

Cat Watch

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

THIS JUST IN

Periodontal Disease

Recent study identifies potential treatment targets

In a recent study funded by the Cornell Feline Health Center, Cornell researchers explored the subgingival (under the gum) microbiome associated with periodontal disease. The researchers used shotgun metagenomics—a technique that allows the detection of smaller microbial communities—to investigate bacteria associated with both periodontal health and spontaneous periodontal disease in cats. It is believed they are the first to use this method. The study compared periodontally healthy cats and cats with naturally occurring chronic periodontitis, aggressive periodontitis, and feline chronic gingivostomatitis.

The researchers identified a higher abundance of the ATP synthase gene in diseased cats and a higher abundance of the nitrate reductase gene in healthy cats, a finding similar to that in human studies. Although more study is needed, these results provide preliminary functional insights of the microbial communities associated with periodontitis in domestic cats and suggest that ATP-synthase and nitrate-nitrite-NO pathways may represent potential targets for treatment. ■

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It's Allergy Season

5 things to know about itching, sneezing felines

1 Environmental allergies are more common than food allergies.

True food allergies are relatively rare in cats, but inhaled environmental allergens such as pollen, dust, cleaning products, and perfumes commonly trigger allergic reactions in cats. All these things can trigger an allergic reaction in susceptible cats. Common symptoms of inhaled allergies in cats include itchiness, hair loss, coughing, and sneezing. Depending on what your cat is allergic to, she may experience symptoms year-round or just when her allergens are present in the environment (for example, during pollen season).



Even indoor cats can be affected by outdoor allergens that blow in through open windows.

2 Your sneezy cat could have allergic bronchitis. Allergic bronchitis is inflammation of the bronchi (airways leading to the lungs) caused by an allergic reaction. In this condition, whenever your cat inhales something that she is allergic to, the offending particles contact the cells lining her airways and trigger an allergic response. This will manifest as coughing and even difficulty breathing. If your cat is struggling to breathe, she should be examined by a veterinarian immediately.

3 Don't forget to treat for fleas! Flea allergy dermatitis (FAD) is the most common cause of allergies in cats. Cats suffering from FAD react to the flea saliva that contacts the skin when a flea bites. Even a single flea bite can trigger a dramatic itchy reaction, complete with red bumps and sores. The cat's haunches are often the itchiest, but any part of the body can be affected. Some cats lick and chew so vigorously that they create bald spots and open sores. This is one allergy that is easy to prevent: Simply keep your cat and all other pets in the household on year-round flea prevention.

4 Allergy testing can be done for cats. There are two ways to test for allergies in cats: skin testing and blood testing. Skin tests (intradermal allergy testing) are the gold standard for environmental allergies, but many owners opt for blood tests due to the convenience. Allergy testing can be expensive, but knowing what your cat is allergic to will allow you to avoid allergens where possible and to know when she will likely need treatment. Cats can also receive allergen specific immunotherapy, where a custom serum is given over several months to desensitize your cat to her problematic allergens. Immunotherapy is not effective for food allergies.

5 Proteins are the most common cause of food allergies. While you have likely heard claims of pets being allergic to corn and wheat, proteins such as chicken, beef, and egg are the more common culprits. Diagnosing a food allergy can be tricky, because many cats with food allergies have the same itchy-skin symptoms as cats with environmental allergies. The best way to determine whether your cat has a food allergy is to do food trials, where you feed a new diet that doesn't have the suspected ingredient for eight to 12 weeks. After that period, do a "challenge" by feeding a food that includes the suspect. If the cat's symptoms return, that ingredient was the problem. If they don't, testing for another ingredient may be useful. ■

The COVID-19 and Myocarditis Connection

Reports about the B117 variant from England raise questions

Recent reports from England suggest that there may be a connection between COVID-19 infections in dogs and cats and myocarditis (inflammation of the heart muscles). The cases revolve around the highly transmissible B117 variant that has become the dominant strain of SARS-CoV-2 in the United Kingdom.

We already know that dogs and cats can be infected with SARS-CoV-2, which is the virus that causes COVID-19. Some cases are asymptomatic, while some show signs of respiratory illness. Infected pets that become ill (i.e., develop COVID-19) may show signs including coughing, sneezing, and/or ocular nasal discharge. There is currently no evidence, though, that cats or dogs can transmit SARS-CoV-2 to people.

Between December and February, researchers at the Ralph Veterinary Referral Centre (RVRC) in Marlow, Buckinghamshire, noticed a surge in dogs and cats being admitted to the RVRC with myocarditis, nearly 10 times the normal rate.

