

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

## THIS JUST IN

### Help for Kidney Disease Injection shows promise

**A** study from Wake Forest Institute for Regenerative Medicine, Winston-Salem, N.C., offers hope for end-stage kidney disease in cats.

Chronic tubulointerstitial fibrosis is a common final pathway leading to end stage kidney disease in cats and has no effective treatment. The use of cell-specific molecules to treat kidney fibrosis may be a promising approach.

Researchers looked at the effects of intra-renal chemokine CXCL12 injection in a pre-clinical cat model of unilateral ischemia/reperfusion (I/R)-induced kidney fibrosis and the safety/feasibility of these injections in cats that might have early chronic kidney disease.

“The goal of this study was to test the safety, feasibility, and efficacy of ultrasound-guided intra-renal CXCL12 injection in cats with chronic kidney fibrosis, first in a preclinical cat model, and then in a pilot study in cats that may have early kidney disease,” according to a release from EurekAlert, from the American Association for the Advancement of Science.

The researchers found that intra-renal injection of CXCL12 may prove to be an effective treatment for kidney fibrosis in cats with CKD. Additional mechanistic and clinical evaluations are needed. ■

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## How to Remove a Tick

*These creepy-crawlies spread disease and suck blood*

**I**f your cat goes outside this time of year, he may bring home an unwelcome guest—a tick. These arachnid parasites need a bloodmeal to move through the stages of their lifecycle and reproduce. As well as creating a bug bite, they can spread diseases such as Lyme disease, cytauxzoonosis, tularemia, hemobartonellosis, babesiosis, and ehrlichiosis, some of which can be fatal. Any tick on your cat needs to go.

An unattached tick is easy to remove. Just grab it with tweezers as it walks across your cat's skin or fur. But once a tick bites your cat's skin, it will latch on tightly. Thankfully, there are several methods to dislodge an attached tick.

Leni K. Kaplan, DVM, MS, senior lecturer in the Cornell Small Animal Community Practice, says, “My preferred ways of removing ticks include using the Ticked Off spoon tick removal device, tweezers, or removing the tick with your fingers. I do not recommend commercial flea/tick shampoos or dips, as they may contain chemicals that are irritating to the skin or harmful to cats.”

A variety of tick-removal tools are available, including the Ticked Off spoon, Tick Key, Tick Twister, Tick Tornado, and Tick Stick. All are small enough to keep on your key fob or in a purse or pocket.

Tick removers all incorporate a notch that allows you to get a good grip on the tick as close to the skin as possible and eliminate the factor of how much pressure to apply. Simply wiggle the tool around the tick's head until it is tightly wedged in the notch. Most products instruct you to pull straight when removing the tick, but the Tick Twister recommends a twisting motion as you pull back.

If your cat goes outside frequently, he should be kept on a regular preventive medication for optimal protection. Dr. Kaplan says, “If a cat has many ticks, I would advise removing as many as possible manually while also applying a veterinarian-approved topical product (Bravecto for cats, Frontline for Cats, Revolution Plus) which will kill the ticks within 24 to 48 hours.” ■



If you spot a tick, grab the tweezers. It won't jump or fly; ticks can only crawl.

### Remove a Tick With Tweezers

- ▶ Part the hair around the tick to get access.
- ▶ Grasp the tick as close to the skin as possible, gripping it firmly but not squeezing so hard as to rupture the tick or break its mouthparts off.
- ▶ Pull back steadily until the tick releases.
- ▶ Dispose of the tick. Place it in a sealed bag or wrap it in a piece of tape and throw it away, or flush it down the toilet.
- ▶ Wash your hands, even if you had access to vinyl gloves.



## New Feline Surgical Training Model

*Students can learn procedures on a synthetic cat*

SynDaver, the company known for synthetic human and animal simulators for education, medical testing, and training, has a new synthetic feline surgical training model, which has been designed for use in veterinary colleges. The feline surgical model allows veterinary students to learn how to perform a spay on a synthetic cat as opposed to a live patient.

SynDaver's synthetic surgical trainers are superior training devices to cadavers because they mimic living tissue. The SynDaver synthetic tissue is not silicone or plastic, so it maintains the fidelity and life-like properties of live tissue.

The first SynDaver Feline, called CopyCat, was primarily used to teach anatomy at large schools and universities worldwide, including Cornell University.

Galina Hayes, BVSc, PhD, MRCVS, DACVS, DACVECC associate professor of small animal surgery at Cornell University's College of Veterinary Medicine, anticipates the surgical model will have a significant impact on students and the surgical community as a whole.

