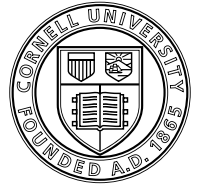




Cat Watch

October 2019 - Vol. 23, No. 10



Expert information on medicine, behavior, and health in collaboration with a world leader in veterinary medicine

THIS JUST IN

TB and Raw Diet

U.K. study found a link

Tuberculosis (TB) in cats is especially worrisome because it can spread to humans. Infected cats are usually outdoor cats, but one outbreak started with indoor cats in England.

The cats showed lesions, lymph-node disease, and/or pulmonary disease, all consistent with the bacterium *Mycobacterium bovis*, which causes TB. The diagnosis was confirmed by polymerase chain reaction (PCR), where possible, or a positive interferon-gamma release assay (IGRA). Cohabiting cats were screened by IGRA and follow-up testing. A lifestyle investigation began to identify the source of infection.

Six sick cats and seven cats who were in contact with sick cats were identified with evidence of TB. Five clinical cases were either too sick to treat or deteriorated despite therapy, giving a mortality rate of 83%.

Lifestyle investigations revealed that the affected cats had all been fed a commercial raw food that was produced by one pet-food manufacturer. Other possible sources of exposure were explored and excluded. The results provided evidence of an association between the commercial raw diet and the infection. ■

J Feline Med Surg. 2019 Aug;21(8):667-681.
doi: 10.1177/1098612X19848455



5 Things When Choosing a Kitten

It isn't easy, but you have to muscle past the cuteness

Every fall and spring, kittens become widely available, due to typical queen heat cycles in January and October and the feline 60-day gestation. Kittens are cute, for sure, and you may be tempted to adopt one (yay for you and the kitten!). But it's important to ensure that you make an objective choice and properly prepare your home. We offer these tips to help with the transition:



A healthy, happy, well-adjusted kitten will want to interact and play with you.

- 1 Age Matters.** A kitten should be at least 8 weeks old before you adopt, which is when they can be weaned. If you can wait till the kitten is 10 to 12 weeks old, you'll be ahead of the game. It gives mom more time to teach the kitten and for the littermates to play and learn together.
- 2 A Healthy Start Is Paramount.** Don't dismiss the warning signs of poor health. Be wary if the kitten seems too thin, has visible parasites like fleas, a dirty/matted coat, runny eyes, nostril drainage, diarrhea, or seems lethargic. If you do adopt a kitten in this shape, your first stop should be the veterinarian's office.
- 3 Temperament Check.** Spend time with the kittens. They should be curious, sociable, and playful. They should approach you and want to interact. If you pick one up, he or she should stay relaxed, maybe purring or snuggling (no claws or yowling). If you're at a shelter, ask the staff about the kittens, but be aware that they may be overwhelmed by the influx of feline babies, too.
- 4 Home Check.** Before the kitten comes home, go through your house with an eagle eye looking for spots where kittens might get into trouble. Inspect each room. Look for tiny spaces a kitten could get stuck in, electric or computer cords that may be tempting chew spots, strings on window blinds that could become entangled around the kitten's neck or limb. Plan a small room like a spare bathroom where the kitten can stay for a few days while you get to know one another. Place food and water bowls, a litterbox, a bed, and a few safe toys in the room. Interact with the kitten there as much as possible to begin to establish a bond.
- 5 Proper Introductions.** If you already have a cat, allow the cat to sniff the kitten under the door. Rub a damp cloth on your resident pet, then rub that cloth on your kitten, then rub again on the resident pet. The exchange of scents will make the introduction easier. Eventually, try feeding them at the same time in the same room. Do not leave them alone together without supervision until you're certain they're "ignoring" one another.
You can introduce your dog similarly, but have the dog on a leash when they meet without the door between them. Let the kitten loose, and see if it approaches the dog. Give them time. Pet the dog and the kitten. You may have to repeat this introduction several times. Do not force the meeting, and do not allow aggression. ■

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Flame Retardant and Hyperthyroidism

Link was found by using silicone pet tags

A study in *Environmental Science & Technology* associated hyperthyroidism with flame retardants, using silicone pet tags like the popular wristbands people wear for charitable causes.

