

Feline Leukemia Virus (FeLV)

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Feline leukemia virus, a retrovirus, is a common infection of cats. It is the cause of more cat deaths, directly or indirectly, than any other organism and is widespread in the cat population.



Disease Transmission

FeLV transmission most commonly occurs through close, social contact. Contact with saliva from infected cats is a primary mode of transmission, because the concentration of virus is high in saliva. But virus is also shed in blood, urine, feces, nasal secretions, and milk. Sharing food and water dishes, using the same litterbox, mutual grooming, and bite wounds are all possible methods of transmission. Infected queens can infect fetuses during pregnancy. Infected queens can infect neonates when the babies drink the infected milk. Transmission can also happen via blood transfusions or contaminated needles/instruments.

Disease

There are four separate classes of infection: abortive, regressive, latent, and progressive.

- **Abortive infections** are those in which the exposed cat produces an effective and early immune response. This prevents viral replication and eliminates virus-infected cells. These cats are negative for circulating viral antigen and viral genetic material.
- **Regressive infections** are those in which viral replication is limited, but a small population of virus infected cells remain. These cats are antigen negative, but the virus can be detected in a small percentage of blood cells by polymerase chain reaction (PCR), a type of blood test. These cats may go on to eliminate the virus completely. These infected cats are not viremic (and therefore not contagious), but may be infectious through blood transfusion.
- **Latent infection** refers to the cats in which a moderate amount of infected cells remain. These cats are antigen negative, but PCR positive. The latently infected cells do have the potential for the virus to re-activate, but the cats are not contagious as long as the infection remains latent.
- **Progressive infections** are those in which virus replication is not eliminated; both viral antigen and genetic material can be detected in the blood of these cats. The cats are actively shedding virus (primarily in saliva and feces). These cats are likely to become ill with FeLV-related disease.

Diagnostic Tests

Necessary diagnostic tests may include blood chemistry, hematology, radiography, bone marrow aspiration, ophthalmoscopy, and specialized antibody tests.

Treatment

There is no effective treatment for the myeloproliferative (bone marrow) form of leukemia. Treatment is mainly supportive, and may require blood transfusions, prednisone, and anabolic steroids.

FeLV cancer (lymphoma) has a better response to therapy than the myeloproliferative diseases do. Treatment may include chemotherapy, glucocorticoids, interferon, Protein A, and supportive treatment.

Prognosis

The prognosis for infected cats is highly variable. It depends upon the specific disease the cat gets during the course of infection and the availability of supportive treatment for secondary infections. A small percentage of FeLV-positive cats may remain healthy for several years, but the prognosis for persistently FeLV-positive cats is poor, as most of the infected cats living within cluster households will die within three years from the time of diagnosis.

Prevention Of FeLV

There are several preventive measures that can be taken to decrease the risk of contracting FeLV. Routine testing, as well as vaccination of cats determined to be at risk, are key factors in FeLV prevention.

- Adult cats can be FeLV tested, and then vaccinated if they are negative. FeLV vaccination of infected cats does not affect the carrier state, the capacity to infect other cats, or the development of disease in the infected cats. Booster vaccinations are generally used in adult cats only if they have continuing risk of exposure.
- Cats are most vulnerable to the virus as kittens. Kittens should be vaccinated with a recombinant vaccine. Leukemia is almost-entirely preventable with just two kitten vaccines and a booster one year later. After that, even if the cat is exposed, the vaccines will help protect it -- plus the cat will naturally be more resistant to infection because of its age. Kittens may be tested at any age. However, infection in newborn kittens may not be detected until weeks to months after birth. Therefore, several FeLV tests during the first six months of life may be necessary to feel completely "safe" about a negative test result.
- All kittens or adult cats that test negative by the first ELISA screening test, but with a known or suspected exposure to FeLV, should be retested. Although the majority of cats will test positive within several weeks, final retest of negative cats should be no sooner than 90 days post-exposure.

- In large catteries, a test and removal program can be instituted.
- Multi-cat households with FeLV positive cats should be maintained as a closed colony. (No new cats should be brought into the household to prevent the spread of infection to the new arrivals.)
- Healthy FeLV-infected cats should be housed indoors and kept away from other cats to limit the risk of disease transmission; veterinary checks should be performed at least every six months.

Notes

Retroviruses are unstable, live for only minutes outside the cat's body, and are readily destroyed by most disinfectants.

Because the feline leukemia virus is so unstable, a new, healthy cat can be brought safely into a "contaminated" house within days of the departure of an FeLV-infected cat.