"Our students have had the privilege to train on the canine surgical models previously, and we couldn't be happier. However, the newest feline surgical model gives them the opportunity to perform the feline spay, which is a benchmark in their surgical skills acquisition. The simulator allows them to practice in a highly realistic model where they can repeat as often as necessary, get comfortable with the tools required and have no fear of failure or harm to a patient. . . . This is a huge leap forward for us in achieving high quality learning and retention of surgical skills." ■



*Students can practice their surgical skills without using a live animal.*

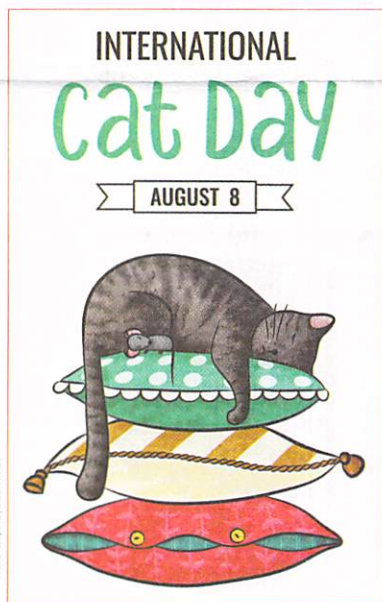
## International Cat Day This Month

*Plan something special for kitty on August 8*

International Cat Day, or World Cat Day, was started in 2002 by the International Fund for Animal Welfare. They set aside August 8 as the day to raise awareness of cats and how to care for and protect them.

August is also host to other important days for our feline friends:

- ▶ August 17 National Black Cat Appreciation Day
- ▶ August 22 National Take Your Cat to the Vet Day
- ▶ August 28 Rainbow Bridge Remembrance Day



Interestingly, the origin of the concept of the Rainbow Bridge is believed to be a poem, although the author is unknown. The poem described a beautiful lush meadow with plentiful food and water, just outside of heaven, where pets were returned to good health and could play while they waited for their owner to arrive. On that day, it is said, the pet stops playing and races to where their owner awaits, reunited forever, crossing the Rainbow Bridge to heaven together. An addendum to that story is that those who have rescued pets during their lives are allowed to take an unattached pet who has no one to wait for with them and their own pets into heaven. ■



## CatWatch

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For information on your cat's health, visit the Cornell University College of Veterinary Medicine, Cornell Feline Health Center website at [www.vet.cornell.edu/fhc/](http://www.vet.cornell.edu/fhc/).

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# 5 Things About Hypertension

*High blood pressure can silently destroy the body*

**H**ypertension (high blood pressure) is as much a “silent killer” of cats as it is of people, so it pays to understand a little about this disease.

**1 Hypertension is systemic.** It impacts the heart, kidneys, brain, and eyes. Your cat may have trouble breathing, appear weak, or drag her rear legs. These may be signs of cardiac effects. From the renal standpoint, you may notice the litterbox is unusually wet. Her appetite might be off, and she may vomit. Seizures, disorientation, or unusual vocalization may reflect brain influence. The retina in the eye is sensitive to hypertension. Your cat may go blind without any warning.

**2 Senior cats need regular screening.** Senior cats (those 10 years of age and older) should have twice-annual physicals that include hypertension screening. Blood pressure is checked with an inflatable cuff placed around a leg. As the cuff deflates, pressure readings are provided by machines that detect when the blood flow that is initially blocked by the higher pressures of the inflated cuff becomes unblocked (the cuff pressure at which this occurs is considered the systolic blood pressure). Currently, the at-home versions to check your cat's blood pressure are not considered accurate or reliable.

It's not easy to get a cat settled for a blood pressure reading, but sometimes it helps to keep her in her carrier and remove the top half or open it up, so the veterinarian can have access.

Your veterinarian also will look for changes in the kidneys, brain, eyes, and heart. A screening blood chemistry panel will pick up renal effects. An ophthalmic exam may detect early changes related to hypertension. Cardiac effects may be suggested on auscultation and verified by echocardiography.

**3 The kidney connection.** Close to 80% of cats with hypertension show some signs of kidney disease, and 60% of cats with renal failure have high blood pressure. About a third of cats develop kidney disease, and the cause is often idiopathic (unknown). The kidneys filter toxins and wastes out of the blood

and recover important nutrients and electrolytes. The first signs of kidney disease are often increased thirst and urination, weight loss, a lack of appetite, and lethargy. Some owners notice bad breath or drooling. Cats who aren't feeling well may not groom themselves, so your cat may develop mats and lose that sleek coat. As waste products accumulate in the bloodstream, your cat may suffer from nausea and vomiting.

