

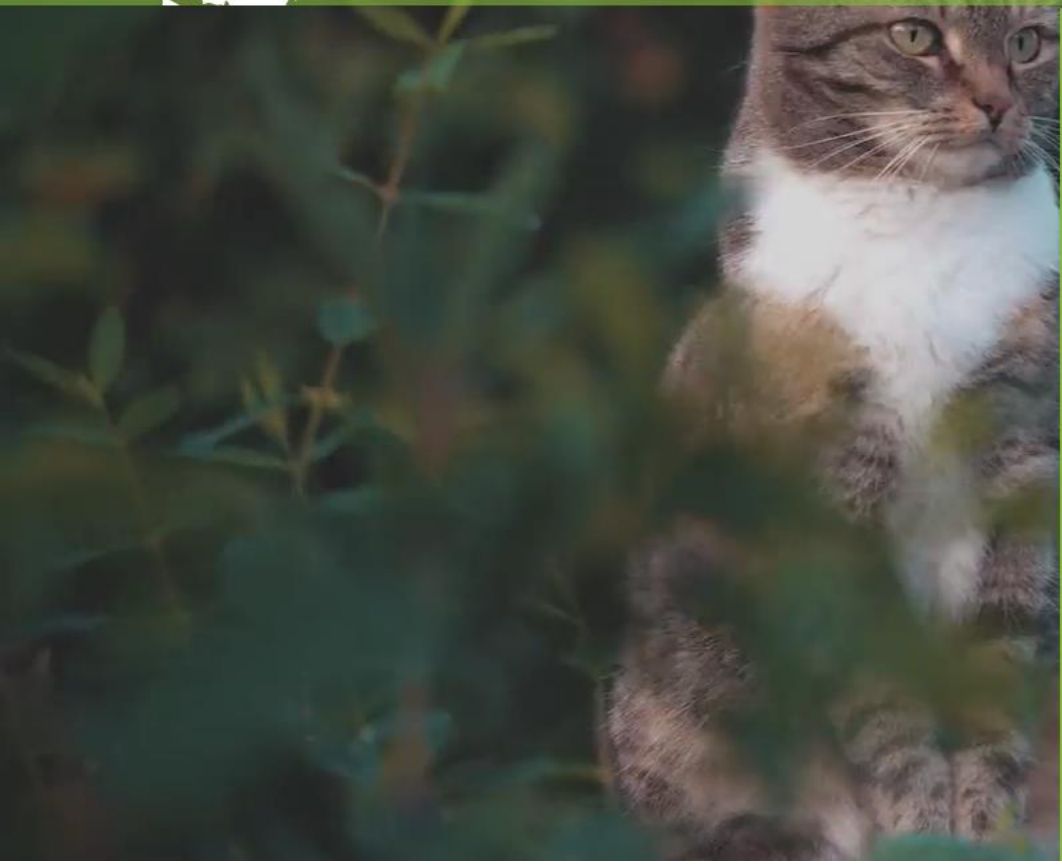
Feline infectious diseases

	FeLV	FIV
Transmission	Secretions (saliva, urine...)	Bite or blood transfusion.
Infection	In several cases, the infection regresses!	Remain infected lifelong.
Clinical signs		
Bone marrow infection	More common in FeLV → neutropenia, anaemia (often non-regenerative macrocytic)	
Lymphoma risk		
Survival		
Treatment		



EUROPEAN
ADVISORY BOARD ON CAT DISEASES

ABCD



General

- Infectious diseases in shelter situations and their management
- Blood transfusion
- Feline injection-site sarcomas (FISS)
- Vaccination of immunocompromised cats
- Vaccine recommendations

Infections

Viral

- Feline Panleukopenia (FPV)
- Feline herpesvirus upper respiratory infection (FHV)
- Feline calicivirus upper respiratory infection (FCV)
- Feline infectious peritonitis (FIP)
- Feline leukemia virus (FeLV)
- Feline immunodeficiency virus (FIV)
- Rabies
- Poxvirus infection

Bacterial

Diseases

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Table 21: General treatment recommendations for progressively FeLV-infected cats