Public Health Implications

FeLV has been the subject of many studies. Although human infection with FeLV might be possible, no human has ever been known to become infected with FeLV. Also, no human leukemia ever been traced back to FeLV infection. Currently, FeLV in cats is not regarded as a human health hazard.

Feline Immunodeficiency Virus (FIV)

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What is FIV?

FIV stands for feline immunodeficiency virus just as HIV stands for human immunodeficiency virus. In fact, these two viruses are closely related and much of the general information that has become common knowledge for HIV also holds true for FIV. FIV is a virus that causes AIDS in cats; however, there is a long asymptomatic period before AIDS occurs and our job is to prolong this asymptomatic period.

Life expectancy of the FIV+ cat is variable. Approximately 18% die within 5 years of infection. An additional 18 percent are still alive in that time frame but are experiencing illness from their immune-suppressed state. The remaining cats appear normal in that time frame and many go on to live long lives, only periodically experiencing illness.



For a lengthy description of this virus, we recommend the [Cornell Feline Health Center](#).

Also helpful is information from the [American Association of Feline Practitioners](#).

How is Diagnosis Made?

Most of the time FIV infection is discovered using a screening test performed in your vet's office or on a blood panel. Once a cat has been identified as positive by a screening test, it is best to confirm with an additional test of a different type, such as a PCR test or Western Blot to add an extra degree of certainty. Once this test is positive, the cat is considered to be truly infected.

Kittens less than 6 months old may test positive due to the antibodies passed from their mother. Such kittens should be retested when they are over 6 months old.

In a household with multiple cats, it is important to test all the cats when one cat comes up FIV+ as it is important to know who is infected and who is not. Cats that test negative should be tested annually as they are at higher risk for infection even though, it is generally considered unnecessary to isolate the negative and positive cats from each other. Knowing a cat's status tells you which cats need to follow the guidelines listed in this page.

It should be noted that giving the FIV vaccine will cause a cat to test positive on both of the above tests. PCR testing is generally not used for screening but is able to detect viral DNA. It can be used to distinguish an FIV-infected cat from an FIV-vaccinated cat. The FIV vaccine has been withdrawn from the U.S. and Canadian markets, not for safety reasons but because it has never been widely embraced by the veterinary profession due to the testing ambiguity situation.

TESTING KITTENS

While screening a new kitten for Feline Leukemia Virus and FIV is considered crucial to the adoption process, it is important to understand what a positive FIV test means in a kitten under 6 months of age. Testing is generally done on a new kitten either before adoption or shortly after. The in-house test takes about 15 minutes to run, and the FIV portion of the test is a test for FIV antibodies. The mother cat with FIV rarely transfers the virus to her kittens, but she most certainly will transfer her antibodies (usually during nursing). This means that a positive FIV test in a kitten most likely indicates that the mother was FIV+. It will take some time for transferred antibodies to wane so a positive test in kitten flags the kitten for testing later on (usually around age 6 months or after). After this period, the kitten should be retested. Most kittens will revert to a negative status after their mother's transferred antibodies have worn off.

How did my Cat get Infected?

The major route of virus transmission is by the deep bite wounds that occur during fighting. There are other means of spreading the virus but they are less common. FIV can be transmitted sexually and via improperly screened blood transfusions. Casual contact such as sharing food bowls, or snuggling is very unlikely to be associated with transmission. As mentioned, infected mother cats do not readily transmit the virus to their kittens. Mother-to-kitten transmission

requires the mother to be an early stage of her own infection in order to transmit the virus. Kittens testing positive for FIV generally will revert to negative once their mother's antibodies wear off.

Isolation of an FIV+ cat is not necessary in a stable household unless the FIV+ cat is likely to fight with the other residents. That said, it is important not to introduce any new cats as this is likely to lead to fighting and consequent virus transmission.

What do I do Now?

Some lifestyle changes will probably be needed now that you know you have an FIV+ cat.



Keep your Cat Indoors Only

Now that you know your cat has an infectious disease, the responsible thing is to prevent the spread of this disease in your community. This means that your cat will need to be an indoor cat and not just for the good of the community but also to minimize his exposure to infectious diseases. Cats who are used to living outdoors will make a fuss about being allowed inside. It is crucial that you do not give in as this will simply reinforce the crying and fussing. If you just allow the fussing to run its course, it will cease and the cat will get used to the new indoor only life.

Cats who are inclined to slip past people entering the home when the door is open can be managed by leaving them in a closed room when someone is out of the house. This way, when someone arrives home, the cat does not have access to the front door.

