



Cat Watch

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



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IN THE NEWS ...

Study Seeks to Develop Nonsurgical Sterilization

Researchers have struggled for years to develop a nonsurgical way to sterilize dogs and cats. Now the Gary Michelson Found Animals Foundation has awarded a Harvard professor of bioengineering a \$700,000 grant to develop a vaccine to sterilize animals by disrupting gonadotropin, a hormone that controls reproduction.

David Mooney, Ph.D., hopes to extend his team's work in implantable, injectable vaccines that activate the immune system to fight cancer and infectious disease to develop a one-time contraceptive vaccine.

At Cornell, S.H. Cheong, DVM, Ph.D., a specialist in theriogenology (reproduction), says the possibility of avoiding surgery is reason enough for pet owners to celebrate: "The ease of use would maximize veterinary labor at shelters. An implant could potentially be designed to also include vaccines for rabies and other diseases, reducing the number of injections for pets and helping control disease in feral populations." ♦

Why Cats Hate Veterinary Visits

They fear the unfamiliar — the noise and smells — but these seven easy steps can help ease their anxiety

More than half of cat owners — 58 percent — report that their cat hates going to the veterinarian, according to a study by Bayer Veterinary Care. They hide, hiss and howl for one simple reason: They're afraid. Through no fault of their own, cats' native instinct to stay safe by avoiding the unfamiliar doesn't serve them in the crate, the car and the clinic.

"Cats may be unfamiliar with loud noises, such as barking dogs or vocalizing



Many clinics practice gentle handling of feline patients.

cats, strange odors in the air and on the floor of the clinic, and that translates into fear," says Leni K. Kaplan, MS, DVM, a lecturer in the Community Practice Service at Cornell University College of Veterinary Medicine. "Cats are also routine-oriented, and going to the vet, which most likely involves traveling in a car, is not part of their regular routine."

Missing Checkups.

Owners aren't immune to stress either. Thirty-eight

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A DNA Test Helps Diagnose Anemia

It identifies bacteria among the many causes, including injuries, chronic diseases and bone marrow problems

Cats suffer kidney disease more often than many other species, including dogs and humans. Almost all geriatric cats have some kidney damage. Because the kidneys produce a hormone that stimulates red blood cell production, when the kidneys fail, cats may experience anemia, which is low red-blood cell concentration in the blood. Anemia may limit the delivery of oxygen to vital tissues.

It can't be dismissed merely as tired blood to be cured by magic elixirs. Anemia can be life threatening and may occur suddenly. At other times, it may be a clue to a chronic underlying problem like kidney disease. How-

ever, advances in veterinary medicine are providing hope.

A Blood Sample Clue. One breakthrough in the diagnosis of the cause of anemia is the polymerase chain reaction (PCR) test. This revolutionary technique, which can identify small pieces of DNA in a sample of blood, has been used in research applications since its discovery in the 1980s.

Now veterinarians use the technology to identify the DNA of potential infectious organisms such as *Mycoplasma sp.* or *Babesia sp.* that can cause anemia.

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CatWatch

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SHORT TAKES

New Treatments for Pain: 'It's Not Just About Drugs'

Updated guidelines on pain management from the American Animal Hospital Association and the American Association of Feline Practitioners are primarily intended for private practice veterinarians. The guidelines' information-packed 18 pages cover the latest research and experts' consensus on medications, but cat owners can find practical help, too. Examples: advice for the home environment and a new emphasis on complementary therapy.

In the chapter on "It's Not Just About Drugs," the guidelines acknowledge the science behind numerically evaluating, or scoring, pain, advances in the field and classical veterinary education that emphasizes "treatment through pharmacology and surgery."

However, they advocate that based on evidence and experience, what used to be considered alternative therapies be considered "mainstream options." The list includes cold compression, therapeutic laser, weight management, exercise, acupuncture, physical rehabilitation and myofascial trigger point therapy for muscle and skeletal pain.

The guidelines unequivocally state that it should be assumed that senior cats have some degenerative joint disease (DJD), which includes osteoarthritis. They describe it as one of the most under-diagnosed diseases in cats.

