



## FELINE LEUKEMIA VIRUS (FELV)

This article is dedicated to my wonderful FELV Kyle (picture to the left). At the bridge since 2004.

Feline Leukemia Virus (FeLV) is an RNA retrovirus or oncornavirus first described by W. Jarrett at University of Glasgow, School Veterinary Medicine, in 1964.

A retrovirus is a type of RNA virus that, unlike other RNA viruses, reproduces by transcribing itself into DNA

in the host cell.

An enzyme called reverse transcriptase allows a retrovirus's RNA to act as the template for this RNA-to-DNA transcription.

As a retrovirus, the genetic information of FeLV is carried by RNA instead of DNA.

When this happens the DNA inserts itself into a cell's DNA and is reproduced along with the cell and its daughters. The life cycle is completed when the viral DNA in the selected daughter cells makes an RNA copy of itself that covers itself in a protein coat and leaves the cell. Retroviruses sometimes destroy the cells whose DNA they alter.

Four subgroups of FeLV exist: A; B; C, and T, but only subgroup A is transmissible between cats. The other subgroups arise *de novo* and as results of recombination with an endogenous DNA feline sequence.

There are two stages of Feline Leukemia, Primary viremia, and Secondary viremia.

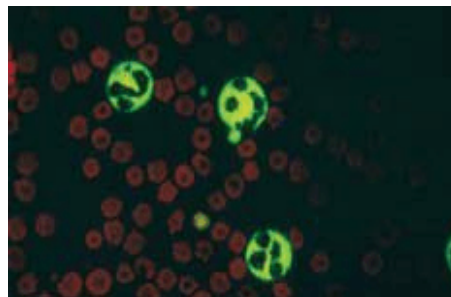
Most cats can fight off Primary viremia, but once it has reached the secondary stage, there is really no help for the cat., secondary illnesses will eventually take the cat, however life expectancy after diagnosis varies depending on the circumstances.

### How is FELV diagnosed

Two test methods (see images below) are used in practice: the IFA (blood smear sent to a special lab) and the in-hospital ELISA test (a few drops of blood or serum).

Please note that both tests detect virus antigen (p27), not antibody, therefore, a cat with a positive test is in all likelihood infected.

In the picture below you will see a + indirect fluorescent antibody (IFA) test for the FeLV antigen (p27) inside white blood cells and platelets (infected cells appear green) of a FeLV-infected cat.



In the image below you can see a + ELISA test (Combo SNAP® Test, IDEXX Laboratories) for FeLV antigen (p27) in the blood of an infected cat (the blue dot in the 3 o'clock position represents the positive test spot. The blue dot in the 12 o'clock position represents the "positive control").



PCR testing - Polymerase chain reaction (PCR) tests for FeLV may be offered by some commercial laboratories, but also may not have been independently validated.

#### How is FELV transmitted

Transmission occurs through saliva and close contact,(by close contact I mean that long and constant exposure with the infected cat), through bites, food and water dishes, grooming each other and sharing litter boxes with an infected cat.

Transmission can also occur from an infected mother cat to her kittens, either before they are born or while they are nursing.

Since FELV is a retrovirus, retroviruses are species-specific.

Meaning that a feline retrovirus will only infect cats; a human retrovirus will only infect humans.

That being said FELV it is NOT transmitted to humans or dogs,

It is only transmitted from cat to cat.

Contrary to what most people believe, FeLV is not easily transmitted.

For a cat to contract FeLV, as I mentioned above it takes prolonged, close contact the kind of contact you'd get with two cats are living together, sharing bowls, mutual grooming, food and water dishes and litter pans.

Retroviruses are weak therefore are easily inactivated by ultraviolet light, heat, detergents, and drying.

FELV can only survive outside the host about 2 hours in a dry environment, and about 48

hours in a damp environment (such as a litter box).

**FYI to rescuers**, and I specially say rescuers because all too often and specially during kitten season I get e-mails from rescuers asking other rescuers for nursing mothers to help nurse orphan kittens that they got into their rescue.

**Never ever use a cat that is nursing to nurse other orphan kittens that are not hers.**

By doing this you are putting the mom and the babies at a very high risk.

A mom that hasn't been tested can give the virus to the orphan kittens when nursing.

Orphan kittens are too little to test for the disease, if they were to be + the nursing mom and her entire litter will be at high risk of infection.

Bottle feeding orphan kittens is exhausting but is the safest way to go.

Kittens under 4 months of age are susceptible to infection, but by eight months are resistant.

Kittens can be born with it, having contracted it from their mother while in utero.