The pets that were referred in had symptoms suggesting heart disease, ranging from lethargy, lack of appetite, rapid breathing, and shortness of breath to severe life-threatening arrhythmias (irregular heartbeat). Two of the cases experienced collapsing episodes. Further tests revealed they all had myocarditis. None of these pets showed the classic respiratory signs usually seen in patients with COVID-19.

Most of the affected animals improved dramatically with cage rest, oxygen therapy and diuretic therapy, although one cat died while hospitalized. Some pets needed medications to stabilize their heart rhythms.

In most of these cases of myocarditis, the owners of the pets had experienced COVID-19 symptoms or tested positive three to six weeks before their pet became ill. Many of the pets also tested positive for B117 variant of SARS-CoV-2. This stresses the importance of having someone else care for your pets if you become infected with SARS-CoV-2. If you have no one to help, wear a mask and practice strict hygiene.

The research paper reporting these recent cases of myocarditis in pets infected with the B117 variant of SARS-CoV-2 has not yet been peer reviewed for publication. The researchers stress that, at this point, it has not been clearly established that the virus directly caused the myocarditis, but studies in humans suggest that this may be the case. Follow up studies to investigate this possibility are ongoing. ■



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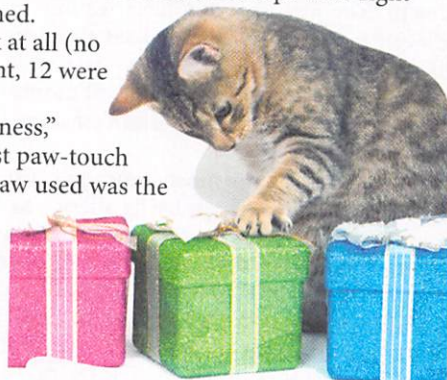
Testing for Paw Preference

It's pretty well split between left and right—and ambidextrous

Dr. Mikel Maria Delgado recently posted a fun blog at WhatYourCatWants.com about “pawedness” in cats. Researchers in Turkey studied 41 cats (ages 6 months to 14 years; 22 males and 19 females) that were given two tests to track paw preference and problem-solving skills. For each test, four plastic cups were attached to a wooden block. In the first test, the cups were upside down with wet food inside. The cat had to tip the cup over to get the reward. In the second test, the cups were right side up but had flip tops that had to be opened.

Out of the 41 cats, three refused to work at all (no surprise there!), 10 were right-paw dominant, 12 were left-paw, and 16 were ambidextrous.

The cats were consistent in their “pawedness,” using the same paw for both tasks. Their first paw-touch fit with their dominant side. So, if the first paw used was the left, that was consistent throughout. A few cats were also willing to try to open the flip tops using their mouths or heads. Cats with a strong paw preference were faster (no matter which paw they preferred) than cats who were ambidextrous. ■



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CatWatch

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CONTRIBUTING WRITERS

Eileen Fatcher, DVM
Katherine Basedow, LVT

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College of Veterinary Medicine
Feline Health Center

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Send questions and letters to the editor:

CatWatch*
535 Connecticut Ave.
Norwalk, CT 06854-1713
catwatcheditor@cornell.edu

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When You're Thinking Adoption

It's a lot more involved than choosing a pretty face

June is "Adopt a Cat" Month, a special month started by the American Humane Association in 1974 to bring attention to homeless cats. In June, many shelters and humane societies offer specials on cat adoption.

But before checking photos on internet sites or visiting a shelter—and falling in love with a furry face—consider whether you want to add another cat to your family permanently or you simply want to foster and help a cat in need.

Try to Foster

Most rescues, shelters, and humane societies desperately need foster homes. A foster home provides a temporary haven for cats that aren't immediately available for adoption or when there is no space to house another cat. Cats often put on the foster-home list can include those recovering from surgery, a mother with kittens who are too young to be separated, or a cat that simply can't handle the stress of a shelter.

Depending on the organization, fostering usually comes with financial support. For a litter of kittens, it may mean deworming medications and vaccinations are covered. For an injured cat, veterinary appointments and possibly rehab appointments would be covered. For most agencies, routine expenses like food and litter may be up to you.

When the kittens are old enough, the injured cat is well, or space opens up in the facility, the cat returns to the shelter to be adopted. Admittedly, some foster families end up "foster failures," which is a funny name for a foster parent who decides to provide the cat a permanent loving home. (We think it should be called "foster success"!)