The signs may not always be apparent to owners, the guidelines say:

- ◆ Reduced appetite
- ◆ Hunched posture with the head lowered
- ◆ Squinting or facial expression indicating discomfort
- ◆ Decline in grooming or over-grooming the painful area
- ◆ House soiling and decline in defecation
- ◆ Stiffness and decline in jumping
- ◆ Increased vocalization but decreased greetings

- ◆ Irritability and hissing if touched on the painful area
- ◆ Withdrawal and hiding or increased clinginess
- ◆ Aggression toward other cats or humans

Recommendations for making home life easier for a cat with DJD include providing a stool, ramp or step to allow him to reach favored areas; additional litter boxes with at least one low side to make access easier; and physical therapy through "play times using favorite toys to increase exercise and mobility."

The 2015 guidelines are available at www.catvets.com/guidelines.



A stool, ramp or step gives a cat with a degenerative joint disease like osteoarthritis a boost to his favorite spots.

Dr. Debra Givni

Say Goodbye to Bach

Scant research has been conducted — mostly in dogs — on the benefits of music therapy to calm animals. One frequently cited study showed that dogs prefer classical music over heavy metal. No surprise there.

Now research from the University of Wisconsin-Madison, reported in *Applied Animal Behaviour Science*, suggests that cats respond more favorably to music created specifically for them rather than to classical music. For the study, cellist and lecturer David Teie at the University of Maryland School of Music composed the two "cat songs" at a higher pitch than human music because cats vocalize an octave higher. The tempos that Teie used mimicked purring and the suckling sound of nursing.

When researchers played the sound samples for 47 cats in their homes, it took cats an average of 110 seconds to react to the cat songs, purring and rubbing against the speakers. It took longer — 171 seconds to respond favorably to Bach's "Air on a G String" and Fauré's "Elegie."

A sample of the composer's work is available at <http://news.nationalgeographic.com/2015/03/150313-animals-music-cats-tamarins-psychology-science>. ♦

Indoor Cats Aren't Safe From This Bacteria

Contact with contaminated soil or infected urine from other pets can expose them to leptospirosis

If your cat is contending with a kidney ailment, testing his hunting skills outdoors or co-existing with dogs who like hiking in the woods in the home, he may be at risk for a rare but serious bacterial infection known as leptospirosis.

The spiral-shaped *leptospira* bacteria can burrow into the skin and spread through the blood to damage the kidneys and liver. Young cats and those with compromised immune systems are especially vulnerable. In addition, the disease can be transmitted to people — particularly children — from exposure to infected urine from dogs, cats and wildlife. Cats may also contract leptospirosis by licking their muddy paws after walking in soil contaminated with the bacteria.

"The leptospirosis bacteria can survive in water and wet soil for weeks to months, particularly stagnant water," says Meredith Miller, DVM, ACVIM, board-certified internist and lecturer in small animal medicine at Cornell University College of Veterinary Medicine.

Good Hygiene. These risk factors demonstrate the need to supervise your cat's outdoor access and practice good hygiene when cleaning the litter box or feline urine on flooring in your home. Wearing rubber gloves to avoid contact with urine and thoroughly washing your hands after scooping the litter box can reduce your risk of contracting leptospirosis.

While mammals worldwide are at risk for becoming infected with the *leptospira* bacteria, cats seems more resistant to developing the disease. It's more prevalent in cattle, swine, dogs and horses. However, veterinarians and health scientists say that cats who have access to outdoors and drink water in stagnant ponds or lakes or who hunt and kill rodents are more susceptible than cats who stay exclusively indoors.

The reason cats rarely develop leptospirosis remains a mystery, but Dr. Miller points out that cats have been shown to develop antibodies in their blood against the bacterial infection. "Although cats rarely show clinical disease, a recent study demonstrated that a higher percentage of cats with kidney disease were positive for leptospira antibodies compared to healthy cats," Dr. Miller says. "The study suggests that leptospirosis should be considered as a potential under-diagnosed cause of kidney disease in cats."

The Tell-tale Signs.