**4 Hyperthyroidism is a possible cause.** The connection between hypertension and hyperthyroidism—the overproduction of thyroid hormones—isn't as clear as it is with kidney disease.

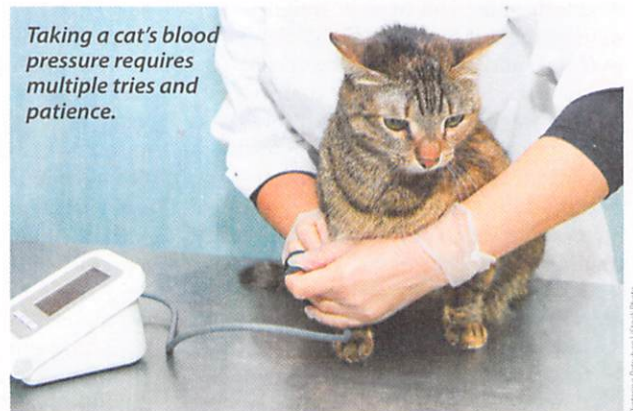
“The latest research shows that only about 10 to 25% of hyperthyroid cats have systemic hypertension, compared to older reports of 85% and up, but even that may be inflated by stress, because very few of the hypertensive hyperthyroid cats show evidence of target organ damage like retinal changes,” says Meredith Miller DVM DACVIM senior lecturer and section chief of Small Animal Medicine at Cornell University's College of Veterinary Medicine. “For cats with both problems, hyperthyroidism usually comes first

and leads to the cardiomyopathy (heart disease) and hypertension, especially with longstanding or poorly controlled disease,” she says.

Common signs of hyperthyroidism include weight loss, increased appetite, unkempt coat, increased drinking and urination, hyperactivity and/or increased aggression, vomiting, and changes in the cat's voice.

**5 Treat the cause, if known.** In addition to hyperthyroidism and kidney disease, obesity, and hyperaldosteronism, an adrenal disorder, can contribute to high blood pressure.

With treatment, feline hypertension is frequently controllable and may be reversible if the underlying disease is successfully treated. However, 10 to 20% of cats have no obvious cause. It's important to distinguish these cats from cats in which inaccurately high blood pressure readings are obtained due to stress. Most veterinarians will take two to three readings to see if calming down in the setting changes a reading. ■



*Taking a cat's blood pressure requires multiple tries and patience.*

## Medications for Hypertension

For the hypertension itself, many veterinarians prescribe calcium channel blockers such as amlodipine (Norvasc), and angiotensin-converting enzymes, commonly called “ACE” inhibitors, such as benazepril (Lotensin). Both drugs relax and dilate the blood vessels. For some cats, combining benazepril with amlodipine works well.

Amlodipine is a first-choice medication, with the best track record for use in cats. It works directly on smooth muscle in the vasculature and may drop readings as much as 30 to 60 millimeters of mercury (mmHg). The goal is to have a blood pressure reading of 160 mmHg or less to minimize organ damage. Amlodipine can be given both orally and transdermally (through the skin). Be aware that it may take time to get the ideal dose calibrated for your cat.

Telmisartan (Semintra) is the only FDA-approved treatment for hypertension in cats. This oral drug is an angiotensin receptor blocker that works on the renin-angiotensin-aldosterone system, which regulates blood volume.

# End the Wave of Fat Cats

*Obesity is a disease with long-reaching consequences*

**M**aintaining a healthy body weight is a critical aspect of overall health, yet obesity continues to grow among cats, dogs, and even people. Obesity is a disease often accompanied by multiple comorbidities. This is unfortunate. Excess body weight is deleterious to feline health and longevity, and prevention is relatively simple.

For an obesity assessment, veterinarians use a 9-point scoring system called the Body Condition Score, where 1 is emaciated and 9 is fatter than you can imagine. A score of 4 to 5 is healthy. Every point above 5 equates to about 10% overweight. It's pretty simple to find a body condition score chart on the internet, but the Cornell Feline Health Center also has a free app called "Purrfect Weight" for iPhone/iPads that can help, available at Apple's App Store.