Adoption Decisions

When adopting a shelter cat, be sure you ask the right questions:



Adopting a pet involves the entire household.

- ▶ Has the cat or kitten received routine veterinary care?
- ▶ Was she tested for FELV (feline leukemia virus) and FIV (feline immunodeficiency virus)?
- ▶ Are her vaccinations up to date?
- ▶ Has she been checked for internal and external parasites?

While many shelters provide these services, an animal-control office may not. If that is the case, schedule a veterinary visit to take place on your drive home, before you bring her into your home. Note: It is not unusual for a shelter cat to have a mild upper respiratory infection. If so, set up an isolation room at home to protect your other cats.

Which Cat?

Consider the sex of the cat you're considering. If you have a spayed female, a neutered male might be your best choice and vice versa.

Think about coat care. A shorthaired cat requires minimal grooming, like once a week, with a quick nail trim every other week. Longhaired cats need a thorough combing once or twice a week with daily checking for mats. You may also end up

doing daily sanitary grooming for urine, stool, or litter that gets on the long hair around the rectum and tail.

If you work full time, an adult cat may be best. While adult cats can be playful, they aren't as likely to have wild zoomies or climb drapes while you are away. Many cats live into their late teens or longer, so even a 10-year-old cat likely has plenty of great years to share with you. (Yes, we're making a pitch on behalf of adult shelter cats, as they have trouble competing with cute kittens at adoption sites.)

If you hope to add a kitten, think about the cat(s) already in your home. A cranky senior cat may find an energetic kitten annoying. On the other hand, some cats are more accepting of a kitten than another adult cat. Consider setting up a large dog crate to keep the kitten and your home safe while you work.

While cats have a reputation for being antisocial, two adult cats can be double the fun. Remember, though, that it is also double the expense.

It's a wonderful thing to rescue a deserving cat and make her part of your family. You just need to get all your ducks in a row, which may take a little planning.

To find out more about the wonders and responsibilities of cat adoption, check out the Cornell Feline Health Center's new informational brochure, "What to Expect When Adopting a Feline Friend" at tinyurl.com/Cornelladoptioncat. ■

You Should Know

Sometimes would-be adopters become frustrated with all the "red tape" they need to go through to adopt a kitty. But shelters need to be careful. Their goal is to find forever homes for the cats. The shelter may need to meet all household members to be sure the incoming feline will be welcomed by all. They may require a visit, including with pets, to help ensure everyone will get along.

You can expect to fill out an extensive questionnaire and/or do an interview. Some shelters will ask for periodic updates or if they can stop in to check on the cat. Most adoption groups require that you keep your new cat indoors (something we also recommend). The exception is for semiferal cats who get "working adoptions" as barn cats.

How Many Is Too Many?

Going from a dedicated cat lover with five cats to an overwhelmed owner with 20 cats is all too easy. While it can be hard to say no to a cat in need, think about your current pets. Adding another pet means taking at least some time and attention away from the animal(s) you already share your life with. If you're too stressed for time, it can take away some of the pleasure—grooming can become a chore or buying quality food and paying for veterinary care can strap your finances.

Progress in Feline Hyperthyroidism

This common cat ailment is being detected sooner

Hyperthyroidism occurs when a tumor on one or both of the thyroid glands in your cat's neck cause excessive production of thyroid hormone. About 98% of these tumors are benign, but all that extra thyroid hormone circulating throughout your cat's body can wreak havoc on her metabolism.

Common symptoms of hyperthyroidism include weight loss, increased appetite, unkempt coat, increased drinking and urination, hyperactivity and possibly increased aggression, vomiting, and changes in the cat's voice. You may also be able to feel the enlarged thyroid gland(s) on your cat's neck under her chin. Left untreated, hyperthyroidism can lead to hypertension, which can damage your cat's kidneys, retinas, heart, and brain.

Be Proactive

"Veterinarians are diagnosing hyperthyroidism earlier than ever," says Meredith Miller, DVM, DACVIM, Senior Lecturer in Small Animal Internal Medicine at Cornell University's College of Veterinary Medicine. With routine screening bloodwork and close attention to subtle symptoms that show up on annual exams, Dr. Miller says, "Diagnosing this disease earlier in the course can prevent some of the more common and challenging complications of hyperthyroidism, such as structural changes to the heart."