Leptospirosis takes time — up to seven to 10 days after being exposed through infected urine — to show signs in an infected cat. Some cats may not show signs, making it to tricky to diagnose. Take your cat to your veterinarian for a complete examination if he displays any of these symptoms:

- ◆ Vomiting
- ◆ Diarrhea
- ◆ Fever
- ◆ Moving stiffly or showing pain when walking
- ◆ Coughing or wheezing
- ◆ Discharge from the nose or eyes
- ◆ Reduced appetite and water intake
- ◆ Weakness
- ◆ Shivering

Your cat's veterinarian will likely perform blood and urine tests to rule out other conditions with similar symptoms. Expect also to be asked about your cat's habits to help pinpoint the disease. Does he go outdoors unsupervised? Like to hunt and kill mice or rats?

While the primary treatment for leptospirosis in cats is antibiotics,



It's important to supervise your cat if he goes outdoors. *Leptospira* can survive in water and wet soil for months.

some cats may also need intravenous fluids and medications to combat possible nausea, to stimulate their appetites, to correct electrolyte imbalances and to counter dehydration. The quicker your cat receives antibiotics and other necessary treatments, the faster his chance for recovery and the less likely any organs will suffer damage from the bacteria. "Fortunately, leptospirosis has not become resistant to the antibiotics we commonly use to treat it," Dr. Miller says.

Prevention Is Key. You can't keep your cat in a protective bubble. He needs and deserves to live in an environment that provides him with mental and physical enrichment. Consult his veterinarian to determine if he's a candidate for the leptospirosis vaccine. And take these steps to reduce his exposure to *leptospira*:

- ◆ Note any subtle changes in his behavior and book wellness examinations with his veterinarian at least once a year, ideally, twice a year.

(continued on page 5)

VISITS... *(continued from cover)*

percent in the Bayer study say that they become stressed just thinking about taking their cat to the clinic. Many avoid veterinary visits, resulting in 52 percent forgoing annual check-ups for their cats.

"Sometimes I think the owners are more apprehensive about the visit than the pets — understandably so," Dr. Kaplan says. "Their cats are their family members and owners perceive that their pets are stressed."

In some cases, cats may be wary of vet visits because they had negative experiences previously, such as rough restraints and injections. You can reduce your cat's anxiety, however, with this expert advice:

1) Be positive. "Cats can sense our anxiety or frustrations, which may cause them to become fearful or anxious," according to "Getting Your Cat to the Veterinarian," a brochure from the American Association of Feline Practitioners.

"Many owners are concerned about the veterinary visit as well. Perhaps they worry about controlling the pet or that something painful will happen

or there is a serious medical problem," said Debra Horwitz, DVM, ACVB, of Veterinary Behavior Consultations in St. Louis, Mo. "Either way, their unease may be transmitted to their pet, increasing pet anxiety as well. Remember, it is not necessarily problematic to be afraid of something new, especially if you then learn it can be a pleasant experience."

2) Train your cat to accept touching. Begin at an early age by gently handling his head, feet and face, and using food as a reward. When the veterinary staff does the same, your cat won't be so nervous. If he shows signs of distress or irritation when touched in certain areas, avoid those areas, and tell the veterinary staff so they can work at your cat's comfort level.

3) Accustom him to a crate. Cats are usually cued about an impending vet visit when you pull out the cat carrier. Training him to accept the carrier



Positive reinforcement can train cats to use the carrier. Put treats inside, and, when your cat enters, use a consistent word so that he associates the word with the act.



If a crowd of owners and dogs in the waiting room unnerves your cat, book the first appointment of the day and ask to be taken directly into the exam room.

is easier than you may think, says Ilo-na Rodan, DVM, ABVP (feline), at Cat Care Clinic and Feline Consultations in Madison, Wis. She was the co-chair of the committee of the American Association of Feline Practitioners that developed "Feline-Friendly Handling Guidelines" for veterinarians, among other goals to reinforce "the veterinarian-client-cat bond, trust and confidence, and thus better lifelong medical care for the cat."

"Positive reinforcement works very well in cats, and enticing them and rewarding them with what they love when they are close to or walk into the carrier works very well," Dr. Rodan says. "Remember, though, it needs to seem like it is their choice."