## What Causes It

No matter how you twist it, weight management is a matter of calories in (food) and calories out (exercise). Achieving a healthy balance maintains a healthy weight and body condition. (And don't try to blame it on a low thyroid condition, as hypothyroidism is rare in cats.) But cats do have predisposing factors that increase their risk for obesity, including:

- ▶ **Indoor living**, as indoor cats tend to have a less-active lifestyle than cats who go outdoors
- ▶ **Spaying and neutering**, but this is not a call to stop spays and neuters
- ▶ **Free feeding dry food**, which makes it impossible to manage intake

## What You Should Do

- ▶ Weigh your cat periodically and compare his physique to a body condition sheet or our app
- ▶ If you note excess weight, use our formula to ensure a 1 to 2% weight loss per week
- ▶ Increase the cat's activity (play with him more!)
- ▶ Make a veterinary visit to enlist your veterinarian's help and expertise



*A cat that lays around all day may not be a "contented cat." It may be too hard to move easily due to excess weight.*

▶ **Genetics**, although this should never be used as an excuse

## Why It Matters

Obesity is far worse than lugging around a few extra pounds. Fat cells, called adipocytes, are active molecules that produce biological compounds with potentially harmful effects, especially when present in the abnormally high amounts associated with obesity. Some of these compounds, called cytokines, lead to chronic inflammation. Others interfere with normal insulin function, resulting in a predisposition to diabetes.

Areas compressed by fat have a decreased blood flow. Excess fat interferes with lung expansion, resulting in lower circulating oxygen and higher carbon dioxide levels. When cells suffer oxidative stress, all kinds of pro-inflammatory mediators are released. These mediators combine with the cytokines described above to create chronic, widespread inflammation in the body.

And obesity costs you money. You're buying excess food, and you're setting your cat up for long-term diseases that can negatively impact quality of life and lifespan and be expensive to treat.

## Those Comorbidities

Diabetes in cats is similar to type 2 diabetes in humans, in that there is resistance to insulin at a cellular level and decreased insulin production. This disease can be promoted by the metabolic derangements caused by substances secreted by those excess adipocytes we

mentioned earlier. Managing a diabetic cat requires a big commitment: usually twice-daily insulin injections, special diets, and careful monitoring of food intake and activity levels. All of this, and the cost associated with it, can be avoided by addressing and/or preventing obesity.

Constipation is an uncomfortable condition that can become so severe that a cat cannot defecate at all, and simple enemas may not be enough to move the bowels. This is when constipation becomes life-threatening obstipation. Obstipated cats typically end up under general anesthesia for large-volume enemas and manual extraction of feces.

Feline lower urinary tract disease (FLUTD) and bladder stones are common obesity comorbidities. The reason isn't clear, but obese cats arrive at the veterinary office with urinary tract issues far more often than lean cats. This comorbidity is so common that there are prescription diets for it.

Osteoarthritis is partially due to the excess stress on the joints and cartilage that the extra weight causes, but those pro-inflammatory compounds the adipocytes release are guilty too. Obese cats are particularly prone to elbow issues including arthritis, tendonopathies, and hyperextension injury. Arthritis in the hips and knees is common.

Skin problems may occur because fat cats cannot reach certain places and are not comfortable holding the posture necessary to groom for long. Seborrhea oleosa-sicca, a dandruff characterized by both greasy and dry flakes, is common and can lead to bacterial skin infections. Treatment involves medicated baths.

Painful, ulcerative moist dermatitis around the vulva in obese female cats can also occur. The excess fat creates deep skin folds that trap moisture and bacteria, and infection can set in quickly. If you have an obese female cat, you need to provide hygienic cleansing until she can reach back there to clean herself again.

Hepatic lipidosis, or fatty liver syndrome, can be fatal. If your obese cat ever suffers an illness that results in anorexia for more than a day or two, rapid metabolism of the excess fat can quickly overwhelm the liver and cause it to fail. These cats present with jaundice (yellow discoloration of the eyes, gums, and skin) and require intensive care. In addition to diagnosing and treating the inciting illness, these cats often require indwelling feeding tubes to stop the negative calorie balance resulting in fat

mobilization. It's a big deal, and again, avoidable in many cases by maintaining a healthy body weight.

Hypertension is common in obese cats (see "5 Things" on p. 3). Untreated hypertension can cause acute blindness and other problems, including heart, brain, and kidney diseases. If your cat is obese, ask for a blood pressure check.

Anesthetic risk increases exponentially with those extra pounds. While the risks of anesthesia can be mitigated, it is never without risk. As discussed, obese cats often suffer at least some degree of cardiovascular and respiratory compromise. Additionally, their excess fat makes accurate drug dosing a challenge.