The onus is on you, however. You'll need to say yes to annual screening bloodwork. "Annual screening of thyroid hormone levels should be performed



Location of the thyroid glands.

in any cat over 8 years old or anytime clinical signs of increased appetite, weight loss, increased thirst, urination, and hyperactivity are detected by owners," says Dr. Miller. There are several tests and panels that evaluate thyroid hormones, but the most common starting point is a T4 (thyroxine, the thyroid hormone that plays a role in heart and muscle function, brain development, and digestion).

If your cat's bloodwork comes back normal, that isn't wasted money. Your veterinarian will keep track of your cat's values to watch for changes and trends that develop over time. For example, T4 levels tend to drop in older cats. So, a senior cat may have a T4 level at the high end of normal but still be symptomatic for hyperthyroidism. Previous T4 levels may show that the current T4 is a spike upward for your cat. The hyperthyroidism diagnosis can be confirmed with additional thyroid tests.

If your cat has been diagnosed with hyperthyroidism and is being treated with methimazole, she will need regular bloodwork to make sure that her current medication dosage is regulating her thyroid hormone levels adequately. While treating hyperthyroidism medically is often effective, it does not address the underlying cause. As the tumor(s) on the thyroid gland(s) continue to grow, your cat will likely need a higher dose of medication to control symptoms.

In addition to T4 levels, the American Association of Feline Practitioners recommends monitoring blood pressure during all routine veterinary visits for all hyperthyroid cats. This is because 15 to 20% of cats with hyperthyroidism develop high blood pressure, which can damage your cat's kidneys, brain, retinas, and heart. There are medications that can help to combat hypertension.

Transdermal Medication Options

Right now, the only FDA-approved medication for treating feline hyperthyroidism is Felimazole, coated methimazole tablets. But as many cat owners know, getting pills into a cat twice a day can be challenging! For these cats, transdermal gel formulations can be ordered from a compounding pharmacy. Dr. Miller says, "Despite it not being FDA approved, I do not hesitate to use transdermal methimazole, because we have an objective way to determine if and how well it is working by monitoring T4 concentrations. The

Tips for Feeding y/d Diet

If you have a hyperthyroid cat and have opted to treat her either solely or in part with the limited-iodine prescription diet Hills y/d, you already know that going off-diet is not allowed. Any treats or foods stolen from other pets can potentially contain enough iodine to increase your cat's iodine levels, leading to increased thyroid hormone production.

But what you might not have known is that foods aren't the only source of excess iodine. Well water can include levels of iodine that might be too much for your cat's restricted iodine diet, and bowls used for other foods or even shared with pets eating other foods can be a source of contamination.

Research on the Horizon

For all we know about hyperthyroidism, we still don't know what causes it. A study published in the *Journal of the Endocrine Society* in 2020 is one of the early steps in evaluating whether reproductive hormones may play a role. It was already known that the structure of luteinizing hormone (LH, a reproductive hormone) is similar to thyroid stimulating hormone (TSH), and that they are able to trigger receptors intended for the opposite hormone in research settings. This study looked at the levels of LH in both intact and neutered cats and found that neutered cats have increased LH concentrations. Future studies will be needed to evaluate whether this means anything for hyperthyroidism in cats. "This is challenging to comment on since most cats in the U.S. are neutered, but there is no known correlation between neuter status and hyperthyroidism. In my mind, the challenges of managing an intact male cat outweigh the potential risks of developing a readily treatable (and even curable) disease like hyperthyroidism," says Dr. Miller.

compounded formula is only as good as the compounding pharmacy but, overall, we know that the bioavailability is lower in transdermal methimazole (compared to oral) and takes longer to take effect.”

Dr. Miller has some tips for getting the best results from transdermal methimazole. “Owners should always wear gloves or finger cots to avoid absorption of the drug. It is important to alternate ears and remove any crusty material (with a damp cloth or moistened cotton ball) before administration.”

Should we expect an FDA-approved transdermal option for treating hyperthyroidism in the near future? Dr. Miller says there’s potential. A 2020 study published in *Schweizer Archiv für Tierheilkunde* looked at the safety and efficacy of a new dermal formulation: amphiphilic dendritic core-multishell-nanocarriers. While the name is somewhat intimidating, the outcome was positive: Thiamazole [methimazole] ointment based on nanocarriers is suitable for the treatment of feline hyperthyroidism. Perhaps this product will ultimately become FDA approved and routinely available.