In the mid-1970s, manufacturers put polybrominated diphenyl ethers (PBDEs) into textiles, polyurethane foam, plastics, and electronics as flame retardants. But in 2004, U.S. manufacturers started phasing them out amid environmental and health concerns. Alternatives including organophosphate esters (OPEs), such as tris (1,3-dichloroisopropyl) phosphate (TDCIPP), were added instead, but recent research suggests that these flame retardants can also act as endocrine disruptors, just like PBDEs.

Prior research suggested a link between PBDE levels and feline hyperthyroidism, but researchers wondered if they could use silicone pet tags to assess hyperthyroid and non-hyperthyroid cats and their exposure to various flame retardants, including OPEs. Silicone picks up volatile and semi-volatile organic compounds, and wristbands made of the material have been used in studies to monitor human exposure to environmental chemicals.

The researchers recruited 78 cats ages 7 and older, half with hyperthyroidism and half without. They gave the cats' owners silicone tags to put on their pets. After the cats had worn the tags for seven days, the researchers analyzed the silicone and found higher levels of TDCIPP from cats with hyperthyroidism. Among non-hyperthyroid cats, TDCIPP exposure correlated with serum concentrations of a hormone elevated in hyperthyroidism. Higher TDCIPP exposures were associated with air-freshener use, houses built since 2005, and cats that prefer to nap on upholstered furniture. ■

Environ Sci Technol. 2019 Jul 10. doi: 10.1021/acs.est.9b02226. *Science Daily.*



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Technology Improves Veterinary Care

Information shared via a smartphone makes sharing simpler

A publication by members of the Section of Ophthalmology at the Cornell University College of Veterinary Medicine highlights the innovative use of a smartphone with an open-source 3D printed smartphone indirect lens adapter. Using the adapter, they obtained high-quality ophthalmic videos and still images that can be sent to the primary veterinarian. This technology has the potential to dramatically improve the care of feline patients. The quality of images obtained using this technique are expected to improve as smartphone technology imaging advances. ■

Vet Ophthalmol. 2019 Jan;22(1):88-92. doi: 10.1111/vop.12577



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Video Records of What Cats Do All Day

Researchers strapped tiny cameras on 16 willing cats

A study from *Applied Animal Behaviour Science* used tiny cameras to follow 16 cats throughout their neighborhoods. The camera was about the size of a golf ball and attached to the cat (originally, 21 cats were selected, but five said no thanks).

"Cats are seen as relatively lazy, especially compared to dogs. But we saw that when they were outside, they became super alert," co-author Maren Huck told *Science*. "They scanned their surroundings, sometimes for a half-hour or more on end. And even though cats are highly territorial, they didn't always fight with other cats they encountered. Often, they just sat a couple of meters away from each other for up to a half an hour. They may have been sizing each other up. Sometimes they would engage in a greeting, briefly touching noses." See the video at <http://bit.ly/cameracats>. ■

<https://doi.org/10.1016/j.applanim.2019.04.016>



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CatWatch is an independent
newsletter produced in collaboration
with the Cornell College of Veterinary
Medicine Feline Health Center



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For information on your cat's health, visit
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Medicine, Cornell Feline Health Center
website at www.vet.cornell.edu/fhc/.

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Subscriptions: \$39 per year (U.S.) • \$49
per year (Canada). For subscription and
customer service information, visit
www.catwatchnewsletter.com/cs
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Belvoir

CatWatch* (ISSN: 1095-9092) is
published monthly for \$39 per
year by Belvoir Media Group, LLC,
535 Connecticut Ave., Norwalk,
CT 06854-1713. Robert Englander,
Chairman and CEO; Timothy H. Cole,
Executive Vice President, Editorial
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The Good, the Bad, and the Coffee

Cat cafés are challenging but can be beneficial for all

Playing with cats while enjoying a cup of coffee—what more could you want? Cat cafés have blossomed in popularity since the first one opened in Taiwan in 1998. Expansion into the U.S. has been slow due to regulations around food preparation and animal welfare, but they're starting to appear.

The basic concept of a cat café is to enjoy all the amenities of a coffee shop with the company of cats. These cafés are popular with cat lovers, especially those who cannot have a cat of their own.