Start by placing the carrier in a permanent and familiar place, such as a family room. Put treats or toys on the floor near the carrier and gradually move them closer. Reward your cat if he approaches the carrier. Ignore him if he doesn't and try again the next day.

Put treats inside the carrier, and when your cat goes inside, use a consistent word so that he associates the word with the act, Dr. Rodan says. "It could be 'in,' 'carrier' or anything you

(continued on bottom of page 5)

LEPTOSPIROSIS ... (cont. from page 3)

- ◆ Do not allow your cat or other pet in your household to drink from puddles, lakes or other water sources that may be contaminated. In a multi-pet household, a dog returning from a hike can have the bacteria on his paws and can pass it on to an indoor-only cat.
- ◆ Work with a pet-friendly pest control company to reduce the chance of mice, rats or other rodents on your property. Your cat may develop this disease if he comes into contact with an infected rodent.
- ◆ Always wash your hands in warm, soapy water after cleaning up a pet mess or the litter box.
- ◆ Clean and dry food and water bowls daily.
- ◆ Avoid picking up or handling stray cats you encounter outdoors. ❖

PEOPLE WHO ARE AT SPECIAL RISK

Cases of leptospirosis have increased worldwide since the 1980s in people and animals, with outbreaks generally occurring in periods of wet as well as hot, humid weather, according to the U.S. Centers for Disease Control. Most cases develop during the fall.

People who work outside or with animals, such as farmers, sewer workers, slaughterhouse workers and veterinarians, are more at risk for this disease.

In people, this bacterial disease can occur through contact with urine from infected animals or contact with contaminated water, soil or food. While some infected people may show no symptoms, leptospirosis can cause:

- ◆ Elevated fever
- ◆ Headaches
- ◆ Chills and muscle aches
- ◆ Abdominal pain and diarrhea
- ◆ Vomiting
- ◆ Rashes

In extreme cases, a person may suffer meningitis or kidney or liver failure if the disease is untreated. Antibiotics, such as penicillin or doxycycline, are used to treat this infection.

BEHAVIOR**VISITS**... (cont. from page 4)

choose as long as it is said calmly and positively. Some cats will be trained to the carrier in a few hours and some in a few weeks."

As you train your cat, the guidelines on vet visits say, "Often, you will first see that treats are removed from the carrier during the night," adding that, "Adding bedding or clothing with your scent to the carrier can help your cat feel more secure."

4) Practice car rides. Some cats are wary of cars because they develop motion sickness. If necessary, your cat's veterinarian can prescribe medication to prevent it. To accustom him to the car, put him in his crate and briefly drive around the block. Praise and treat afterward. You can move on to longer rides as your cat becomes more at ease.

5) Visit a cats-only clinic. They're extremely effective in curbing anxiety in their patients, Dr. Kaplan says. "These hospitals are quieter and implement low-stress tactics to help calm their patients, including having a

team of staff and doctors who are very good at working with cats using low-stress restraint techniques."

6) Try calming aids. Cat-ap-peasing pheromones are available in a variety of applications. "Using Feliway prior to a visit is helpful," Dr. Kaplan says. "Feliway diffusers can be used in the house a few days prior to the veterinary visit. Wiping the carrier down with a Feliway wipe or spraying the carrier and blanket with Feliway about 30 minutes before travel will also have calming effects on your cat."

An over-the-counter product called Zylkene is intended to relax cats. It's formulated with casein, a lactose-free protein in milk. "Research suggests that it does improve stress and anxiety in a proportion of patients," Dr. Kaplan says.

7) Call ahead. If you have any reservations about taking your cat to the clinic, call ahead of time to discuss your concerns so the staff can prepare accordingly. "If we have a cat

who is very stressed, for example, we will make that pet a first appointment when no other pets are expected to be at the clinic in order to minimize the stress for the owner and pet," Dr. Kaplan says. "We can also escort them directly into an exam room instead of having them in waiting room."