Consider Radioactive Iodine Therapy

While not new, radioactive iodine therapy (RAIT) isn’t utilized as much as it could be for hyperthyroid cats. “I wish owners knew that radioactive iodine therapy is a definitive treatment, i.e., it is treating the underlying cause of hyperthyroidism in cats (thyroid adenoma/adenomatous hyperplasia) vs. managing the result of hyperthyroidism,” says Dr. Miller. “Treating with methimazole or an iodine restricted diet mitigates the hormone production and clinical signs of hyperthyroidism but does not treat the underlying cause. Thus, many cats become resistant to these therapies over time as their untreated thyroid tumors continue to grow. I think this is becoming more of a problem as our senior cats experience greater longevity with the exceptional care their owners can provide to them.”

Early detection of hyperthyroidism with regular screening bloodwork makes RAIT an even better treatment option. “I would encourage owners to talk to their veterinarians about radioiodine treatment soon after diagnosis,” says Dr. Miller. “The investment in RAIT earlier in the disease course can deter complications and long-term challenges (and cost required) in treating

hyperthyroidism later in its course. A cat that has been treated with methimazole for five years with a large thyroid tumor is more challenging to safely treat with radioiodine than the cat who was diagnosed in the last year with a smaller thyroid tumor.” The cure rate with a single treatment is between 95 and 98%.

How does it work? An injection of radioactive iodine is given under the skin, where it then travels to the thyroid glands. The tumor cells are destroyed, bringing the cat back to normal thyroid hormone production levels. Because your cat will be temporarily radioactive, she will need to stay at the veterinary facility for between three and seven days so that she doesn’t expose you or your family.

Once back at home, for the first several weeks you will need to take a little extra care when handling and caring for her to minimize radiation exposure,

What You Can Do

- ▶ Watch for symptoms: unexplained weight loss, increased appetite, increased drinking and urination, unkempt coat, lump under chin, behavioral changes, etc.
- ▶ Include thyroid levels (usually T4) in routine screening bloodwork for cats 8 years of age and older
- ▶ Discuss treatment options with your veterinarian

but after that everything can go back to normal. While it sounds like science fiction, this is a very safe and effective treatment option that the Veterinary College at Cornell University has been offering for over 25 years. ■

DIAGNOSTICS

Relative Supersaturation’s Role

How RSS values can help you prevent urinary crystals

If your cat has suffered from urinary crystals or bladder stones, you may have heard the term “RSS,” which stands for relative supersaturation. It refers to minerals in your cat’s urine, and it is one of the tools that can be used to assess your cat’s urine and predict crystal formation. In addition, this test is most often used by pet-food manufacturers when formulating food, especially prescription urinary diets, but it can help your veterinarian choose the best food for your cat.

To do a proper RSS, your cat may be assigned a specific diet, which means she cannot eat anything else for the specified period of time (at least two weeks). At the end of the trial, urine will be examined frequently over the course of a week or so to measure changes in RSS. These values will be considered:

- ▶ **Urinary specific gravity or concentration.** If urine is dilute, it can handle greater amounts of minerals without crystals or stones forming in most cases. This is why cats prone to urinary problems must be encouraged to drink more.
- ▶ **Amounts of some minerals your cat consumes on a daily basis.** These minerals include magnesium, ammonium, and phosphate for struvite problems and calcium oxalate for oxalate problems. Your cat may need a diet that limits the amounts of these minerals.
- ▶ **Urinary pH.** Minerals will settle out to varying degrees depending upon the pH (acidity or alkalinity) of the urine.

RSS values are calculated using various software programs after looking at these three variables. An RSS lower than 1 means low likelihood of crystal formation. For struvite, an RSS between 1 and 2.5 is acceptable. For oxalate, RSS values of 1 to 10 are good. Any RSS calculated above those limits means a higher risk of crystal formation and may prompt a diet change.

RSS values can be calculated both to prevent any crystal or stone formation and to try to dissolve already formed stones through dietary management. For stone dissolution, the ideal RSS is less than 1. ■



Illustration by [unreadable]

Has My Cat Been in a Fight?

Injuries may not be noticeable until days later

Cat fights are hard to miss, as they are usually loud with hissing, yowling, and crashing into things. But, unless you were present, cats can be secretive about any altercations they have.

They're also stoic and try not to reveal any sign of weakness or injury. A cat injured in a fight may hide a bit more and avoid activities that twinge his wounds. Blood will often be promptly groomed away. And cat bites themselves are sneaky—the sharp, narrow canine teeth of cats create small but deep puncture wounds that can be difficult to find under your cat's thick coat. Even if you suspect your cat might be hurt, you may not be able to find the wound(s) until several days later when swelling and infection make them more noticeable.