Businesses around the world put their own unique spin on the idea. Some have themes, such as all black cats or a particular breed of cat. Some have permanent resident cats who are professional cuddlers, while others team up with shelters and rescue organizations to help strays find homes.

Logistics

The biggest challenge for cat cafés in the United States is that only service animals are allowed in areas where food is prepared and served. This is good, because no one wants a cat who just got out of the litterbox to step in their tray of fresh-baked scones, but it does complicate the layout. The two portions of the business must have separate entrances to minimize the risk of a cat darting through a door into the café. Cat cafés are also subject to occupancy limits for fire safety.

In addition to following health-department regulations, a cat café must meet the requirements of local animal control to ensure that the cats are properly cared for. This includes how many cats can be comfortably housed in the allotted space and standards of care. Cats need daily care, regardless of the weather or holidays, including daily feedings and litterbox cleaning.

Cat adoptions add a layer of complexity, as the cat café must work with a non-profit entity, and a balance must be struck between having cats in the café for people to interact with while also matching them to suitable homes.

Cat Comfort

As cat lovers, we all understand that the needs of the cats must come first to ensure that they are happy and healthy.

Perks in Cat Cafés

- ▶ It's an opportunity to just hang out with cats.
- ▶ The environment gives cats lots of attention and socialization.
- ▶ For adoptable cats, it's a way to meet potential new owners without any pressure.
- ▶ Gives a permanent home to cats who function as professional cuddlers.

This includes mental and emotional well-being. Many cats do not enjoy being around strangers, or even around strange cats. To judge the quality of a cat café, look for these characteristics:

- ▶ Rules about cat handling, such as no picking cats up, no waking sleeping cats, no flash photography, and no chasing. Some cafés have age limits that restrict children's access.
- ▶ Hiding places for cats to get out of reach and/or sight from customers for downtime.
- ▶ Fresh smell. Litterboxes should be cleaned frequently, as well as any other messes.

- ▶ Staff member is always present to make sure that customers are respecting the cats.
- ▶ Healthy cats with clean coats and in good body condition. No runny eyes, sneezing, or bald patches.

Most of the cat cafés in the U.S. are partnered with shelters to find homes for the cats. Cats staying in the café should be prescreened to ensure that they are comfortable with people and will not be unnecessarily stressed out by being in the café. It is also important that the cats get along—turf wars don't make for a safe environment for the cats or human spectators. Customer-owned cats are not allowed for health and safety reasons. Adding cats from varied backgrounds further increases the risks of disease transmission and cat aggression.

Cost

So how much does this magical experience cost? A visit to the cat section of a cat café can range from \$6 to \$20 for a half hour to \$11 to \$35 for a full hour, depending on the location and any additional amenities.

Most places recommend making a reservation ahead of time to ensure that there will be a spot for you, but walk-ins are usually welcome. Some cat cafés will even let you reserve the entire space for a private audience with the cats—this can cost up to \$1,000 for an hour. Fees and donations go toward the expenses of the space, staff, and, of course, caring for all those lovely cats. ■



You can mingle with cats at a cat café, just getting to know them and enjoying their company.

Congestive Heart Failure

Lifetime treatment is usually a necessity

Congestive heart failure (CHF) is often the stage of disease at which a cardiac problem is first diagnosed. When a cat has CHF, the heart no longer functions as an efficient pump, unable to bring enough oxygen and nutrients to the body cells and move waste products such as carbon dioxide out. Fluid buildup can occur, usually in the lungs (pulmonary edema) and in the chest cavity around the lungs (pleural effusion).

Cardiomyopathies, which are primary diseases of the heart muscle, are the most common cause of feline heart disease. Hypertrophic cardiomyopathy (HCM), which is characterized by thickening of the walls of the ventricles, is the most common form of cardiomyopathy in cats.

Symptoms

The initial signs of congestive heart failure, including lethargy, hiding, and a decreased appetite, are associated with many illnesses. The cardinal sign of CHF, though, is respiratory difficulty.

“Owners should be on the lookout for tachypnea (rapid breathing) and dyspnea (difficult or labored breathing),” says Bruce Kornreich DVM PhD DACVIM (Cardiology), Associate Director of the Cornell Feline Health Center.