Shortened lifespan has been documented in obese cats. We all want our cats to live happily and healthily for as long as possible, so let's get into the formula for weight loss.

### The Formula

First, because losing weight too quickly is dangerous (remember hepatic lipidosis), you should involve your veterinarian, who will take a thorough history—including diet type and amount, lifestyle, and snacks/treats—and a physical exam with any indicated medical workup.

The goal is to lose no more than 1% to 2% of their bodyweight per week, so for some cats it could take about a year to get them down to a healthy weight.

With a calculator in hand, it's easiest to determine the recommended 1% to 2% reduction. First, convert your cat's weight in pounds to ounces. Multiply your cat's weight in pounds by 16 (there are 16 ounces in a pound). Note: If you have a scale at home, it's easy to weigh your cat. Weigh yourself while holding the cat, then weigh yourself alone. Subtract your individual weight from the total.

So, if your cat weighs 15 pounds, multiply 15 by 16 and you get 240 ounces. Multiply the 240 by 0.01-.02 (which is 1% to 2%), and you get 2.4 to 4.8 ounces. A healthy weight loss for this cat would be about a quarter of a pound (4 oz.) per week.

Monitor your cat and recalculate this at least once every one to two weeks as your cat continues to lose weight. If he has lost more than 2% of his body weight, increase his calorie allowance a tiny bit. If he's lost nothing, decrease it a tiny bit. Always work closely with your veterinarian in devising and monitoring a weight-loss plan for your cat.

### Calories In

A prescription diet formulated for healthy weight loss is a good choice. These diets are typically "nutrient dense," meaning they pack more essential protein, vitamins, and minerals into each morsel, so that your cat doesn't suffer nutrient deficiencies while losing weight. Feeding less of a maintenance diet will result in weight loss, but it potentially deprives your cat of appropriate amounts of essential nutrients.

If the cost of the prescription diets is a concern, remember you will be feeding less, which will offset some of the cost. Otherwise, consider a high-quality over-the-counter weight-loss cat food from your pet-supply store.

Many veterinarians prefer a high-protein, low-carb approach to weight loss, as opposed to the original high-fiber, low-fat approach. This diet may be more in line with the cat's natural diet (mice, birds). Cats are carnivores, adapted to utilizing mostly protein and fat as their energy sources, and providing enough protein ensures that cats will not lose the healthy lean muscle mass they need.

Feeding canned food instead of dry food more frequently results in successful weight loss. The higher water content in canned food means your cat can eat a larger amount per meal, so she feels fuller and more content after eating. This method often segues into less begging between meals and helps both you and your cat to stick with the program. If you're thinking about adding water to



*Sure, it can be a pain when your cat helps you dust, but isn't that what owning a cat is all about? Getting weight under control will bring that playfulness back.*

## Skinny and Not-So-Skinny Housemates

A multi-cat household can be challenging. You will never get one cat to lose weight if food is left out all the time for the others. You will need to have scheduled, separate meals for all resident cats. An alternative is purchasing a commercially available radio-tagged feeder, where each cat wears a tag that only opens his individual bowl when he approaches the feeder. It's pretty high tech and expensive, but it can be effective. Or, you can get creative and invent something like a "Slender Cats Only" food house. This would be a box with a narrow slit cut in it, such that only slender cats can enter.

your cat's dry food, think again. You would likely have to add four to five cups of water to each cup of dry food to reach the moisture percentage in canned food.

### Calories Out

There are lots of ways to encourage exercise in cats, beyond the classic laser-pointer play we've all engaged in. Some other ways might be a little sneaky (but effective), like moving the food bowl to different locations in the house every day so he needs to go look around for it.

You can divide his meals up into little brown bags you hide around the house. This not only gets your cat moving around, it's also a great way to satisfy your indoor cat's natural hunting instincts. He has to find the food source and rip into the bag to eat.

Commercial puzzle feeders for cats help by making your cat work a bit to get the food. If you're feeding dry food, toss some of the kibble on the stairs. A bird feeder outside a window can get your cat moving and grooving.

If you feel you can safely get your cat some outdoor excursions (see "Teach Your Cat to Walk on a Leash" on p. 6), you can increase activity and your cat's enjoyment. For more ideas, look at The Ohio State's Indoor Pet Initiative website ([indoorpet.osu.edu](http://indoorpet.osu.edu)).