"Employing these simple steps can make cat veterinary visits relaxed and happy for everyone — and promotes longer, healthier lives," Dr. Kaplan says. "It is such a great feeling when an appointment finishes and the owner is surprised but happy that everything went so well." ❖

FOR MORE INFORMATION

Visit the American Association of Feline Practitioners at www.catvets.com/guidelines for its brochure on "Getting Your Cat to the Veterinarian."

ANEMIA ... (continued from cover)

“Over the years our diagnostics have become more sophisticated,” says Meredith Miller, DVM, ACVIM, a lecturer in small animal medicine at Cornell University Hospital for Animals. “PCR testing is much more sensitive than looking for blood parasites via microscopy and more specific than using antibody titers — a measurement of antibodies in the blood.”

Anemia has a host of causes and can be classified as either regenerative or non-regenerative, based on the body’s response to it:

Regenerative: With this type of anemia, bone marrow produces new red blood cells, but often not quickly enough or in sufficient numbers to replace what is lost. “The two biggest causes of regenerative anemia are blood loss and hemolysis — where red cells are produced but prematurely destroyed,” says Catherine Cortright, DVM, ACVIM, veterinary internist and former resident at Cornell.

Non-regenerative: The more common variety — and the one with the most possible causes — is characterized by the body’s inability to produce new red blood cells, typically because of a problem with bone marrow.



Listlessness can be a sign of anemia, as are pale gums and shallow breathing.

Initial tests to diagnose the severity and type of anemia are usually performed as part of a complete blood cell count (CBC), starting with the hematocrit, a test that measures the percentage of the volume of whole blood made up of red blood cells. A blood sample processed in a centrifuge separates the red blood cells from the plasma, the liquid part of the blood. The normal hematocrit is about 31 to 45 percent in cats. “Anemia is any hematocrit count that is below the normal reference range, but we generally grade it as mild when the hematocrit is 25 to 30 percent, moderate when the hematocrit is 15 to 25 percent, and severe when the hematocrit is less than 15 percent,” Dr. Miller says.

The CBC can also determine whether the anemia is regenerative or non-regenerative. “We look under a microscope for the size and color of the cells and the number of immature red blood cells, called reticulocytes. Their presence is a sign that the bone marrow is sending out immature blood cells and trying to regenerate,” Dr. Cortright says.

Screening for evidence of internal bleeding or of an underlying infection comes next. If no other reason for a nonregenerative anemia is found, a bone marrow aspirate — a

sample taken with a large needle — must be performed under sedation or anesthesia to see if a primary bone marrow disease like cancer is present.

Regenerative Anemia

Although regenerative anemia is less common, it often requires immediate diagnosis and treatment. The blood loss resulting from traumatic injury — if for example, a cat is in an accident and is bleeding profusely — is the easiest type to diagnose.

Treatment is relatively straightforward: Once the cat is stabilized, the bone marrow can resume producing red blood cells. Often a blood transfusion is the only way to achieve this stabilization. The principle is the same for internal bleeding, except that it’s more difficult to detect until a cat shows signs of severe anemia, such as shallow breathing, lethargy and pale gums.

“Keep in mind, however, that cats are especially good at hiding signs of illness, and sometimes the only indicator that something is wrong may be a decrease in social behavior or increased hiding,” Dr. Miller says.

Causes of regenerative anemia include:

- ◆ *Mycoplasma hemofelis*, parasitic bacteria that infects red blood cells. The bacteria is transmitted by fleas. Infected red blood cells are removed from circulation by the spleen or liver, leading to a severe and life-threatening anemia.
- ◆ The ingestion of toxins such as rat poison. This alters the ability of the blood to coagulate and may lead to life-threatening bleeding into the chest or abdomen.



Cornell University Hospital for Animals keeps blood products on hand for transfusions to stabilize cats after blood loss.

Michael Connell, Cornell Photography

◆ The consumption of food or household items such as raw onions, garlic, the pain medication acetaminophen, and zinc, the main component of pennies produced since 1982.

Sometimes a blood transfusion is the only way to help a cat who is bleeding or showing signs of severe anemia. But cats have naturally occurring antibodies to the common blood types other than their own and can have a fatal reaction if the wrong type blood is administered, Dr. Miller warns. Transfusing a cat without knowing the blood type of both the cat and donor beforehand is never advised.