Another possible symptom of cardiac problems is the loss of mobility in one or both hind limbs, which may be due to



An irregular heartbeat may be detected during a veterinary examination.

an aortic thromboembolism (clot). Clots can form in the heart of cats with heart disease and then be ejected from the heart, traveling via the aorta to the two main blood vessels that supply blood to the hind limbs, where they can obstruct blood flow. The lack of oxygen delivery and the buildup of toxins in the hind limbs can lead to significant pain and paralysis. An affected cat's pulse will be reduced, and the leg(s) will usually feel cool. This is difficult to treat and often a sign of advanced cardiac disease. The prognosis for recovery is poor to grave. Note: You also may see this condition called a saddle thrombus or an aortic thromboembolism (ATE).

Diagnosis

A quick screening tool for cardiac disease in cats is the use of N-terminal pro brain natriuretic peptide (NT-pro BNP, a protein that is released from the myocardium or heart muscle when the heart is inappropriately stretched or stressed). NT-pro BNP is produced and excreted by heart muscle cells and helps control blood pressure and fluid balance. The amount excreted increases with dilation of the heart.

Many veterinary clinics have NT-pro BNP tests that can help establish an index of suspicion for heart disease and will use this screening test to distinguish respiratory distress due to cardiac disease vs. non-cardiac disease. While this blood test is a simple, inexpensive first step, a definitive diagnosis, both false positives and false negatives can occur, so additional testing may be required to make a definitive diagnosis.

Blood pressure and thyroid levels usually will be determined if there is concern for heart disease, as both kidney

disease and hyperthyroidism can cause changes to the heart that mimic those seen with HCM.

Radiographs (x-rays) of the chest can evaluate the size of the heart and blood vessels and the status of the lungs. This is the only readily available modality to determine whether there are problems in the lungs. Radiographs can be used upon first diagnosis and to modify drug therapy in the face of CHF.

If your cat's veterinarian detects an irregular heart rhythm during auscultation (listening with a stethoscope), the next step might be an electrocardiogram (EKG), which measures electrical activity in the heart. If your cat is weak or has collapsed, the EKG can be used to rule out cardiac arrhythmias (irregular heartbeats) as the cause. If the EKG appears abnormal, your veterinarian may request a consultation by a veterinary cardiologist.

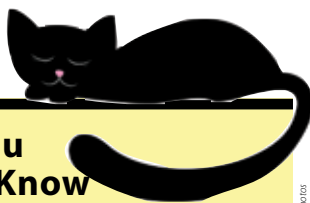
The gold standard for evaluating cardiac function is the echocardiogram, a non-invasive radiological examination that uses sound waves to look at cardiac structure and function. There is no radiation involved in echocardiography, and while many veterinarians have the ability to perform this test in their practices, a board-certified veterinary cardiologist may be consulted in complicated cases or in the event that a practice does not have the necessary equipment or expertise.

The Cardiac Cough

Dogs and humans with heart failure will often cough, but this is generally not true in cats. A coughing cat is much more likely to have a respiratory ailment such as asthma. Still, a coughing cat should be seen by your veterinarian.

Taurine

Dietary deficiency of taurine, an amino acid, is associated with feline dilated cardiomyopathy, in which the walls of the ventricles become thin and the pump function of the heart decreases. Discovery of the connection between heart disease and taurine deficiency in cats over 30 years ago led to most feline diets now being appropriately supplemented with taurine, so this syndrome now is rarely seen in cats.



What You Should Know

Rapid or difficult breathing is the cardinal sign of CHF. Learn your cat's normal breathing pattern now.

Observe your cat when she is lying quietly or sleeping (not just after a rousing game of chase!). Count her breaths by watching her sides; one breath is when her sides move in and out once (she should not be purring when you do this). Most cats take between 20 and 30 breaths per minute. Anything over 35 breaths per minute warrants consultation with a veterinarian.

Treatment

The treatment of cats with congestive heart failure focuses largely upon minimizing symptoms while trying to forestall disease progression. There is no cure for most causes of feline heart failure, but many cats can be controlled and gain quality time with their families with appropriate therapy.