### **How does FELV progress**

The disease has a wide range of effects.

Cats can fight off the infection and become totally immune or they can become carriers,

Cats that are carriers they will never be sick, however they will spread the disease among other cats.

There are many possibilities as to how a cat's immune system will react to the virus.

Studies show that about 40% of cats extinguish the virus. 16% fight it off due to minimal exposure and another 24% resist the virus at phase four (explained below - phases). This happens approx 16 to 18 weeks after FELV infection starts.

10% of cats are able to put the virus into a latent stage, and will re-emerge when the cat is stressed out.

5% to 10% of cats go through a sequestered stage in which viremia is intermittent, limited or absent altogether.

Approximately 30% of cats go through the disease from start to finish, normally resulting in death.

At the time that the virus enters the cat body, there are 6 phases to a FeLV infection:

Phase 1- is when the virus enters the cat, usually through the pharynx where it infects the epithelial cells and infects the tonsillar B-lymphocytes & macrophages.

These white blood cells then filter down to the lymph nodes and begin to replicate.

Phase 2, the virus enters the blood stream and begins to distribute throughout the body.

Phase 3-The lymphoid system producing antibodies to attack infected and cancerous cells causing infection to spread to the rest of the body.

Phase the 4-Being main point in the infection, where the virus can take over the body's immune system cause viremia, at this point the hemolymphatic system and intestines become infected.

If at this point the cat can still fight the virus off then it will it progress into phase 5.

Phase 5- The bone marrow becomes infected. The virus replicates and is released in approx. 4 to 7 days later in infected neutrophils (white blood cells), and sometimes lymphocytes, monocytes (white blood cell formed in the bone marrow), and eosinophils (another white blood cell).

It is at this stage when the virus will remain in the cat for the rest of its life.

Phase 6- at this point the virus has really taken over the cat's body by infection, mucosal, glandular epithelial cells (tissue that forms a thin protective layer on exposed bodily surfaces and forms the lining of internal cavities, ducts, and organs) become infected.

Cats diagnosed as persistently infected by ELISA testing may die within a few months or may remain asymptomatic for up to 4 years, as the virus will lay dormant in the bone marrow for up to 4 years.

FeLV produces a variety of associated diseases and symptoms.

In some cats the virus can produce degenerative diseases, liver disease, anemia, reproductive and intestinal problems.

In other cats, it produces cancerous diseases such as leukemia and lymphosarcoma.

Cats infected with felv are susceptible to secondary infections such as respiratory infections (URI's), chronic gingivitis, stomatitis, bladder infections (UTI's), etc.

Other associate illnesses: unexplained weight loss, enlarged lymph nodes, fever, seizures, neurological disorders, etc.

This is why is imperative that cats with FELV are seen by a veterinarian every 6 months for a check up and any secondary infections MUST be attend it to immediately, no buts.

Although there is no known cure for the virus infection, in 2006 the United States Department of Agriculture approved Lymphocyte T-Cell Immunomodulator as a treatment aid for FeLV and/or FIV infections.

### Prevention

Vaccines for FeLV are available, However please keep in mind that no vaccine is 100%.

Your best bet is to always keep your cat(s) indoors and to spay, neuter them to discourage them from wanting to explore the outdoors when picking up scent that are attractive to them such a female in the neighborhood that is in heat.

When bringing in a new cat into your household always test the newcomer before he or she is introduced to the rest of the feline family.

It is recommended that the cat be tested when first arrive and then test anywhere from 60 to 90 days later.

The reason for the above is because in the event that the cat was just exposed to the virus when you just brought the cat home, it will not show up in the first test. If infected will show up 60 to 90 days later.

It is also recommended that kittens be tested between 6 and 8 months for results to be accurate.

Testing also should be done in all cats in an existing household prior to bringing in a new uninfected cat, I know this may sound costly to you (as testing is not cheap), but it is money well spend it if you want your cats to live long healthy lives.

If you decide to give your cat the FELV vaccine, please be sure the cat is tested for the virus and the results are negative prior to administering the vaccine.

HPR does not recommend FELV vaccines, due to the risk of vaccine associated sarcomas, which is an aggressive tumour, at the injection site, due to the inflammation caused by aluminium adjuvants in the vaccines.

Merial produces a recombinant vaccine consisting of canarypox virus carrying FeLV gag - group specific antigen and env - enveloped genes (sold as PUREVAX FeLV in the USA and Eurifel FeLV in Europe).