Non-regenerative Anemia

The inability to produce red blood cells that characterizes non-regen-

erative anemia has myriad possible causes, including:

- ◆ Infections and inflammatory diseases, especially chronic kidney disease. Cats stand out as a species in this regard, says Brian Murphy, DVM, Ph.D., veterinary pathologist and Associate Professor at the UC Davis School of Veterinary Medicine. "We don't understand why it is so common. It's not true of dogs, humans, horses and primates, but most cats start acquiring renal injury at 10, 11 or 12 years of age, and a significant number of them eventually go on to develop renal failure."
- ◆ Dr. Murphy and his team are working on gene therapy solutions. (See sidebar below.)
- ◆ Medications affecting bone marrow. Some antibiotics and pain medica-

tions, including aspirin and acetaminophen, may be associated with bone marrow suppression, as can estrogen-containing creams.

- ◆ Infectious diseases like the feline leukemia virus and parvovirus.

Often non-regenerative anemia is too mild to cause clinical signs. It is usually resolved by treating — if not curing — the underlying condition. Cats who become anemic over a period of time, as is the case with many non-regenerative anemias, fare better than those who have a sudden onset of anemia, because the body has had time to adjust to the decreased red blood cell count.

"With the continued advancements in veterinary medicine," Dr. Miller says, "many cases of even severe anemia may be treated with an excellent long-term prognosis." ♦

RESEARCHERS PURSUE A GENE THERAPY CURE

Some veterinarians use a newer form of the human hormone erythropoietin (EPO) called darbepoietin to treat anemia associated with renal failure. EPO, produced in the kidney, signals the bone marrow to create red blood cells. Treatment of cats with this latest version of EPO has shown greater promise than the use of human EPO used in the past but remains problematic.

In some cases, treated cats form antibodies against darbepoietin. This is because the protein structure of human EPO differs from the feline form of the protein. Antibodies directed against darbepoietin can even cross against the cat's own EPO, resulting in an autoimmune response that can be fatal.

At the UC Davis School of Veterinary Medicine, Brian Murphy, DVM, Ph.D., and colleagues want to use the cat's own EPO gene product to avoid the potential for autoimmune rejection.

They started by isolating feline kidney tissue from a cat cadaver and cloning feline EPO from it. That was the relatively easy part, Dr. Murphy says. "The trick is to try to get the feline gene introduced into cat cells and have stable long-term expression. To do so, we plan to use a modified virus, a gene therapy vector. The gene therapy vector 'infects' the feline cells temporarily, introducing the feline EPO into the cat's own DNA." The eventual goal: re-infusing an anemic cat with his own genetically modified cells, stably producing feline EPO.

As with all gene therapy, safety mechanisms are vital. "There's a concern if we introduce the gene into the wrong chromosomal location, it could have a negative result, perhaps something like leukemia," Dr. Murphy says. "With modern gene therapy vectors, there's little evidence that this is happening, but we have created a 'kill switch' within our vector. If we determine that the cells are autonomously replicating and creating something that looks like a tumor, we can treat the cat with a drug to destroy all of the genetically modified cells."

So far, Dr. Murphy has tested the cells only in the laboratory and has demonstrated the production of functional feline EPO in cat cells.

Owners who hear about his studies ask him to try the gene therapy strategy on their ailing cats. "I tell these people that at this stage of the project, we can't ethically do that. I don't want to take an animal that is debilitated because of kidney disease and then introduce something that might do harm and further shorten the life of the cat," he says.

Dr. Murphy's initial studies have been supported by grants from the Winn Feline Foundation and the Morris Animal Foundation. "This treatment strategy has a really good chance for eventual success," he says. "It's just a question of time before the technical problems are resolved."



Elizabeth

Elizabeth is thankful for the assistance of **Bruce G. Kornreich, DVM, Ph.D., ACVIM**, Associate Director of the Cornell Feline Health Center, in providing the answer on this page.