The first line of defense is often a diuretic, which induces urination, thereby decreasing blood volume and minimizing fluid accumulation in the lungs and/or chest cavity. This facilitates easier breathing, and owners should be aware that this increase in urination will require that they clean litterboxes more frequently.

Other therapies may include angiotensin converting enzyme (ACE) inhibitors to dilate blood vessels, pimobendan to increase the contractility of the heart (this is currently not approved for cats, but is often used off-label), and antithrombotic agents to decrease the likelihood of clot formation.

Cats who develop acute pulmonary edema or pleural effusion need immediate veterinary attention. Hospitalization is recommended so that medications can be given intravenously (IV) for a rapid response. Diuretics are essential, and your cat will be placed in an oxygen cage if available.

In some cases, pleural fluid will be removed from the chest cavity by passing a small needle through the body wall (thoracocentesis) to improve a cat's respiratory status. Nitroglycerin ointment also may be used to dilate blood vessels and facilitate improved ventricular function.

Your veterinarian will determine the best combination of medications for your cat. Unfortunately, though, once a cat has developed congestive heart failure, the long-term prognosis often is not as good as we would prefer, with survival times varying between three and 18 months.

At Home

Keep your veterinarian informed of any changes in your cat or if you're having trouble giving your cat medicine. Keep all suggested follow-up appointments and consultations.

Monitoring your cat's resting respiratory rate at home can be helpful in managing a cat with CHF, as can encouraging him to eat. Some cats may benefit from diets specifically formulated for patients battling heart disease. ■

A Feline DNA Analysis

It's still a new technology, but it has great potential

Not that long ago, a DNA analysis on anyone or anything was unthinkable. It wasn't until 2003 that the human genome (genetic material) was fully sequenced. In 2007, the feline genome was partially sequenced in an Abyssinian cat named Cinnamon. This is important because sequencing helps us understand what an organism will look like and what disease conditions it might be prone to having. DNA analysis can be valuable to cat owners and breeders.

So far, we know of about 250 heritable genetic conditions in cats. These include diseases like hypertrophic cardiomyopathy, polycystic kidney disease of Persians, and progressive retinal atrophy of Siamese cats. Being able to study the way these diseases are passed on to offspring is a critical part of DNA analysis.

To understand this information, it's important to know that there are limited DNA sequences to compare your cat against. Because there are fewer feline breeds and more money has been spent on dog DNA testing, our information on felines is currently limited. Luckily, there are several laboratories working on broadening the database. These include the 99 Lives Cat Genome Sequencing Initiative at the University of Minnesota, which is contributed to by researchers



DNA testing can give you information about heritable conditions like polycystic kidney disease in Persians.

funded by the Cornell Feline Health Center at Cornell's Veterinary Biobank (see sidebar on p. 6) and others. The project currently has 200 cat genomes sequenced, at the Cat Genome Project at the U.S. National Cancer Institute.

Furthermore, companies offering feline DNA testing are building their own databases against which to compare your cat's sample. The more cats that undergo DNA sequencing, the more information we will have. In the chart on this page, we have collected three popular commercial tests and compared them.

How It Works

Since Cinnamon's genome was sequenced, feline DNA kits are becoming

DNA Analysis from Popular Commercial Companies

Test	Sample type	Price	Information	Pros	Cons
Basepaws basepaws.com 415-634-7387	Cheek swab Hair	\$99	Breed Ancestry Health report coming in 2019	Can use for any cat Continually refining and updating results	Relatively slow turnaround reported Fairly new
Optimal Selection optimal-selection.com 888-597-3383	Cheek swab Semen	\$99.99	40+ diseases Blood type Coat length Coat color Coat type	Four week turnaround Tests for 40+ diseases and 20+ traits	Only for use in purebred pedigreed cats (designed for breeders)
DNA Health Screen and LifePlan homedna.com 800-281-2916	Cheek swab	\$115-125	Blood type 40+ diseases	Tests for 40+ diseases	Slightly more expensive Currently only available in U.S.

more available. While it may sound daunting to collect DNA from your cat, it is quite simple. The kits generally request either a hair sample or a swab of the cheek. Blood testing is likely the most accurate, and if you are interested, your veterinarian can collect this for you.

