

Fighting Feline Leukemia

This complex disease is the No. 1 killer of cats, but hope comes in the form of tests and vaccines.

By Karen M. Staples



Photo: Sally Kwon

Feline leukemia is a deadly disease that blocks a cat's natural ability to fight germs.

Have you ever had a special cat that took over your heart? Mine was Stumpy, a miniature fur ball covered in gray dandelion fluff with only a stub of a tail. In the daytime, Stumpy constantly dodged from room to room. At night, he vaulted onto my bed to play tag with my toes under the covers. He had so much energy, I was sure he would never grow up—I thought he would be a kitten forever. But for Stumpy, forever didn't last long. He was less than 2 years old when he contracted feline leukemia.

Most cat owners are familiar with this deadly disease, but many are unaware of how serious it is. Feline

leukemia is a complex disease that blocks cats' natural ability to fight off germs. It does not yet have a cure. Stumpy faced a downhill struggle against tumors, blood loss and infection. He also threatened the health of nearby cats because of the contagious nature of the disease. For his sake, as well as his feline friends', Stumpy was euthanized.

At the time I had few alternatives. Now cat owners have more options because researchers have discovered so much about FeLV. Your cat's life depends on your efforts to fight the disease. The more you know about FeLV, the better your strategy will be.

The Rise of the Opposition

Scientists suspect the feline leukemia virus originated in North Africa several million years ago. Surprisingly, this disease, which is the second most common cause of death in cats (being hit by cars is the most common), was not discovered until 1964. The virus may have been overlooked because it produces several symptoms that mimic other disorders.

Feline leukemia most commonly is transmitted through saliva, but it also is transferred through urine and feces. An infected cat can contaminate a healthy one when the cats eat from the same bowl, groom each other, →

FELINE LEUKEMIA

continued

fight or share the same litter box. Additionally, female cats can pass the virus to their unborn kittens.

Some cats are more likely to become actively infected than others. Because FeLV spreads through intimate contact, cats living in multicat households have the highest risk of contracting the disease. Those who spend part or all of their time outdoors also are at high risk, because the more time a cat is outside, the more chances it has of contacting an infected animal.

Age also affects cats' vulnerability. Kittens are less able to fight FeLV because their immune systems are not fully developed. Cats more than 10 years old also are more susceptible because their immune systems are weaker. Owners of high-risk cats should be careful to protect their pets. Cats not in the high-risk group are still susceptible to FeLV, however, and also need protection.

Without a host to harbor it, the

FeLV virus is weak. Household cleaners kill the virus almost immediately. Environments that are not precisely the right temperature and humidity will kill the virus, too. Even in an ideal environment—one that is cool and damp—FeLV rarely lasts more than three days. Because the virus is so weak, the chances of owners transferring the disease from cat to cat on their hands or clothing is small. Although owners should take care to wash their hands after petting unfamiliar cats, they need not panic if an oversight occurs.

Some owners worry that they will catch feline leukemia from their cats. Humans have little to fear from FeLV, according to Joseph M. Trueba, D.V.M., of the American Board of Veterinary Practitioners. He says that although we can't prove that the disease doesn't affect humans, two factors indicate the possibility is low. First, no evidence has appeared of the feline leukemia virus causing disease in any humans since it was discovered. Also, viruses that are similar to FeLV tend to affect only one species.

The Line of Attack

Feline leukemia goes through several stages after entering a cat's eye and nose membranes, says William D. Hardy Jr., V.M.D., of Cornell University. It first travels to lymph nodes in the throat, where it begins to reproduce, infecting the cat's white blood cells. At this stage, the cat could fight off the disease if its immune system is strong enough; about 40 percent of exposed cats are able to withstand the virus. Otherwise, the infected blood cells transport the virus to the spleen and intestinal tissue, as well as to other lymph nodes.

Eventually the virus enters the bone marrow and contaminates the cat's growing blood cells. Circulating blood then carries the virus to the salivary glands, respiratory cells and urinary tract. About 56 days after invading its host, the virus becomes present in the cat's saliva and urine, and can be passed to other cats.