This is known to be safer than the old vaccine as it does not require an adjuvant to be effective, it is a "LIVE VIRUS" vaccine that apparently is from a bird host and doesn't not replicate on mammals.

#### Approved US Treatment

Please note that any treatment for FELV+ cats should be closely monitored by a license veterinarian.

Specially treatments for Feline lymphoma with the use of cytotoxic drugs as these drugs may cause significant toxicities if not dosed and administered properly. Most cytotoxic drugs are also carcinogens and must be handled properly. Before undertaking treatment with these drugs,

In 2006, the US Department of Agriculture (USDA) issued a conditional license for a new treatment aid called Lymphocyte T-Cell Immune Modulator.

<http://www.imulan.com/felv-fiv-treatment.html>

Lymphocyte T-Cell Immune Modulator is used as an aid in the treatment of infected FELV and FIV cats with associated symptoms of lymphocytopenia, anemia, granulocytopenia, opportunistic infections or thrombocytopenia.

Interferon Alpha is also used in the treatment of FELV + cats in non-terminal stages and

has been proven its use to be a substantial improvement in mortality rates; in non-anaemic cats, mortality rate of 50% was reduced by approximately 20% following treatment.

**Additional known treatments:** Staph Protein A, Baypamun (not sold in the US) rumor has it that the drug ZYLEXIS sold by Pfizer, is the same drug as Baypamun but nothing is confirmed.

[http://www.pfizerah.com/Product\\_Overview.aspx?drug=ZS&country=US&lang=EN&species=EQ](http://www.pfizerah.com/Product_Overview.aspx?drug=ZS&country=US&lang=EN&species=EQ)

Steroids and many homeopathic products on the market today are known to be very beneficial in the aid and support of FELV+ cats.

As mentioned before always consult with your veterinarian before starting any treatment or given any medications to your pets.

Please note that FELV is a deadly disease, the mortality rate is very high and unfortunately as of today there is not known cure for it.

### **FELV infection management.**

1- Always keep your FELV+ cat(s) indoors, by doing so exposure to other diseases will be minimum, keeping your cats indoors will also prevent the spreading of infection to other cats in your neighborhood.

2- Spay and neuter is a must.

3- Raw diets are NOT advisable because of the risk of - borne bacteria as well as parasitic infections. That being said proper nutrition and support is a must for your FELV+ cat.

4- Vet visits every six months are a must for a detailed physical examination where eyes, gums, skin, weight and lymph nodes are checked among a complete blood count, serum biochemical analysis, and urine analysis is performed.

5- Always monitor the behavior as well as the health of your FeLV+ cat .

Call your vet the minutes you notice that your cat is acting different than usual. Sing can be that your cat is lethargic, behaving different, etc.

FeLV and FIV Feline immunodeficiency virus are in the same family however the 2 viruses are very different. Shape wise FeLV is more circular while FIV is elongated. genetically they are also quite different as their protein coats differ in composition and size. Although many of the diseases caused by FeLV and FIV are similar, the specific ways in which they are caused are very different.

While an FELV infected cat's immune system is definitely compromised, making him more susceptible to other infections, there is no reason why the cat cannot live a long and healthy life with proper nutrition and support.

Some FELV+ cats can live for many years and unfortunately for some life is very short, but whatever the case may be please remember that cats with FELV need homes too, so if you are looking for a furry companion and you have no other cats in your household, please look pass the disease and open your heart and home to an FELV + cat.

These little ones deserve homes too and all too often they are euthanized in shelters because of the disease, some vets also all too often recommend euthanasia for these animals to their owners once the test has come back +, and in my eyes there is no - reason for it.

**Education to the clients and to the public on the disease is what is need it, no euthanasia for these sweet and loving little ones as all too often + cats are.**

My Kyle had given me many years of fun times, purrs and love .

At the time I didn't know much about the disease as I know today, at the time when he first was tested his test came back +, at the time my vet too recommend it euthanasia, I am glad I brought him home that day!

He was the best cat I ever had, he went to the Bridge peacefully 4 years ago at 3.5 years of age , we will meet again I know and I cannot wait.

If you already have an FELV+ cat in your home please know that there is already a seat in heaven waiting for you.

If you don't have one yet, what are you waiting for be a guardian Angel and adopt one today.

**THANK YOU.**

Celene Albano  
HPR Rescue CEO

Website:  
[www.hurricanepetsrescue.org](http://www.hurricanepetsrescue.org)

ADOPTIONS:  
[www.hurricanepets.petfinder.com](http://www.hurricanepets.petfinder.com)

Telephone:786-999-8239