What Can DNA Testing Tell You?

Feline DNA testing can offer a wealth of information, including genetic control of coat color, coat length, and possible predisposition toward certain diseases. Unlike dog DNA testing, in which owners receive a percentage breakdown of breeds, cat DNA testing does not offer this yet.

The current DNA tests compare your cat's DNA to the pedigreed breeds that have been sequenced to find the most similar match. This can tell you why your cat looks a certain way and may provide insight into behavioral traits and disease processes. For instance, Bengals are known to be very active, athletic cats, whereas Ragdolls are known for being cuddlers. Maine coon cats and Ragdolls have a heritable genetic heart condition called hypertrophic cardiomyopathy, and Persians are prone to genetically mediated polycystic kidney disease.

DNA tests can provide information



What Is DNA?

We're all familiar with the term DNA. But do you know what it is? DNA stands for deoxyribonucleic acid. It is the hereditary genetic code upon which life is built. Most DNA is found within chromosomes, which are contained in the nucleus of the cell, the director of all cellular activity. Cats possess 38 chromosomes (for comparison, humans have 46).

DNA is composed of the chemical bases adenine (A), guanine (G), thymine (T), and cystine (C) arranged in a double helix. These pair together—A with T, G with C—to form base pairs. The pairs are bound together by sugar and phosphate molecules, forming a "ladder." These pairs and their organization determine how an organism is built and how it functions.

The feline genome has approximately 2.5 to 3 billion base pairs per cell, making up about 20,000 to 25,000 genes. Genes are short segments of DNA. Genome refers to the entire set of hereditary information within an organism.

regarding what diseases your cat may be a carrier for (if you are interested in breeding) or may have a heritable predisposition toward. When deciding to breed, knowing your cat's carrier status for breed-linked diseases is critical. This way, when selecting a breeding partner,

you can avoid propagating that gene in the kittens.

Bottom Line

Feline genome sequencing is still in its infancy, but advancements and improvements are being made. Several institutes are working on building feline genetic databases.

If you're considering a feline DNA test, ask yourself what you're interested in learning and why. If you are concerned about a breed-specific disease, consult with your veterinarian about submitting blood to laboratories. If you are mostly interested in learning about your cat's possible genetic disease predisposition, a feline DNA test kit is likely adequate. ■

Cornell's Feline BioBank

Researchers at the College of Veterinary Medicine at Cornell University are developing a database of cat DNA to identify the genetic basis of a variety of common feline diseases, including inflammatory bowel disease, hypertrophic cardiomyopathy, chronic renal disease, and diabetes mellitus. By comparing DNA from healthy cats with DNA from cats with one or more common cat diseases, they hope to learn more about what roles genes may play in these conditions. This knowledge can improve diagnosis and treatment of a variety of feline diseases. If you would like to help with this study, a small blood sample will be needed from your cat (only cats ages 10 and older). There is no charge to participate. If you're interested, you can fill out the DNA donation form at <http://bit.ly/CornellCatDNA>



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DID YOU KNOW?

Pheromone Scent

From a sulphur in urine

Felinine is a sulphur (cysteine) amino acid found in cat urine. It works as a pheromone. This sulphur amino acid is what causes the strong scent in urine marking by intact male cats. The cauxin gene allows cats to produce felinine to mark their territories. ■



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Feline Anemia

With too few red blood cells, a cat's body can "starve"

Anemia is the state where a cat has too few red blood cells. Red blood cells carry oxygen to the tissues. They circulate for 70 to 80 days in cats before being removed from the circulation and replaced by the bone marrow. Since red blood cells carry oxygen and nutrients to tissues, a loss of these cells is a serious problem and can be fatal.

Because an anemic body is starving for oxygen, one of the first signs of anemia is lethargy. Affected cats will have little energy to play. If you look at the gums, they may be very pale or jaundiced (yellow) due to red blood cell destruction. In extreme cases, your cat may have trouble breathing. Respiration and heart rates may be increased as your cat tries to compensate for the lowered oxygen delivery due to a lack of red blood cells.

Depending upon the cause, you may also notice a fever and loss of appetite (due to an infection/inflammatory response) and/or melena (black stools due to digested blood) or discolored urine that may suggest internal red blood cell loss/destruction.