One reason scientists have not yet found a cure for feline leukemia is because the virus acts differently from most other viruses. When a normal virus attacks a cell, it enters the cell's nucleus, the "command center," and takes control. Effectively, the virus hijacks the cell, forcing it to obey the virus's commands. Once it has assumed control, the virus begins to multiply, commanding the captured cell to assist in producing thousands of duplicate copies of the virus. When the new viruses are complete, they burst out of the cell, destroying it.

Feline leukemia hijacks cells the same way, but unlike normal viruses, FeLV may command its victim to do more than one task. The captured cell will become either a virus producer or a cancer producer. When an FeLV-captured cell becomes a virus producer, it is not destroyed when it completes a set of new viruses. Instead, the cell lives on to produce more batches of viruses. Because the producers are not destroyed, FeLV progresses much faster than many other diseases.

When captured cells become cancer-producers, a transformation uncommonly caused by most viruses, the cells mutate and cluster together, causing tumors. Scientists still do not know why FeLV creates cancerous cells.

Casualties

After it is exposed to the disease, a cat's system could react in different ways. Veterinarians have no reliable

Testing for Feline Leukemia

MOST VETERINARY hospitals currently perform feline leukemia tests in their laboratories. When a client brings in a new kitten or an unvaccinated adult cat, or perhaps a sick cat, the veterinarian draws a tiny amount of blood to perform a test.

Some of the tests available also can be performed on tears or saliva. Called *ELISA* (*enzyme-linked immunosorbent assay*) tests, they are highly sensitive and easy for a veterinarian to perform. If a cat tests negative on an ELISA test, the cat should then be vaccinated against leukemia. If the result is positive by a distinct color change of the solution containing the patient's blood, the owner and the veterinarian must decide how best to handle the situation. Also, the veterinarian must evaluate the result in light of the fact that the ELISA test has approximately 2 percent false positive results.

A cat that has tested positive should be isolated from all other cats for four to eight weeks. If the cat retests positive after that time, the veterinarian usually will send a blood sample to an independent commercial laboratory to verify the results. This also should be done if a cat from a low-risk household is positive on an in-clinic test.

The commercial laboratory will perform an *IFA* (*immunofluorescent antibody*) test. While this test is slightly less sensitive, it carries no history of false positive results. Researchers use both tests when evaluating the effectiveness of new vaccines, as well as several other tests.

If the cat tests positive on the IFA test, the veterinarian will consider it an infected cat that has the potential to shed the virus and act as a source of leukemia.

Several brands of ELISA tests are available to the veterinarian. Synbiotics' Virachek/FeLV also uses blood. TechAmerica manufactures Diasystems FeLV-Flex II, which can be run on blood, saliva or tears. Idess produces Cite leukemia test and Cite Combo for FeLV and feline immunodeficiency virus, which are performed on blood samples. This brand has two built-in controls that allow 99 percent accuracy.

Once the veterinarian and his or her staff become familiar with a particular test, the incidence of false positives will decrease below 2 percent. This allows the doctor to feel comfortable with the test protocol and results.

—Margaret Reister, D.V.M.

The Natural Way to Better Lawns



Garden Thunder® Organic Lawn Care is a natural solution to brown unproductive lawns. Just attach the bottle to the hose and spray it on. The natural ingredients start working immediately to give you a beautiful green lawn within weeks. Remember, a healthy environment starts in your own backyard.

GARDEN THUNDER®

Natural Earth Technologies
655 Montgomery Street
San Francisco, California 94111
© 1992 Natural Earth Technologies, Inc.

FELINE LEUKEMIA

continued

way of predicting reactions, so they usually can't help cats until it's too late. About 40 percent of exposed cats—usually those who are healthy and stress-free—manage to destroy the disease and become immune to it. The other 60 percent divide into carriers and symptomatic cats.

In carriers, 30 percent of exposed cats, the immune system weakens the virus enough that it doesn't make the cats sick. The virus is present in a carrier cat's body, but the cat does not show FeLV symptoms. Because of the lack of symptoms, an owner of an FeLV carrier probably will not realize that the cat has the virus. Meanwhile, the carrier cat can infect other cats because the virus is contagious. Carrier cats also are more vulnerable to other germs because their immune systems are busy fighting FeLV.

