

What is feline leukaemia virus infection?

- It is caused by feline leukaemia virus (FeLV), a retrovirus, which may induce depression of the immune system, anaemia and/or lymphoma.
- It affects cats worldwide. The prevalence of infection in Europe is low ($\leq 1\%$), but may exceed 20% locally.
- Over the past 30 years, the prevalence of FeLV infection has dropped considerably, thanks to reliable diagnostic tests enabling removal of infected cats and effective vaccination.

Infection

- Transmission of FeLV occurs through viral shedding (mainly saliva, but also faeces, nasal secretions, milk) by infected cats, mainly through friendly contact (mutual grooming), but also through biting and blood transfusion.
- The virus does not survive for long outside the host and is readily destroyed by disinfectants, soap, heating and drying.
- However, the virus may survive in faeces; it remains viable if kept moist at room temperature (e.g. in contaminated needles) or in refrigerated blood for transfusions.
- The infection usually starts in the oropharynx, followed by bone marrow infection and viraemia.
- In the cell, the viral RNA is reversibly transcribed into viral DNA, which is usually incorporated into the host cell genome (provirus).
- Three outcomes of FeLV infection can be defined:
 - **Abortive infection:** circulating anti-FeLV antibodies are present in serum. The infection is not detectable with standard FeLV antigen or PCR detection methods.
 - **Regressive infection:** FeLV proviral DNA remains integrated into the DNA of host cells (DNA PCR is positive, antigen test negative) in cats that have overcome viraemia (or even without previous transient viraemia). Viraemia can be reactivated by stress and/or high doses of corticosteroids. Blood donors should be tested by PCR for FeLV provirus, as regressively infected cats can transmit FeLV.
 - **Progressive infection:** The viraemia persists (antigen test and DNA PCR positive). These cats continuously shed FeLV and often develop FeLV-associated diseases.
- Young kittens are especially susceptible to FeLV (progressive) infection. With age, cats become increasingly resistant.

Clinical signs

- The most common signs of persistently FeLV viraemic cats are:
 - Anaemia (mainly non-regenerative)
 - Immune suppression (predisposition to other infections)
 - Lymphoma (mediastinal, peripheral, spinal)
- Less common:
 - Lymphoma (gastrointestinal, renal, cutaneous, ocular)
 - Other neoplasias
 - Immune-mediated uveitis
 - Reproductive disorders in viraemic queens (foetal resorption, abortion, neonatal death and fading kittens)
 - Peripheral neuropathies (anisocoria, mydriasis, Horner's syndrome, abnormal vocalisation, hyperesthesia, paresis, paralysis).
- Most progressively infected cats will develop clinical signs typical for this infection, but some may remain healthy for years with proper care and an indoor-lifestyle.

Diagnosis

- For routine diagnosis, the following tests are used:
 - **FeLV p27 antigen** (in-house tests): a positive test result indicates antigenaemia, usually consistent with viraemia.
 - The p27 antigen test gives persistent positive results in progressively infected cats and may be transiently positive in regressively infected cats.
 - Cats testing antigen positive may overcome viraemia after a few weeks or months (regressive infection). FeLV-positive cats without clinical signs should be retested later.
 - Cats with regressive or abortive infection will test negative.
 - **FeLV provirus:** PCR detects genome-integrated FeLV proviral DNA, and is positive in both progressively and regressively infected cats.
 - **FeLV RNA:** a positive result (RNA from blood or saliva) is a reliable indicator of viraemia. The test becomes positive very early following FeLV infection, before p27 antigen testing becomes positive.
- **NOTE:** In areas of low FeLV prevalence, positive p27 antigen test results may be false positives: a positive test result in a healthy cat should be confirmed, preferably by PCR for provirus.
- Cats that have cleared FeLV from plasma (regressively infected cats) will be negative by

Please see the
**ABCD FeLV
diagnostic tool**
for more detailed
information on
diagnostic tests

p27 antigen tests, but remain positive by PCR for provirus and some cats may even be positive for RNA at low levels.

Disease management

- Supportive therapy (including fluid therapy, if required) and good nursing care are essential.
- Secondary infections should be treated promptly.
- Feline interferon omega may reduce clinical signs and extend the survival time.
- Zidovudine may be used, but side effects may occur.
- FeLV infected cats should remain indoors and receive regular clinical check-ups (every 6 months).
- Corticosteroids at high doses, other immune-suppressive or bone marrow-suppressive drugs should be avoided, unless used as a treatment of FeLV-associated malignancies or immune-mediated disease.

Vaccination recommendations

- All cats of uncertain FeLV status should be tested prior to vaccination for p27 antigen and preferably also for FeLV provirus.
- Progressively infected cats should not be vaccinated against FeLV (no benefit).
- Regressively infected cats do not need to be vaccinated against FeLV (acquired immunity).
- FeLV vaccination is not a core vaccine. However, all healthy cats with a potential risk of exposure (outdoor access, contact to cats with unknown FeLV status) should be vaccinated against FeLV.
- Kittens should be vaccinated at 8 to 9 weeks of age, with a second vaccination at 12 weeks, followed by a revaccination one year later.
- In view of the significantly lower susceptibility of older cats, FeLV boosters can be given every 2 to 3 years after the age of 3 years.
- Vaccination of FeLV viraemic/antigenaemic, healthy cats against common pathogens should be maintained, but inactivated vaccines are recommended.



Image courtesy of Tadeusz Frymus, ABCD

- Anaemia in a cat with progressive FeLV infection. Most progressively infected cats develop clinical signs typical for FeLV infection.



Image courtesy of Marian Horzinek, ABCD

- Thymic lymphoma in the thorax of an FeLV-infected cat.

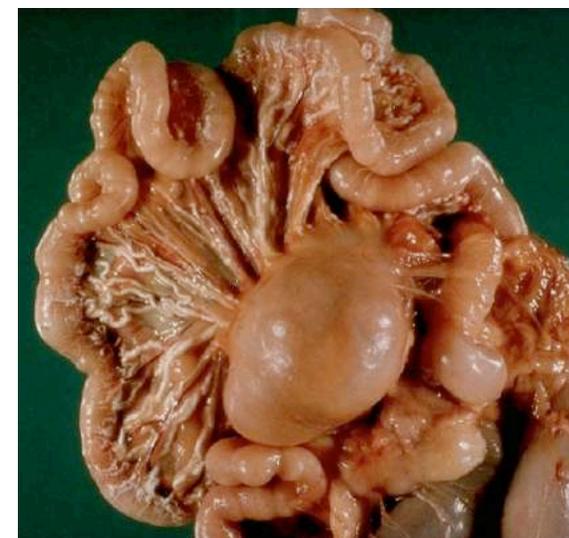


Image courtesy of Hans Lutz, ABCD

- Mesenteric lymphoma associated with FeLV infection.