Causes of Anemia

Anemia may be caused by blood loss (usually due to trauma with internal or external bleeding), destruction of red blood cells (infection, disease, parasites), or decreased production of red blood cells (autoimmune disease, poor nutrition, chronic illness). For kittens, a major cause is flea infestations. Fleas and ticks feast on blood, which can



Kittens can become anemic due to severe flea infestations.

be especially devastating to a tiny cat. The hookworm parasite, which feeds on blood, may cause anemia in cases of severe infestation.

Along with directly causing blood loss by feeding, blood-sucking insects can spread diseases like feline infectious anemia (FIA), which is caused by the *Mycoplasma haemofelis* parasite that parasitizes red blood cells. FIA is usually spread through cat-to-cat contact and infected fleas. A cat's natural defense systems usually destroy the infected cells, but a cat can be reinfected. Some cats will retain some of the parasites at a low level and, if stressed, will suffer another bout of anemia.

Perhaps the most common cause of anemia in cats is feline leukemia virus (FeLV). It affects 2 to 3% of cats in the United States, although its incidence has been greatly lowered "since the development of an effective vaccine and

accurate testing procedures," says the Cornell Feline Health Center. (See <http://bit.ly/FLV-Cornell> for more information.)

Additional possible causes of feline anemia include:

- ▶ Bladder-wall damage
- ▶ Cancer
- ▶ Gastric ulcers
- ▶ Hemangiosarcoma
- ▶ Kidney disease
- ▶ Liver disease
- ▶ Spleen damage
- ▶ Toxins

Autoimmune hemolytic anemia also can occur, usually secondary to feline leukemia, immunodeficiency, or feline infectious peritonitis (FIP).

Outdoor cats are at a greater risk of anemia than indoor cats due to exposure to parasites and infectious diseases, and the increased possibility of trauma.

While anemia can result from dietary inadequacies, this is rare if your cat is eating a good-quality commercial food.

Diagnosis and Treatment

Diagnosing the cause of anemia requires your veterinarian to put on his or her detective hat, take a full history, and order bloodwork. Blood tests often include a complete blood count (including hemoglobin and hematocrit), serum biochemistry, and urinalysis. In some cases, a bone marrow biopsy, ultrasound, or x-rays may be performed.

Not surprisingly, treatment depends upon the cause. Obviously, parasitic infestations require treatment that kills the parasites. Corticosteroids or other immunosuppressive drugs are important for autoimmune diseases. Blood transfusions (and blood typing, see upcoming issue) may be necessary for severe cases.

Nutritional supplements are rarely used, unless the cause is malnutrition. Feeding a high-quality food will give your cat the nutrients he needs to regenerate those critical red blood cells. ■

Queen and Kittens

When a nursing mother has a blood type incompatible with her offspring, neonatal isoerythrolysis occurs, which is immune-mediated blood cell destruction. For example, a queen with blood type B will have naturally occurring antibodies to blood type A. If she has kittens with type A blood, the antibodies the kittens receive from drinking colostrum (the first milk that is produced by the queen after birth) will destroy their red blood cells and lead to a potentially fatal anemia. Transfusions are necessary to try to save the kittens' lives.

PCV for Diagnosis

Anemia is a low amount of red blood cells. For a cat, this usually means a packed cell volume (PCV, the percentage of blood volume occupied by red blood cells) below 25%. PCV also may be referred to as "hematocrit." Normal feline PCV is 25 to 45%. A PCV is the quickest way to judge anemia, but a red blood cell count and measurement of hemoglobin—the protein in red blood cells that allows it to carry oxygen—also can be used to characterize anemia.

Genetic Anemia

In Abyssinian and Somali cats, a genetic defect may occur that causes a deficiency of the enzyme pyruvate kinase. This deficiency leads to a cyclic hemolytic (by rupture of red blood cells) anemia. Affected cats tend to improve if their spleens are removed and/or they receive corticosteroid therapy.

Grain-Free Diet Questions

The best food choice imparts good health without risk

Q There's been a lot of stuff in the press lately about grain-free dog food being associated with canine heart disease and a mention of the occasional affected cat. Is there any reason at all to avoid grain in cat food?