In some carriers, the virus may retreat temporarily, hiding in the cat's bone marrow. In this stage, the virus is dormant; the cat is not contagious and does not have to constantly fight the virus. These latent carrier cats live normal lives until the virus reemerges. Stress often causes the virus to come out of the bone marrow and renew its attack. If a cat doesn't eat a proper diet, if it becomes ill or if something makes it constantly nervous (like the presence of a rival cat), the cat is under stress. Because the immune system does not function as well when stressed, the virus may choose that time to pop out and start fighting again. In both carriers and latent carriers, stress may weaken the cats' systems enough to allow FeLV to completely affect the cats' bodies.

Symptomatic cats, the other 30 percent of exposed cats, receive the full force of the infection and die in three months to three years. These cats are victims of three different conditions. First, FeLV causes various cancers by entering and changing body cells. Altered cells grow together to form tumors in different parts of the body. The tumors eventually will interrupt normal body function.

The second condition occurs when the disease attacks the growing blood cells in the cat's bone marrow. Because the young blood cells are rendered useless, the cat's total number of blood cells decreases, causing anemia and slower clotting. The cat

gradually will become less active until it has too little energy to do anything.

The last and most devastating condition suffered by infected cats is the suppression of their immune systems. FeLV makes it difficult for cats to fight off infections that would normally be easily destroyed. Most infected cats die from secondary infections rather than tumors or anemia. The most common complications are pneumonia, stomach problems, chronic colds, and skin and mouth infections. FeLV also can cause pregnant cats to abort their litters.

FeLV makes it difficult for cats to fight off infections that would normally be easily destroyed.

Symptomatic cats may not show any physical signs right away and may inadvertently pass the disease to other cats. Until symptoms start to appear, clinical testing is the only way to detect feline leukemia.

A Short Defense

Attempts to destroy the FeLV virus within cats have been unsuccessful. A drug called AZT can prevent the disease from taking hold, but it must be given between 14 and 21 days after the cat was exposed to the virus. Because it is difficult to pinpoint the exact time a cat was exposed, and because AZT often produces severe side effects, the drug is not very useful.

Although we do not have ways to stop the disease, we can slow its progress by treating specific symptoms. Veterinarians can control secondary infections with antibiotics, anemia with blood transfusions and cancers with chemotherapy. Unfortunately, repeated treatment is expensive and does not completely alleviate a cat's suffering. Instead of prolonging the inevitable, many owners of actively infected cats opt for euthanasia.

Carriers, cats that test positive but do not have any symptoms, can now live normal lives. Before scientists discovered vaccines against FeLV, most veterinarians recommended euthanasia for FeLV-positive cats whether or

not they had symptoms. This policy was meant to contro! the spread of the disease. Now that we have vaccines, owners have the option to keep their infected cats if the cats are not suffering. If making such a decision,

an owner must isolate the infected cat as much as possible because carriers can still pass the disease to unvaccinated cats.

Unfortunately, isolating a cat without taking any other preventive mea-

asures is unreliable because of the possibility of accidental contact between a healthy cat and a diseased one. Fighting feline leukemia involves three steps: testing, vaccinating and isolating. For information on vaccinating, see "Feline Leukemia Vaccines" at left.

Six years after FeLV was discovered, researchers developed a blood test to determine the presence of the virus. Veterinarians generally test cats for FeLV before vaccinating them. Vaccinating an infected cat will not stop the infection and will give the owner a false sense of security, allowing other cats to be exposed. Testing is especially important if a cat commonly goes outdoors, is frequently sick or lives with more than one cat. The chance of contraction increases with the number of cats. (For more information, see "Testing for Feline Leukemia" on page 16.)

An FeLV test cannot identify the presence of the virus in latent carriers. If a cat in the high-risk category tests negative, it could be a latent carrier. Because a veterinarian cannot identify a latent carrier until the virus reemerges, the best way to handle a suspected latent carrier is to:

- Vaccinate the cat, in case it is not a latent carrier.
- Keep the cat as healthy and stress-free as possible.
- Keep the cat away from other cats as much as possible.
- Watch for symptoms, such as sluggishness, poor appetite or recurring colds or infections.