**PLEASE
SHARE YOUR
QUESTIONS**

We welcome questions on health, medicine and behavior, but regret that we cannot comment on prior diagnoses and specific products. Please write *CatWatch* Editor, 535 Connecticut Ave., Norwalk, CT 06854-1713 or email catwatcheditor@cornell.edu.

COMING UP ...

- ❖
SHEDDING
- ❖
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- ❖
**THE ABCs
OF CBCs**
- ❖
HYPERTENSION

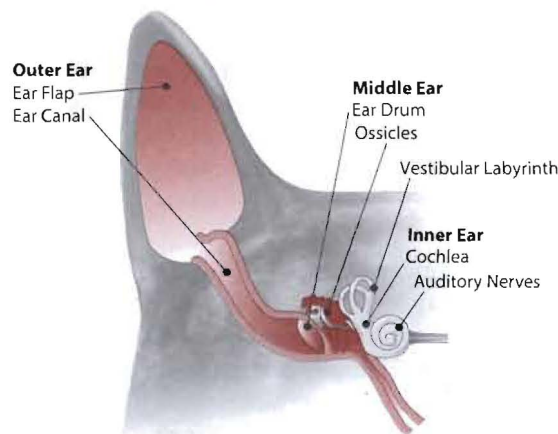
Vestibular Syndrome Causes Her to Sway and Constantly Fall

Q I recently adopted a beautiful kitty named Annie, and she has won my heart. Unfortunately after bringing Annie home, I discovered that she had some real neurological issues. She rocks back and forth and falls constantly when moving from room to room. Her veterinarian says that she has idiopathic [undetermined origin] vestibular syndrome. I do not think that she is going to get any better. Can you shed some light on this condition?

A First of all, thank you sincerely for your kindness and compassion in adopting your new baby. Neurologic signs, such as stumbling, head-tilting and walking in circles, can arise from a number of problems, and I understand your concern, as managing kitties with neurologic problems can be very disconcerting.

Among the causes of this type of behavior are diseases of the vestibular apparatus, composed of the labyrinth and a specialized region of the medulla, a part of the brain located just above the spinal cord. The labyrinth is an organ located within the inner ear that has evolved to inform an animal about the position of its head and eyes in space, and to provide balance so that the body can be appropriately oriented. Abnormalities of the labyrinth can cause a loss of balance resulting in some of the signs you are observing. Perhaps a brief review of the anatomy and normal function of the labyrinth would be helpful.

The labyrinth is comprised of a series of fluid-filled canals containing specialized receptors that respond to the gravity-induced movement of the fluid within them when the position of the head is changed. This exquisite organ informs the brain about whether the head is moving and, if so, in which direction. Through its connections with the medulla, it helps maintain the appropriate position of the eyes as the head is moved. The labyrinth also helps maintain balance by responding to movement of the body toward one side or the other by sending signals to the muscles of the opposite side of the body, allowing them to adjust appropriately and prevent the body from tipping over.



Marty See

Abnormalities of the labyrinth, located in the inner ear, can cause a loss of balance.

Given the functions of the vestibular system, it is no surprise that problems may result in circling or falling to one side, abnormal head position, and oscillatory eye movements. The causes may include bacterial infections, tumors, cysts, polyps and reactions to certain drugs. When the above causes have been ruled out via thorough history, physical examination, blood work and, in some cases, imaging studies such as CAT scan and/or MRI, vestibular disease is termed idiopathic.

Treatment depends upon its cause, if one can be identified (i.e., antibiotics for bacterial infection, cessation of drug therapy in the case of a drug reaction). In the case of idiopathic vestibular disease, no specific therapy is indicated, but measures should be taken to assure that affected cats are eating, drinking and eliminating normally.

If affected cats are thought to be nauseated as result of this condition, anti-nausea medication may be prescribed. It is also important to assure affected cats' safety by keeping them in a place where they will not injure themselves by falling or knocking things down upon themselves. In most cases, cats will recover within several weeks and will not be affected by this condition again.

I hope that this is helpful, and please send Annie my best wishes for a quick and complete recovery. In the meantime, give her lots of love and keep her safe, (as you are already doing)! Please keep in touch and let us know how things turn out.

—Best regards, Elizabeth ❖

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