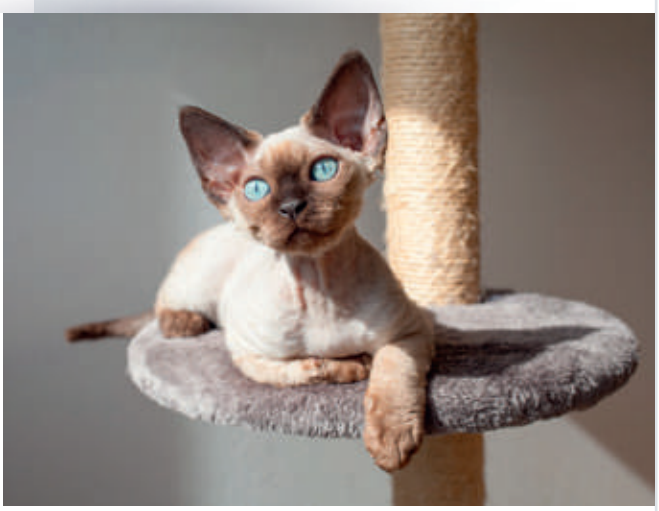
"Indoor" life

Cats can live a full, happy life inside, as long as care is taken so that they **can express behaviours which correspond to the species**. If cats are prevented from meeting their vital needs, then they become **highly stressed**, and this may cause illnesses such as **idiopathic cystitis, and behavioural issues such as aggression and "marking"**.

THESE INSTINCTIVE HUNTERS KEEP UP THEIR SKILLS BY PLAYING.

This is an important activity, even indoors. It is a good way to keep your feline on form – physically and mentally.

Boredom leads to laziness and obesity.



Make sure that your cat has **a high-up view point, hiding places, a comfortable place to nap**…
This does not usually pose a problem, since cats always know how to find the best spots **for dozing, which can take up as much as 18 hours a day**!

The place (or places) where there is **water, their feeding bowl and the litter box** must also **be far from one another, in calm spots, far from passageways or noise**.

In the wild, when cats drink, eat, or do their business, they are vulnerable, and instinctively will look for a safe discreet place to carry out these very particular activities. It is therefore essential that they can recreate similar conditions in their home, "indoors".

Cats can hence perfectly adapt to an "indoor" life style. It is a good idea **to give them special food,** which will **prevent them from putting on weight**, and also limit **the smell of the waste** in the litter box, which must always be kept clean.

When they are outside, cats bury their excrement and keep changing the places where they do so, because the presence of excrement betrays their presence to possible predators.

Indoor cats will have **no other choice but to find substitute** places to do their business (flower pots, plastic bags…) if their litter box does not allow them to satisfy their instinct.

CATS ARE AFRAID OF WATER

Not always! Cat owners agree that this is usually the case, but, looking a little more closely shows that many cats are **fascinated by a dripping tap**, not to mention **the next-door neighbour's garden pond**.

Some breeds have no hesitation in taking a dip to cool down (**the Turkish Van**, for example). It is quite possible that fear of water is one of the consequences of domestication, together with a certain taste for comfort. Indeed, it is impossible to imagine any self-respecting cat getting soaked in the rain, when a cosy sofa is waiting at home!

Wild cats do not generally hang around water points, which are too busy and even dangerous if they are infested with crocodiles. **Animals are vulnerable when they are drinking.**

> "Cats hate water, because they prefer to sunbathe."
> **Stéphane Caron**

We also know that tigers are good swimmers and that a cousin of our domestic cat, the fishing cat, (*Prionailurus viverrinus*), lives in humid regions of Asia, and has webbed feet. Today it is an endangered species.

> Despite this apparent repulsion for water, some cats are bathed regularly.

There will be no problem if cats get used **to being bathed when they are young**.

And indeed, Persian cats are very often bathed before exhibitions. Sometimes, **there are therapeutic reasons** (in the case of skin infections or physiotherapy) for taking a bath! Hydrotherapy helps to regain motricity, and many patients find it easy to get used to.