The bottom line is, obesity is a devastating disease that is preventable. While treatment can be challenging, with loving care and commitment from you, and help from your veterinarian, getting your cat to a healthy weight is an achievable goal. ■

# Teach Your Cat to Walk On a Leash

*Leash walks provide safe outdoor exercise*

**M**any of our feline friends are fascinated with the great outdoors, but letting cats roam freely comes with a myriad of problems and risks. Outdoor cats are at a higher risk of getting injured in fights or attacks from other animals, more likely to get hit by a car, at higher risk for contracting diseases such as feline leukemia and rabies, more likely to produce unplanned litters, a threat to native birds and small mammal species, and more likely to be targeted by angry neighbors for soiling lawns or scratching outdoor furniture.

Thankfully, it is possible to give your kitty outdoor time while keeping her and wildlife safe. One solution is to build a “catio,” a fully enclosed outdoor space where she can enjoy the breeze and lounge in the sun. The other is to teach her to walk on a leash so she can go for strolls with you.

“It is easy to train your cat to walk on a leash,” says Leni K. Kaplan, DVM, MS, senior lecturer in Cornell’s Community Practice Service. “The trick is to be patient, go slow, and use a lot of positive reinforcement (yummy treats, fun toys).”

## Getting Started

Start by choosing a harness that you like and that fits your cat well. Dr. Kaplan says, “Select a harness that is properly fitted to the cat and not loose (you do not want the cat to slip out of it on a walk). Put the harness on and take it off immediately, then give the cat a treat. Do this over time and leave the harness on



*You cat will enjoy a daily walk to change his environment, breathe fresh air, and check out what's happening.*

for longer and longer periods until the cat seems comfortable. The cat should be so comfortable in the harness that it is willing to sleep, eat, and wear the harness in the house when not on walks.”

The next step is to introduce the leash and the concept of not being able to go wherever the cat wants. “Attach the leash and let them drag it around the house so they get used to the weight of the leash,” says Dr. Kaplan. “Feed them treats or give them a favorite toy while they are getting used to being tethered. Practice walking with them in the house and make sure they are comfortable with it.”

Some cats may be uncertain about you walking close by at first. Use treats or a toy to get your cat to follow you,

or you can follow your cat and let her choose where you go. Practice for a few minutes at a time, gradually increasing the sessions as she becomes more relaxed and gets used to the routine.

## Moving Outdoors

“When you first go outdoors, do so for shorter periods of time until they are comfortable being outdoors and wearing a harness while leashed,” says Dr. Kaplan. If your cat has been outside before, she will acclimate more quickly, but being out while on a leash and harness may make her feel vulnerable at first because she is restricted in where she can go. She will quickly figure out that many of the predators and threats that loom large for a cat on her own stay away from a cat accompanied by her human.

For cats that have always been indoor cats, the great outdoors can be overwhelming at first. Hold on tightly to her leash but expect that she may just hunker down next to the porch or your leg for the first few outings. Keep these “walks” short and be patient. In the meantime, you can keep working on leash walking indoors where she is comfortable.

When your cat starts to relax while outside, let her choose where you walk together, trying to keep pressure off the leash. Do this for several outings until your cat is enjoying her walks. Some cats can be trained to follow you even outside, while others may be more independent and prefer to choose their own adventure. ■

## Veterinary Office Visits

“My preference for the cat’s safety is to use a carrier,” says Dr. Kaplan. “This way, they cannot escape and other animals cannot access the cat and possibly cause injury.” If your cat becomes frightened in the lobby or parking lot, she could also potentially scratch or bite you or a staff member.

Dr. Kaplan says, “If a cat is absolutely terrified of the carrier or becomes super anxious in a carrier, then the less stressful solution is the leash. My biggest recommendation is to train the cat to the carrier, so it likes being in the carrier as well as eating and sleeping in the carrier . . . slowly work with the kitty to get comfortable in the carrier—do it on the cat’s timeline.”

## Why A Harness?

Harnesses are the best choice for leash walking a cat for several reasons. First, many cat collars are breakaway, meaning that even mild pressure will cause them to unbuckle and release your cat. Second, cats are flexible and can often wriggle out of a collar unless it is extremely tight. Cats can wiggle out of harnesses too, but the extra straps provide added security. Third, cats have more delicate throats than dogs,



so pulling on your cat’s neck with a leash could result in injury or irritation to her trachea. Just be sure the harness you choose does not interfere with your cat’s shoulder movement (see October 2020 issue for more on choosing harnesses).