Usual Suspects

Any cat can get caught up in a spat, but some are more likely culprits than others. Intact tomcats are the feline world's top fighters, especially if they roam outdoors, fighting over territory and mates.

Any cat that goes outside is more likely to get in a fight than indoor cats because of the exposure to strange cats (one of the reasons we recommend that owners keep their cats indoors).

For indoor cats, fights can occur due to power struggles or redirected aggression. Your cats may get riled up by a strange cat they can see or smell through a window, but then turn on each other when they can't chase the intruder. Bullies may harass your other cats as they try to eat or drink or prevent them from moving freely throughout the house.

What You Can Do

- ▶ Consult with a veterinary behaviorist if your cat likes to bully or attack others in the house.
- ▶ Discourage stray cats from hanging around your house.
- ▶ Keep your cat indoors, supervised on a leash, or in a catio.
- ▶ Provide enough food bowls, water bowls, and litterboxes for the number of cats in your house.



Torn ears are a frequent result of a cat fight.

Noticing Injuries

Obvious signs that your cat has been in a fight include:

- ▶ Puncture wounds
- ▶ Bleeding
- ▶ Limping
- ▶ Missing hair, especially face or tail
- ▶ Shredded ear(s)

Cat fight wounds warrant a veterinary exam, but as long as your cat is conscious and behaving normally and you are able to stop any bleeding, it is probably not an emergency. A veterinary appointment should be made as soon as possible, though, and owners should inform their veterinarians that they are concerned about the possibility of bite wounds when scheduling a visit.

Caution should be used if the cat has been outside, in case the event involved a rabid stray animal. Handle the cat with gloves and be careful not to come in direct contact with any body fluid.

Stealthy Injuries

Unless you catch your cat bleeding or limping, many cat bite wounds will go undetected at first. Unfortunately, these tiny puncture wounds tend to seal up on the surface of the skin, trapping bacteria and other contamination from the bite inside. As the bacteria thrive and your cat's immune system tries to fight them off, an abscess will often form. An abscess is a pus-filled pocket made up of bacteria, white blood cells, and other debris.

The signs of an infection or abscess often include:

- ▶ Area red, swollen, and warm
- ▶ Lethargy

- ▶ Limping
- ▶ Pain
- ▶ Poor appetite
- ▶ Thick, yellowish/greenish discharge

Abscesses are painful, especially if located in an area with little room for swelling, such as the face or a limb. Your cat may resist letting you examine the area. He may also have a fever as his body tries to fight the infection.

If the abscess is unable to expand any more, it may rupture through the skin. It is as gross as it sounds. You may notice pus or blood on his coat in the affected area and on his bedding.

Treatment

When you take your fightin' cat to the veterinarian, he or she will usually start with a physical examination, feeling your cat all over his body and shaving the hair in any areas that feel suspicious. While shaving may leave your cat with a wacky haircut, it allows the veterinary team to get a good look at any injuries and removes fur/debris that can contaminate wounds. Superficial wounds can be cleaned with an antiseptic.

Most abscesses will need to be drained and flushed. If the abscess has already ruptured on its own, your veterinarian will gently manipulate the area to get as much pus out as possible. If it has not ruptured, a small incision can be made with a scalpel to open it up.

Once empty, the pocket can be flushed with sterile saline and an antiseptic to clean it out. Abscesses count as a "dirty" or contaminated wound, so your veterinarian will not usually suture them closed. Small wounds will often be left to heal on their own, and larger ones may be closed partway with a drain left in place for several days to provide any residual discharge a way out. Once there is no more discharge coming from the drain, the drain will be removed.

Your cat will usually be started on antibiotics to prevent or treat infection, and a culture of the wound may be obtained to identify any invading bacteria and guide antibiotic selection. Give the full course, even if your cat seems more comfortable after the first few days.

Some cats are tolerant of having minor bite wounds and abscesses treated, but others may require sedation or general anesthesia. Extremely painful, scared, or aggressive cats and any cat who requires placement of a drain will likely require anesthesia to make the process as quick and painless as possible. ■

Detecting Early Pneumonia

Ignoring a respiratory illness is a mistake

While pneumonia is not common in cats, it can be devastating. If undetected for long enough, cats can end up hospitalized, in critical condition, and may even succumb to this respiratory disease.