A Thanks for getting in touch, and this is a very good question. The issue of grain-free diets and their potential association with heart disease in dogs has received a lot of attention, and the Food and Drug Administration (FDA) recently responded to this developing story by releasing a number of statements informing the public of the status of our knowledge of this syndrome.

There are a few key issues that are important to point out. The first is that the specific cause of this potential increase in the incidence of heart disease (characterized by dilation of the ventricles, thinning of the walls of the ventricles, and decreased pump function) in dogs is unknown.

In some cases, it is possible that the heart disease was not due to diet; but many, if not most, of these cases occurred in breeds in which this type of heart disease is uncommon. More than 90% of the diets eaten by dogs in this report were grain-free (lacking corn, soy, wheat, rice, barley, and other grains), and 93% of these contained peas and/or lentils.

Many of the affected dogs were also eating diets that utilized non-traditional



Aaron Annual / Deposit Photos

It has not been established that food was responsible for the dilated cardiomyopathy cases reported to the FDA for dogs and cats.

(exotic) meat sources (i.e. kangaroo). This raises concerns that the problem, if diet related, may not be due to the absence of grains, but rather to the presence of other ingredients such as peas, lentils or other legumes, and/or exotic meats.

Finally, some brands of dog food appear to be overrepresented in the cases reported to the FDA, raising concerns that the problem may be due to production, sourcing, or quality-control issues at certain dog-food production facilities, although none of these possibilities have been ruled in or out definitively.

Among cases initially reported to the FDA, 515 were dogs and only nine were cats. While the number of cats in this report is low, prudence dictates that these feline cases should not be ignored.

Two important aspects of determining which food(s) to feed any pet are the potential risk and benefits of a given diet to the well-being of the pet. In theory, a food that imparts benefit would be viewed more favorably, while a food associated with health risks would be viewed less favorably. The ideal food would be one that imparts great health benefit while incurring no health risk, and foods that are associated with health risks while providing no health benefit would be less than ideal.

To our knowledge, unless a specific sensitivity to grains has been demonstrated in a cat (this is very rare), feeding grains to cats had not been identified as causing any health problems (this is true for dogs as well).

Since feeding grain-free diets to cats (and dogs) may potentially cause heart problems (this has not been proven or disproven yet), and since there is generally no known benefit to feeding cats (or dogs) a grain-free diet, the consideration to avoid grain-free diets is, in my view, a reasonable one at this time, although this may certainly change as we learn more about this situation.

Of course, it is vitally important that this major decision be made in close consultation with a veterinarian and/or veterinary nutritionist, and we are closely monitoring this important evolving story.

All my best,
Elizabeth

Elizabeth works with the Cornell Feline Health Center to provide answers on this page (vet.cornell.edu/fhc/). Write to her at catwatcheditor@cornell.edu or CatWatch



535 Connecticut Ave., Norwalk, CT 06854. We welcome digital photos of your cat to consider for use with your question.

© HAPPENING NOW...

Pizza and Pets - Angelo's Pizza in Matawan, N.J., is "delivering more than just food," according to CBS New York Channel 2. They're posting flyers of missing pets on their pizza boxes in an attempt to help locate pets in the neighborhood that are reported missing from their homes.

Mark Your Calendar - October 16 is National Feral Cat Day. The event, which began in 2011, is a day to educate people about trap-neuter-release programs in your area and free-roaming cats. In addition, October 27 is National Black Cat Day. As rescue groups

are acutely aware, black cats are not highly favored for adoption for reasons that are largely not understood (beyond silly superstition). This day is to help celebrate these beautiful panther-like black felines who bring love to every household.

New N.Y. Law - Gov. Andrew Cuomo signed a law for rescuing pets trapped in cars in New York that makes firefighters and emergency medical professionals not responsible for any vehicle damage that occurs when removing a pet from a hot or cold car. Previously, only police officers were protected by law. ■



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Coming Up ...

- ▶ *The Duties of Therapy Cats*
- ▶ *Feline Inflammatory Bowel Disease*
- ▶ *What's Important about Blood Types*
- ▶ *Choosing Health Insurance for Your Cat*