

# Feline Leukemia Virus Disease Complex

## What is feline leukemia virus (FeLV)?

Feline leukemia virus (FeLV) is a virus that infects cats. It was first discovered in cats with a form of leukemia (cancer of the white blood cells). FeLV can cause a variety of diseases in addition to leukemia. Like all viruses, FeLV is a tiny microorganism that can only replicate itself inside living cells. FeLV is specific to members of the cat family and does not pose a risk to other species of animals or people.

## How common is FeLV?

FeLV infection is found worldwide. In general, around 1-2% of the cat population is persistently infected with this virus, and many more are exposed. The number of cats infected differs according to the geographical location, environment, and the lifestyle of the cat. Infection is more common in colonies of cats where there is close contact between individuals.

## What disease does the virus cause?

FeLV invades various cells of the cat's immune system and blood-forming tissues. Invasion into the cell leads to death of the cell or a **mutation** (change) in the cell's genetic code. Such a change can make the cell potentially cancerous, although this change may not occur for months to years after infection.

Cancers can occur in a variety of tissues, organs, and body sites due to FeLV. Such cancers can involve any type of the circulating white blood cells (leukemia) or other cells of the blood-forming tissues. The most common tumor associated with FeLV is that of lymphoid cells known as **lymphoma** or **lymphosarcoma** (see handout "Lymphoma in the Cat"). These tumors may occur at single or multiple sites in the body.

Although the development of cancer is one outcome of FeLV infection, other diseases are more common. In many cats, FeLV infection results in a moderate to severe suppression of the immune system. This means that the infected cat is less able to defend itself against a wide range of infections that would not normally cause a problem in healthy cats. Affected cats may develop various clinical signs, and there is a progressive deterioration in their health over time.

Another common occurrence in FeLV-infected cats is the development of life-threatening **anemia** (low red blood cells). Other problems, including abortion, severe enteritis (intestinal inflammation), neurological (nerve) disease, and ocular (eye) disease are commonly associated with FeLV infection.

FeLV-related disease is usually fatal. Studies have shown that 80-90% of FeLV-infected cats will die within three to four years of initial diagnosis.

## How is FeLV transmitted?

Direct contact between cats is the most frequent method of FeLV infection. The virus is fragile and cannot survive longer than a few hours outside of the cat. A cat with FeLV sheds a large quantity of the virus in its saliva, as well as in other bodily fluids such as nasal secretions, urine and feces. However, FeLV is not a highly contagious virus, and transmission generally requires a prolonged period of close contact between infected and susceptible cats. Close contact activities include mating, mutual grooming, and sharing of litter trays and food bowls. Cat bites by an infected cat can readily transmit infection.

Another potential source of infection occurs when a pregnant cat infected with FeLV gives birth. In this situation, the kittens may be born with FeLV virus or, more likely are infected when their mother grooms them. However, most queens infected with FeLV are infertile or there is pre-natal death of the kittens with abortion or resorption of the fetuses.

## **What happens when a cat is exposed to FeLV?**

Not all cats exposed to FeLV will develop persistent infections. The immune system of many infected cats responds to the virus, and about 20-30% of these cats successfully eliminate the virus before it can spread throughout the body. This is called Abortive Infection.

30-40% of infected cats will have Regressive Infection: the virus has a chance to spread into organs or bone marrow before the immune system removes it from the bloodstream. These cats aren't normally infectious to other cats; however, anything that suppresses their immune response can cause the virus to circulate again, resulting in them becoming contagious and potentially developing FeLV-related disease. However, until the infection is cleared, these cats carry the virus and damage can be done during this time that may lead to disease later in life.

## **"Not all cats exposed to FeLV will develop persistent infections."**

The remaining 30-40% of infected cats will have Progressive Infection: the immune system is unable to get rid of the virus and it spreads to lymph nodes and organs. Following infection, these cats become persistently and permanently infected with the virus and are at the highest risk of developing FeLV-related disease. It is these permanently infected cats that are primarily responsible for the transmission of FeLV to other cats. It can be many months or even years between the initial virus infection and the onset of related clinical disease problems. During this time, virus particles may be continuously shed in the cat's saliva.

## **How can FeLV infection be diagnosed?**

Diagnosis of FeLV infection is relatively simple in cats with Progressive Infection. A rapid blood test can be performed which is able to detect parts of the virus in the blood of an infected cat. This test is very accurate and reliable, although false results may rarely occur. This is not the case for cats with Regressive infection. They may have inconsistent results (false negatives) due to the fluctuating levels of virus in their blood as their immune system is reducing virus numbers or if immune suppression causes the virus to replicate again. This is why sick cats may be tested again for Feline Leukemia virus after previously testing negative. Some cats with only a transient FeLV infection (Abortive infection) will be positive on the initial blood test. A second test performed eight to twelve weeks after the first test may be required to differentiate between temporary and persistent infections. In some situations, it may be necessary to confirm infection through additional blood testing at a specialized laboratory.

Diagnosis of disease due to FeLV is more difficult because of the variety of signs and symptoms. It is common to have a complicated situation in which other diseases or conditions occur alongside the FeLV infection.

### **Is there any treatment for FeLV infection or disease?**

There is currently no specific treatment for FeLV-infected cats. There is no treatment to eliminate the virus from the body. Most FeLV-infected cats will eventually die or require humane euthanasia due to diseases related to their infection. However, many cats showing FeLV-related disease will improve with symptomatic treatment, at least temporarily. For example, if FeLV is causing immunosuppression and the patient develops secondary infections, the secondary infections may be treatable, leading to clinical improvement.

Newer treatments showing some promise include immune modulators such as human interferon alpha, or feline recombinant interferon omega. Ask your veterinarian what is best for your cat.

### **How can infection be prevented?**

Vaccines are available to protect cats against FeLV infection. Their use is highly recommended for any adult cat that goes outside at any time and therefore could have contact with FeLV-infected cats. Vaccination is also recommended for all kittens, regardless of lifestyle, because kittens are highly susceptible to infection. As with other vaccines, an initial course of two injections is required, and regular boosters are necessary to maintain immunity. Your veterinarian will discuss the most appropriate vaccination options for your cat with you. All cats should be tested for FeLV prior to vaccination.

Although vaccination is very helpful in preventing infection with FeLV and therefore controlling FeLV-related disease, no vaccine is 100% protective. Do not allow your cat to roam. When possible, do not allow your cat, particularly as a kitten, to come into close contact with known FeLV-infected cats or cats without a known history of proper vaccinations.

In larger colonies of cats, it is possible to control FeLV infection through a combination of routine FeLV testing, quarantine, and vaccination programs. Fortunately, vaccinating a cat does **not** interfere with future blood testing for FeLV.