# Reality and Rabies in Strays

## Cats are No.1 in domestic rabies cases

**R**abies is almost universally fatal once symptoms are observed, but it can be difficult to detect. In 2017 in New Jersey, there was a case in which a rabid kitten that was taken to visit a school, a hospital, and a Thanksgiving party before it was evident that it was ill. More than a dozen people were required to have the prophylactic series of rabies vaccinations.

Cats are the most commonly infected domestic animal. In 2018, 20 cats tested positive for rabies in New York state. In 2019, there were 24. Both years had only one positive dog. During 2019, 241 rabid cats were reported nationwide.

Why are cat cases so high? Outdoor cats are more likely to roam unescorted and contact wildlife than dogs. And, sadly, people often neglect rabies vaccinations for their cats, as not all states require rabies vaccination for cats. People believe that indoor cats and barn cats are safe. Not so. Barn cats interact with wildlife all the time, and indoor cats do manage to slip out at times. Plus, infected bats can get into houses.

For stray and feral cats that get picked up, rabies is a concern. Most municipalities have holds for any strays that come into their animal control or local humane societies. While the goal is to allow enough time to reunite cats with their owners, it also avoids adopting out rabid animals.

Elizabeth Berliner, DVM, DABVP, Swanson Endowed Director of Maddie's Shelter Medicine Program and associate clinical professor at Cornell University's College of Veterinary Medicine, says there are fallacies with that thinking: "Mandatory holds for healthy stray cats have nothing to do with mitigating rabies risks, given the long incubation period for rabies in cats (on average, two months, or longer). Preventive health



*Well, of course, you want to rescue them, but you must take proper precautions.*

programs such as trap-neuter-return (TNR) and return-to-field (RTF) get rabies vaccines into cats, which is an essential part of reducing risk to humans and providing better welfare for cats."

More importantly, people need to be aware of signs of rabies in strays. Most cats will die within 10 days of the first signs of rabies, but those signs can vary dramatically and need to be distinguished from other neurological problems.

"Every shelter veterinarian who has been practicing for a while has likely encountered a rabid cat or kitten at some point in their career . . . The overarching lesson is how important it is that shelter intake protocols, which include the recognition of risk factors for rabies and enact isolation and handling protocols, protect staff. Personnel handling stray animals should be given pre-exposure rabies vaccinations to mitigate risk," says Dr. Berliner.

Rabies infections tend to have three stages in cats:

**1. Prodromal.** During this stage, the main sign is a change in behavior. Quiet cats may become aggressive and cats that

aren't normally friendly may become mellow. This can be hard to judge in a newly captured stray. Any bite from an infected cat can transmit rabies. The CDC warns that bites and saliva may contain infective virus even before clinical signs are noticed.

**2. Excitation.** This furious rabies stage is the classic rabid-animal picture. These cats tend to be aggressive. Swallowing is affected, so they will commonly drool excessively and literally foam at the mouth. Alternatively, a cat may show the dumb form at this stage, with quiet behavior and paralysis of the throat and mouth muscles. This is not common.

**3. Paralytic.** After a few days, the infected cats move on to this final stage where swallowing becomes impossible and paralysis sets in.

Throughout all three stages, widely dilated pupils are often noted. It's important to realize that most stray cats and kittens have parasites, both internal and external, and possibly upper respiratory infections. The odds of a cat being rabid are not high, but any cat showing neurologic signs must be considered a rabies suspect. All strays should be isolated from other pets using solid barriers such as doors, not baby gates. A vaccinated adult should be assigned to care for them during a minimum 14-day quarantine and still follow good hygiene.

If someone is bitten, follow your state guidelines for bites by animals of unknown vaccination history. Unfortunately, that might mean euthanasia. While that may seem extreme, rabies is fatal once symptoms develop. ■

## You Should Know

### Signs of Rabies

- ▶ Change in behavior, inappetence, hyperactivity, bad temper, hiding
- ▶ Dilated pupils, anxiety
- ▶ Sudden, unprovoked attacks
- ▶ Abnormal gait, loss of coordination
- ▶ Excessive drooling, foaming at the mouth, worsened by difficulty swallowing
- ▶ Progressive paralysis

## Rabies In Wildlife

Rabies is endemic in North America. Rabid animals are found in cities as well as rural areas. The most common species are skunks, bats, raccoons, and foxes. Except for bats, these animals usually show signs of illness, in particular unusual behavior and abnormal movement. Wildlife that appear during unusual times for their species, such as bats out in daylight, or that move with an abnormal gait or approach humans should be treated as rabies suspects. If a wild animal attacks you or your pets, you should try to confine the animal and contact animal control. Unfortunately, but understandably, the animal usually will be killed and then examined for rabies.