Diagnosing the cause of respiratory distress in cats can be challenging, says Daniel Fletcher, PhD, DVM, an associate professor of emergency and critical care at Cornell University's College of Veterinary Medicine. Heart failure and asthma are more common causes of breathing problems, but still, seeing your veterinarian at the first sign of respiratory difficulty is critical.

Symptoms of cats with pneumonia vary widely, but may include any or all of these symptoms:

- ▶ Cyanosis (bluish tint to mucous membranes)
- ▶ Cough
- ▶ Increased respiratory rate/effort
- ▶ Fever
- ▶ Ocular/nasal discharge
- ▶ Inappetence
- ▶ Lethargy
- ▶ Sneezing (in some cases)
- ▶ Weakness
- ▶ Weight loss

There are two types of pneumonia that are most common: aspiration and infectious.

Aspiration pneumonia occurs when your cat accidentally inhales something he shouldn't, such as a small particle he was snuffing, some hastily eaten food, or vomit. Aspiration pneumonias are considered secondary risks of some toxins such as petroleum distillates. Inhaled acidic stomach contents can be irritating to delicate lung tissues as well. Smoke inhalation can damage lung tissue and mimic pneumonia.

Infectious pneumonia is more common and can be caused by bacteria, viruses, protozoa, parasites, or fungi inhaled from the environment. In many cases, these infections can be transmitted from one infected cat to another.

Lungworms, including *Aelurostrongylus abstrusus* and *Capillaria aerophila*, can also infect cats, resulting in respiratory symptoms. Cats most often encounter these parasites when hunting and eating hosts such as birds, lizards, snakes, snails, and rodents.

Diagnosis

Your veterinarian will do a careful auscultation of your cat's lungs and take a thorough history. He or she will look to rule out more common causes of respiratory symptoms, such as feline asthma. "Cats are notoriously challenging to diagnose when they have pulmonary disease," says Dr. Fletcher. "The general belief is that true pneumonia is pretty rare in cats. Things like asthma or cardiogenic pulmonary edema are much more common."

Diagnostic tests may include:

- ▶ Radiographs to evaluate the lungs
- ▶ Echocardiography to rule out heart disease
- ▶ Bronchial wash to retrieve cells to culture for a possible bacterial or fungal infection
- ▶ Heartworm test, as feline heartworm disease can negatively impact the lungs as well as the heart
- ▶ Fecal sample to rule out respiratory parasites such as lungworms

Treatment

While waiting for the cause to be determined, an initial treatment plan for suspected pneumonia will often consist of oxygen therapy, stabilization with intravenous fluids as needed, and broad-spectrum antibiotic therapy.

Once the cause is identified, treatment may change. For example, if the cause is determined to be a fungus or virus,

appropriate drugs will be chosen to address these organisms.

Treatment for bacterial pneumonia generally starts with 10 to 14 days of antibiotics, but may extend to four to six weeks. Fungal pneumonias almost always require long-term treatment.

Medications such as albuterol (a bronchodilator) may be administered to open the airways. A steam vaporizer, such as those used for babies, or leaving your cat in the steamy bathroom while you shower, can help ease breathing. In most cases, cough suppressants are not required, as it is often better for your cat to cough up any debris in her airways.

Coupage, or percussion therapy, is a type of physical therapy that can help to loosen up debris in your cat's airways that she can then, hopefully, cough up. This involves rapid taps on the chest wall. (If warranted, your veterinarian or veterinarian technician will teach you.)

Cats who have more serious illness will need to be hospitalized. Care might include oxygen therapy and a nebulizer to get medications deep into respiratory tissues. Medications may be switched to intravenous versions as opposed to oral, and placement of a feeding tube may be necessary for cats that will not eat on their own. ■



A cat battling pneumonia may need hospitalization, including IV medications.

COVID-19 Connection

Cats are susceptible to SARS-CoV-2 infection and may show signs of COVID-19, although asymptomatic feline infections by SARS-CoV-2 virus are believed to be common. While human-to-cat spread has been shown to occur, no cases of cat-to-human spread of SARS-CoV-2 have been documented. If you are infected with SARS-CoV-2, isolate yourself from your cat if possible, and follow precautions while caring for your cat. Either have someone else do the care or wear a mask and wash your hands before handling your cat or her food, bowls, etc. Cats can share COVID-19 infections with other cats, but generally shed virus for a short period of time. Isolating your cats from any cat with signs of respiratory illness is always a good plan, especially until an appropriate diagnosis is made.

