

What are mycobacterial infections in cats?

- *Mycobacterium* spp. infections in cats can be divided in three main groups: tuberculosis complex group (TB complex), feline leprosy syndrome (FLS) and non-tuberculous or atypical mycobacteria (NTM).
 - The **TB complex** includes *M. tuberculosis* (rare in cats), *M. bovis* and *M. microti*. Infections due to *M. bovis* and *M. microti* can be common in cats in TB endemic areas. Risk factors include contact with infection reservoir hosts (e.g. voles) or with environmental contamination (badgers). The cat is a spillover host and the risk of cat-to-human transmission is considered very low.
 - **FLS** is mainly caused by *M. lepraemurium*. Risk factors include contact with small rodents. Zoonotic potential is negligible.
 - **NTM** can be caused by a large number of saprophytic species present in the environment. The zoonotic risk is very low. Only *M. avium* has a major zoonotic potential, especially in immunocompromised people.

Infection

- Major risk factors are: an outdoor lifestyle, living in a TB endemic area and contact with small rodents (hunting).
- Most infections occur in immunocompetent cats, but cases of *M. avium* infection have been reported in immunocompromised cats. Siamese and Abyssinian cats may be predisposed to *M. avium* infection.
- Infection usually starts in the skin (rodent bites, contamination of wounds) and may spread systemically. FLS infections rarely become systemic.
- Systemic infections (lungs, liver, mesenteric lymph nodes, bone, eye and CNS) without cutaneous involvement are rare, and generally due to species in the TB complex or *M. avium*.

Clinical signs

- Skin lesions: solitary or multiple dermal nodules, skin ulcers and non-healing draining tracts, regional lymphadenopathy.
- Extensive granulomatous panniculitis is seen with NTM infections or following contamination of a surgical wound.

- Fever, respiratory signs (cough, dyspnoea), uveitis, organomegaly, generalised lymphadenopathy, signs of bone involvement (pain, lameness) can occur in case of systemic disease.

Diagnosis

- Skin lesions with a granulomatous inflammatory pattern on cytology or histopathology should be considered suspicious of mycobacterial infection.
- Acid-fast (e.g. Ziehl-Neelsen or ZN) staining should be performed on cytology or histology samples with granulomatous changes.
 - The presence of acid-fast bacteria is likely to indicate mycobacteria. Species identification is not possible.
 - The absence of acid-fast bacteria does not rule out mycobacterial infections. Samples should be submitted for culture and/or PCR for further investigation (keep some sample material in sterile frozen storage for future culture studies if required).
- Specific culture (in reference laboratories) and/or PCR and sequencing of fresh samples are the diagnostic tests of choice to confirm infection and identify the mycobacterial species. PCR can also be performed on paraffin-embedded tissue samples.

Disease management

- In many countries, euthanasia of infected animals is recommended taking into account the zoonotic risk and prognosis, depending on the species involved.
- Treatment compliance and zoonotic risk should be discussed with the owners prior to treatment, in particular if there are immunocompromised members of the household.
- An oesophagostomy tube or gelatine capsules may be used to facilitate compliance.
- Treatment is based on the combination of two or three antibiotics, usually rifampicin, plus a macrolide plus a fluoroquinolone. The choice of antibiotics should be based on the type of mycobacteria or antibiotic susceptibility tests, if available.

- Long-term (> 6 months) treatment is recommended, as insufficient treatment may lead to relapses or the development of resistance.
- The surgical excision of nodules may be curative in some cases of FLS, due to the localised nature of the disease. Surgical de-bulking or debridement may be needed in some cases presenting with extensive severe disease (NTM infections), but wound dehiscence is a risk.
- Prognosis is guarded to favourable.

Zoonotic risk

- The TB complex species and *M. avium* complex species are zoonotic.
- Cats are spillover hosts for mycobacterial infections, so the risk of cat-to-human transmission is considered very low. The greatest zoonotic risk is the inhalation of organisms from cats with respiratory disease or the contamination of wounds with bacteria.

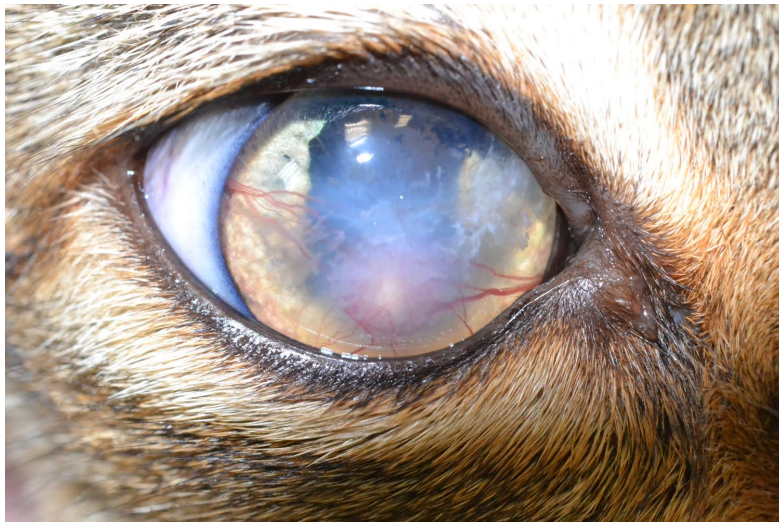


Image courtesy of Albert Lloret

- Uveitis in a cat with mycobacteriosis due to *M. mageritense*.



Image courtesy of Albert Lloret

- Cat with granulomatous panniculitis caused by an atypical or NTM mycobacteria, *M. mageritense*.



Image courtesy of Albert Lloret

- Same cat as above, after 6 months of antibiotic therapy.