The role of water in cats' education is **not really clear**. On the one hand, cat owners are sometimes advised to use a water pistol to dissuade their cats from doing certain "unacceptable" things, and on the other hand, to give them a water fountain to encourage them to drink more. **But humans are sometimes a little illogical.**

TO FIGHT LIKE CATS AND DOGS

Thousands of dog and cat owners will say that dogs and cats get on very well, and there are many photos and videos on the net which demonstrate the very real complicity which can exist between these two historically incompatible species.

Nonetheless, their antagonistic relationship is a never-ending source of gags in cartoons, and is explained by the very nature of our two companions.

> Dogs live and hunt in packs, cats are solitary and self-sufficient.

Dogs will instinctively **run after a potential prey who is trying to run away**. And **running away is the preferred strategy for a cat** who feels in danger. QED! But remember that cats can also easily climb up trees or hide up high, out of reach of canine pursuers.

Theoretically dogs should obey and respond automatically to their masters' commands. So it is up to the master to train their dogs properly, and get them used to cats.

The fishing cat

> "Dogs have masters, cats have servants."
>
> **Dave Barry**

CATS CAN ATTACK DOGS… BUT VERY EXCEPTIONALLY.

Just recently "Tara ", a pet tabby, won an award for bravery after chasing off a dog who was attacking her family's baby son.

But we know that, unfortunately, that is hardly ever the case, and that some dogs can go as far as killing cats who get in their way. It is nonetheless **quite possible to have dogs and cats living together**.

Some will even be the best friends in the world; usually young animals get used to one another better.

Spraying different pheromones in the environment will reassure the feline who is introduced into a household.
Remember to make sure she **has a place high up, out of reach of the dog**, so she can take refuge just in case…

A PURRING CAT IS A HAPPY CAT

At least that is **the impression we have**.
Purring appears very soon after birth: kittens purr when **they are on the teat**.

We think this is a way of **attracting attention and communicating with their mother**. Very often, the queen purrs whilst the kittens are feeding. As they grow, many cats continue to use this means of expression to express their contentment. It may be connected to "kneading", behaviour they learned early on.

But in fact, this sound does not just signify happiness. **Cats who are ill, frightened or in pain sometimes** purr mechanically: they may be seeking to reassure themselves. The acoustic frequency is between **20 and 50 Hertz**, and doctors have noted that when you stimulate badly consolidated fractures at this frequency, they heal more quickly. It is hence quite possible that purring has **a therapeutic value for the animal, as well as for humans**. Some people talk about **"purring therapy"**, to heal both body and spirit, thanks to its monotone vibrations.

> Consequently, never assume a purring cat is a cat who feels good, even if it is the sweetest sound we can hear.

PURRING IS CHARACTERISTIC OF FELINES, AND IS A MODE OF EXPRESSION, JUST LIKE MEOWING.

This low frequency sound (around 27 Hz) is produced by contracting the muscles of the larynx. When the cat's mouth is closed, the air circulates and vibrates at the back of the throat. The vibration is produced both when breathing in and out, so it is a continuous sound. The intensity of the purr varies from one cat to another. For some cats, it is hardly audible, but others really turn up the volume!

WHY ARE CATS OFTEN ATTRACTED TO PEOPLE... WHO DON'T LIKE CATS?

Cats' sense of independence is perceived negatively by people who don't like them. They will describe cats as **mysterious, false, treacherous, cunning, selfish, even devilish**.

> Middle Age beliefs are difficult to change!

Some people do not like cats, or are frightened of them. OK. You can't win them all. However, it is often the case that the household cat goes straight towards the person who is ailurophobic, as if to taunt him and make him feel uncomfortable. **There is nothing malignant about this behaviour.**

In fact, people who are afraid of cats **have body language which cats, paradoxically, find reassuring**: they are fixed on their chair, avoid looking at the animal, or else blink and try to avoid any physical contact, whereas those of us who love cats will try to get near them and stroke them, without always respecting communication codes which are specific to the species.

Indeed, for cats, **demonstrations of affection are often perceived as an attack**.
So it is better **to let them lead the way**.

> "Cats always know whether people like or dislike them. They do not always care enough to do anything about it."
>
> **Winifred Carriere**

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“Stroke the stretched-out neck
of a purring kitten
with the back of your index finger.”

Jean-Hugues Malineau