Isolating picks up where testing and vaccinating leave off. To cover the 10 to 20 percent protection gap left by vaccines, keep your cat indoors, away from unknown cats. By reducing the chances of exposure, you can help a vaccine work as thoroughly as it can.

Winning the War

By staying current with your cat's yearly vaccines and keeping it away from unfamiliar cats, you can give your feline friend the best chances possible for an FeLV-free life. The expense of yearly shots and the inconvenience of a housebound cat may add up, but when you compare both with the immeasurable cost of a lost companion, you may find they're worth it. I do whenever I think of Stumpy. ☺

Karen M. Staples is a freelance writer living in Florida.

Feline Leukemia Vaccines

SINCE THE discovery of the feline leukemia virus, researchers have worked to create a vaccine. After diligent and persistent work by researchers all over the country, Norden Laboratories patented Leukocell as the first commercial leukemia vaccine in 1985.

Since then, veterinarians constantly have received new information about updated laboratory results and new vaccines becoming available. It is a difficult task to decide which vaccine to administer. Throughout the time leukemia vaccination research has been performed, various people have expressed concern about using a vaccine containing a live virus. Some people fear transmission of the virus to humans, but no evidence has appeared to found that fear.

Norden created a killed virus vaccine, Leukocell. If a kitten tested negative for FeLV, it received a series of three vaccinations at intervals of three weeks, then annual boosters thereafter.

Several years later, the company refined the product and introduced Leukocell II, which is manufactured under Norden's new parent company's name, SmithKline Beecham. This vaccine contains all three of the subgroups (pieces) of the leukemia virus. It is the only vaccine containing a type of antigen that helps a cat avoid the form of leukemia that causes malignant lymph tumors. SmithKline Beecham believes its combination covers all possible forms of infection with FeLV and that it does not suppress the immune system at the time the vaccine is given. Also, the initial vaccination series decreased from three to two injections, three to four weeks apart, continuing with yearly boosters.

Building on earlier research, several other vaccines have emerged. Fort Dodge Fel-O-Vax Lv-K is a killed, whole virus vaccine. Fort Dodge believes, along with several other companies, that the use of the whole virus rather than subunits offers better immunity. The company claims the potency is higher to provide a good immune challenge. Their leukemia vaccine is available alone or in combination with other viral and chlamydial components.

Synbiotics Corp. also produces a killed virus vaccine, VacSYN/FeLV, which contains the three virus subunits.

One of the two newcomers in the leukemia vaccine market is Geneti-Vac, manufactured by Pitman-Moore Inc. This product is the result of developments in genetic engineering and is called a *genetically recombinant* vaccine. The technology allows researchers to isolate and rearrange genes to produce useful proteins.

Pitman-Moore has isolated the protein that allows the virus to attach to the host cell. Researchers take the one gene needed to produce that protein out of the virus and insert that gene in *E. coli* bacteria. The bacteria can be triggered to produce that protein, which is the primary antigen that stimulates an immune response. By causing the cat to produce antibodies against the protein that allows attachment of the virus to the cell, the viral attack is thwarted at the outset.

The other newcomer is from Solvay Animal Health Inc. and is called Fevaxyn FeLV. A killed virus vaccine faring well in the comparison studies, it provides superior protection and has been thoroughly tested. This leukemia vaccine is available alone or in various combinations with vaccines against the other major preventable diseases in cats: panleukopenia, rhinotracheitis, calicivirus and chlamydia.

Each vaccine has its supporters in veterinary practices across the country, and each veterinarian has an explanation for choosing one brand over another. Cat owners should remember several facts. First, testing each cat as it enters the household is the first line of defense. Minimizing chances of exposure by keeping cats away from all high-risk situations, such as fighting, makes a difference. Third, maintaining a proper vaccination schedule is important, but always keep in mind that no vaccine is 100 percent effective. Statistics prove that the available vaccinations may be no more than 80 percent effective at preventing leukemia in any given cat.

For the best information on protecting your cat from FeLV, consult your veterinarian.

—Margaret Reister, D.V.M.