No Raw Foods

There are currently numerous fad diets involving raw foods for pets. It is crucial that one not succumb to these popular recommendations when it comes to the FIV+ cat. Uncooked foods, meats especially, can include parasites and pathogens that a cat with a normal immune system might be able to handle but an FIV+ cat might not. Stick to the major reputable cat food brands.

Vaccination

There is some controversy in regard to what is best for vaccinating an FIV+ cat. Unlike the FeLV+ cat, who probably requires more frequent vaccination than the average cat in order to get a decent immune response, there is some evidence that vaccinating the FIV+ cat may encourage the virus to activate. This evidence involves cultured lymphocytes in test tubes, however, not actual infected cats. If you live in an area where vaccination is legally required, then you should continue to vaccinate your cat normally. Similarly, if your cat goes outdoors despite the above recommendation, then you should continue to vaccinate your cat normally. If your cat is indoors only and no other cats in the home go outside, then it is reasonable to forgo vaccination unless they come to be required for boarding or for elective veterinary procedures.

Parasite Control

The last thing an FIV+ cat needs is fleas, worms or mites, especially now that he is going to be an indoor cat. There are numerous effective [products](#) on the market for parasite control. Consult with your vet about which parasites you should be especially concerned with and which product is right for you.

Immune Stimulating Agents

There is an assortment of products on the market claiming to stimulate the immune system. Most of these do not have adequate science behind them to justify recommendation.

LTCI made by TCyte® is an injectable immunomodulator. It was originally produced as a product for FIV + cats and can still be obtained for this use but, more recently, TCyte has gained FDA approval for their product for dogs with arthritis and have shifted their marketing efforts to this objective. The original information for cats can be obtained by contacting the company.

Antioxidants

Oxidative stress is rather a long story and has been implicated in development of cancer, age-related degeneration, and other disease states. In short, oxidative stress stems from reactive oxygen compounds that are generated by our metabolism. The oxygen compounds are able to damage DNA unless they are "scavenged" (rendered harmless) by either the natural antioxidant systems of our bodies or by antioxidant supplements we take orally. Oxidative stress has been implicated in the progression of HIV infection in humans and it has been extrapolated that the same is true of FIV infection in cats. A 2008 study by Webb et al published in the Journal of Feline Medicine and Surgery looked at an antioxidant called Superoxide Dismutase in FIV cats and found an improvement in the CD4+ to CD8+ ratio in supplemented cats. This is a promising finding, though cats were only followed for a 30-day period and indicates that further studies may show more substantial clinical benefit. What this all means is that oral antioxidant supplementation may be helpful in keeping FIV+ cats healthy. While the jury is still out as to how significant a treatment this is likely to become, it is certainly clear that antioxidant supplementation may be beneficial on a number of planes and may be worth a try.

General Monitoring

While a non-geriatric FIV- cat should have an annual examination, the FIV+ cat should have a check-up twice a year. Annually, a full blood panel and urinalysis is wise. Also, it is important to be vigilant of any changes in the FIV+ cat. Small changes that one might not think would be significant in an FIV- cat should probably be thoroughly explored in an FIV+ cat. Any weight loss in particular should be addressed.

Keeping your cat indoors is the most significant step in disease prevention that you can do. The feline immunodeficiency virus is not transmissible to humans in any way.

What about Medications Used in HIV+ Humans?

AZT (brand name Retrovir®) is a prominent antiviral medication for the treatment of human HIV infection. Tests in FIV+ cats indicate that those with either neurologic signs or with stomatitis (oral inflammation) may benefit most. At this time at least (in cats), AZT seems to be something to save for when symptoms of viral infection appear. There are some bone marrow issues with red blood production and some periodic monitoring tests are advisable. If problems arise, fortunately, they are reversible and should resolve with a few days of discontinuing medication.

Drugs other than AZT seem to have more potential for toxicity and are not recommended for feline use.

The Immune-Suppressed Owner

Immune-suppressed cats and immune-suppressed owners do not mix well. Those who are immune suppressed, be they human or non-human, are inclined to become infected with opportunistic organisms and in turn shed larger numbers of those organisms than one might naturally come into contact with in the environment. This means that someone who is immune-suppressed (human or not) can serve as an amplifier for infectious agents. An immune-suppressed cat can increase an immune-suppressed human's exposure to infectious agents and vice versa. This is obviously not a good situation. The same is true for multiple immune-suppressed cats living together. If possible, there should be only one immune-suppressed individual per home.