Sudden, Unexplained Death

An necropsy may help you find an answer

Q Our beloved gray and white tabby domestic shorthair recently died suddenly the day after receiving a clean bill of health (normal blood work and examination) and a routine rabies vaccine. We, of course, are devastated, and our veterinarian is mystified about what caused this terrible thing to happen. He suspects some sort of arrhythmia stopped Smokey's heart, but we just don't know. Is there anything you may be able to tell us about what may have led to our devastating loss?

A Thank you for getting in touch, and I am so very sorry to hear of your loss. I know that this must be a very difficult time and that not knowing what caused it must make accepting it that much harder. While I cannot, unfortunately, provide you with a definitive answer, perhaps a few thoughts will help you and other cat owners.

The first thing is that the best way to determine what led to the unfortunate passing of a beloved cat is to have a necropsy (the animal form of an autopsy) performed by a board-certified veterinary pathologist as soon as possible after the passing of the pet. It is generally ideal to store remains in a refrigerated (not frozen) environment until the necropsy is performed, if possible, and you can ask your veterinarian about where they may be able to request this service.

By examining the remains and



We do not necessarily always know what physical abnormalities our cat may have.

microscopic samples of tissues, combined with the use of toxicology and other specific tests, pathologists can often—but not always—determine the cause of death of a beloved pet. In some cases, no obvious cause is identified, and in these cases, the possibility of cardiac arrhythmias is always considered to be a possible cause. Animals that succumb to cardiac arrhythmias may not have any identifiable structural heart disease on necropsy, although many do.

The role of the vaccine in this unfortunate event is unclear, but vaccines are generally considered to be extremely safe and vital to maintaining feline health. In very rare cases, though, reactions to vaccines can occur in cats. The vast majority of these, though, are minor and involve localized swelling

at the injection site, and perhaps some degree of fever and lethargy, but are self-limiting.

In exceedingly rare cases, cats can develop allergic-type hypersensitivity reactions to vaccines, but these most commonly occur soon after the time of vaccination and are treatable if identified early. It does not sound like this is a likely explanation for Smokey's death.

In about one of every 10,000 vaccines given, cats can develop an aggressive type of tumor called an injection-site sarcoma, which can be very disfiguring and difficult to treat, but these occur over a much longer period of time. This is why veterinarians generally try to give the fewest number of vaccines necessary to cats, and why owners should carefully monitor injection sites in their cats and contact a veterinarian if they notice a persistent/growing lump.

In very rare cases (usually in cats that are immunosuppressed), some vaccines that use modified versions of the viruses they are designed to protect against by inducing immunity (called modified live vaccines) can cause cats to develop some signs of that viral disease. But your description does not sound like it would fit with what happened to Smokey, and rabies is a killed-virus vaccine.

It is very possible that an arrhythmia was the cause of Smokey's demise, but I am afraid that it is likely that we will never know the true cause. I hope you can remember all the wonderful times you shared, and in doing this, you allow his spirit to live on in your heart.

Please accept our deepest condolences from all of us here at the Feline Health Center, and let us know if we can be of any further assistance. ■

© HAPPENING NOW...

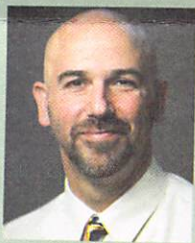
New Guidelines—The American Animal Hospital Association and the American Association of Feline Practitioners updated their 2010 feline life stages to better tailor veterinary care to a cat's age.

Cancer Research—The Petco Foundation awarded \$75,000 to Cornell University's College of Veterinary Medicine for cancer treatments for dogs and cats.

Hypertension—The American Association of Feline Practitioners' newly released Hypertension Educational Toolkit emphasizes the importance of routinely checking feline blood pressure.

COVID-19 Vaccine—Russia has registered the world's first COVID-19 vaccine for animals. Clinical trials of the vaccine, called Carnivac-Cov, involved dogs, cats, Arctic foxes, minks, foxes, and other animals.

Cat-Scratch Schizophrenia—According to *Animal Health Veterinary Briefs*, bacteria associated with cats has been tied to human schizophrenia. DNA of bartonella bacteria was found in the blood of 12 of 17 people with schizophrenia, but in only 1 of the 13 people in a control group. Bartonella bacteria are already associated with cat-scratch disease. More research on the connection is needed. ■



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 or

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

Coming Up ...

- ▶ *Handling Incontinence in Your Cat*
- ▶ *What's Your Cat's Tail Saying?*
- ▶ *Toxoplasmosis: Caused by a Protozoa*
- ▶ *Treatments for Feline Arthritis*