# Cerebellar Hypoplasia Tremors

*Damage occurs in utero when queen is infected*

**Q** I would appreciate your thoughts on our female 12-year old tuxedo kitty, who has had a neurological problem since kittenhood.

It's not severe like getting heavy-duty seizures or epilepsy, but she's always had mild head tremors every now and then. Recently, she tends to tilt her head to the left when she's eating or circles to her left when approaching her food bowl.

Can you provide us with any information that would shed some light on what is causing this strange behavior? Our veterinarian says that she otherwise checks out as being completely healthy.

**A** Thanks for getting in touch, and I completely understand your concern regarding your kitty's tremors. The first point to make is that it is important that you work with your veterinarian, and perhaps a veterinary neurologist, to assure appropriate diagnostic and therapeutic (if required) care for her.

Tremors are characterized by rhythmic, involuntary muscle movement that causes shakiness in a part of the body. They may affect only one part of the body, such as the head or the limbs, or may be generalized, and they disappear when the patient is sleeping. Shakiness that does not stop when a patient is sleeping are not characterized as true tremors.

Tremors that worsen when a cat is



*Cats with cerebellar hypoplasia usually get along just fine, but it's wise to keep them out of places where they might fall.*

trying to perform a specific task (i.e., eating, reaching out for something) or another purposeful movement are called intention tremors, and these are most commonly associated with disease in a part of the brain called the cerebellum. The cerebellum functions to coordinate the timing and force of contraction of muscle groups to facilitate fluid movement of the limbs and body.

The most common cause of the types of tremors that you seem to be describing is a condition called cerebellar hypoplasia (CH). This is caused by abnormal in utero development of the cerebellum in cats when the queen is infected with feline panleukopenia virus during pregnancy. During such an infection, all kittens in a litter may be affected with CH, or just some of the kittens in a litter.

There are other potential causes of CH in kittens, including extreme starvation of the queen during pregnancy, trauma to the brain of a neonatal kitten, toxoplasmosis, and some other inflammatory diseases, but panleukopenia infection is by far the most common cause.

While observing these tremors can be disconcerting to owners, in many, if not most, cases, affected cats are

otherwise healthy and can live long, fruitful lives, and they do not require any specific therapy. They are not generally infectious for other cats, are not believed to experience any pain as a result of CH, and in many cases, they adapt very well to their unique way of getting around and doing things.

Owners of cats with CH may have to modify their environments to prevent falls or things falling on them, and in some cases, providing elevated food and water bowls can make things easier for these cats, but otherwise they can be quite healthy and happy.

Please be sure to consult with your veterinarian if you have any additional concerns, if the symptoms worsen/change, or if you have any further questions, but I am happy to say that cats with CH can be very unique, special, and fun feline friends for those that are lucky enough to love them! ■

## Feline Panleukopenia

Due to a modern effective vaccine, feline panleukopenia is no longer a leading cause of death in cats. Also called "feline distemper" or "feline parvo," it is not the same virus that causes canine distemper and parvo.

Feline panleukopenia is highly contagious and spreads through the cat's urine, feces, and nasal secretions. Cats can become infected by old secretions left behind by an ill feline. The virus can survive for long periods in the environment as it is difficult to kill. Once inside its victim, the virus infects developing cells, such as in bone marrow, the intestines, and developing fetuses.

Signs of an infection include inappetence, lethargy, nasal discharge, vomiting, and diarrhea. Young kittens rarely survive and may suffer brain and eye damage. No medications are effective against the virus. The only treatment is supportive care.

for rodent control. The vaccinated and neutered cats are unadoptable, usually because they are too feral. The released cats must be provided shelter and food, which also ensures the rat fighters will hang around. ■



This column is written by Bruce Kornreich, DVM, PhD, DACVIM, Director of the Cornell Feline Health Center and Editor-in-Chief of *CatWatch*. You can write to Dr. Kornreich at [catwatcheditor@cornell.edu](mailto:catwatcheditor@cornell.edu) or

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

### Coming Up ...

- ▶ *5 Things to Know About Diet Changes*
- ▶ *Understanding Soft-Tissue Trauma*
- ▶ *Feline Upper Respiratory Disease*
- ▶ *Are Those Signs of Aging or Illness?*

### © HAPPENING NOW...

**Working Cats**—The Treehouse Humane Society in Chicago released 1,000 cats to fight the city's growing rat problem as part of its "Cats at Work Program," which offers environmentally friendly solutions