- **Treatment in patients without clinical signs**
 - If no clinical signs are present, no treatment is necessary.
 - Strict indoor-only lifestyle is recommended.
- **Treatment in patients with various clinical signs**
 - If clinical signs are present, first identification of any underlying diseases (FeLV itself alone is usually not responsible for the clinical signs, e.g., secondary infections might be present) is essential.
 - Underlying diseases should be treated thoroughly.
- **Treatment of FeLV-infected cats with lymphoma**
 - In cats with FeLV-associated lymphoma, antitumor chemotherapy using a recommended protocol can be used similarly to non-infected tumour patients.
 - However, owners should be informed about more guarded prognosis.
- **Treatment of FeLV-infected cats with anaemia**
 - Blood transfusions is recommended if anaemia is severe.
 - Treatment with an erythropoietin derivative (e.g. darbepoetin (long acting recombinant human erythropoietin) 0.25-0.5 µg/kg SC weekly until HCT is normal, then increasing dose interval for maintenance)) can be tried.
 - If there is no effect, glucocorticoid treatment (e. g. prednisolone 2 mg/kg PO q1h as a starting dose, then slowly tapered down to effect) can be considered (anaemia in FeLV-infected cats can have an immune-mediated origin, and some cats might respond).
- **Treatment of FeLV-infected cats with neurologic signs**
 - Underlying diseases (e.g., lymphoma) causing the neurologic signs have to be identified and treated.
 - If no underlying disease is identified (and the neurologic signs are assumed to be caused by FeLV directly), treatment with zidovudin (AZT) 5 mg/kg PO q12h might be an option.
- **Treatment of FeLV-infected cats with recurrent infections**
 - Aggressive treatment (e.g., longer courses of bacteriocidal antibiotics) of recurring infections (e.g., long-term antibiotics after culture and sensitivity) is recommended.
 - If this is not successful, treatment with antiviral or immunomodulatory drugs (e.g., feline interferon-omega 10⁶ IU/kg SC 1x/week (or alternatively 10⁶ IU/kg SC q24h for 5 consecutive days, 3 courses starting on days 0, 14, 60) or raltegravir 20-25 mg/kg PO q12h or AZT 5 mg/kg PO q12h) can be tried.
- **Treatment of FeLV-infected cats with chronic gingivostomatitis**
 - Treatment of choice in cats with severe chronic gingivostomatitis is removal of all teeth (usually in 2 sessions; total removal of all tooth roots must be confirmed by radiographs).
 - If total mouth extraction is not an option, medical treatment can be tried.
 - Glucocorticoids should be avoided.
 - If concurrent FCV infection is present, local oromucosal treatment with feline interferon-omega (0.1 × 10⁶ IU/cat q24h) might be an option.
 - If no FCV infection is present or interferon-omega is not effective, treatment trial with azidothymidine (AZT) (5 mg/kg PO q12h) plus antibiotics can be used.
 - In addition, lactoferrin topically (40 mg/kg q24h) to the oral mucosa can be tried.

FIP

90% of cats who have lived in a shelter or the street carry feline coronavirus.

5% will develop a mutation that allows the virus to replicate within monocytes-macrophages, leading to:

- Granulomas (dry FIP)
- Vasculitis (wet FIP)

No need to isolate FIP cat from other cats - IF THEY LIVED TOGETHER, THEY ALL HAVE CORONA!

Clinical signs:

- Weight loss, fever, jaundice, effusions
- Neurological
- Ocular
- Dermatological (rare)

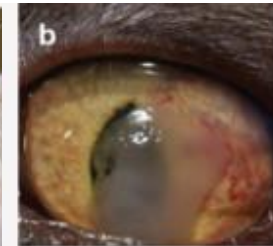


Figure 11 (a) Uveitis and leakage of fibrin into the anterior chamber of the eye. (b) Rubeosis iridis and a clump of fibrin. Images courtesy of Jessica Meekins



Diagnosis:

Blood:

- Haematology: lymphopenia, anaemia
- Biochem: ↑bilirubin, ↑globulins, albumin/globulin often <0.4 (not FIP if >0.8)
- ? Serum antibodies not very helpful (90% of shelter cats will be+, 10% of FIP cats will be-)
- ? RT-quantitative PCR on blood has poor sensitivity/specificity, do it on effusions or masses instead!

Effusions:

- Low cell count (modified transudate) but high protein (exudate)
- Albumin/globulin often <0.4 (not FIP if >0.8)
- Cytology: neutrophils and macrophages (the definition of pyogranulomatous)
- Alpha1-glycoprotein >1500 ug/ml
- RT-quantitative PCR: detects viral RNA (high levels → FIP very likely)
- ImmunoCYTOCHEMISTRY: detects viral antigen (high levels → FIP very likely)

FNAs of lesions / CSF / aqueous humour:

- Cytology: pyogranulomatous
- RT-quantitative PCR (high levels → FIP very likely)
- ImmunoCYTOCHEMISTRY (high levels → FIP very likely)

Biopsies of a mass, liver, kidney, mesenteric lymph node:

- Histopathology: pyogranulomatous
- RT-quantitative PCR (high levels → FIP very likely)
- ImmunoHISTOCHEMISTRY: detects viral antigen (high levels + pyogranulomatous lesion → **CONFIRM FIP, GOLD STANDARD**)

Treatment - ISFM protocol

Clinical presentation	GS-441524 – oral	Remdesivir – by intravenous or subcutaneous injection
Cats with effusions and without ocular or neurological signs	10-12 mg/kg once daily	10 mg/kg once daily
No effusion and without ocular or neurological signs	10-12 mg/kg once daily	12 mg/kg once daily
Ocular signs present (effusive and non-effusive)	15 mg/kg once daily	15 mg/kg once daily
Neurological signs present (effusive and non-effusive)	10 mg/kg twice daily (i.e. 20 mg/kg/day given as a divided dose q 12 hours)	20 mg/kg once daily

NOTE ON WEIGHING CATS: It is very important to weigh cats weekly during treatment, using accurate scales – weight gain and/or growth in kittens will occur with successful treatment necessitating an increase in dose to ensure that the dosage of antiviral administered is still appropriate for the type of FIP being treated as in Table 1.

GS-441524:

When a cat has been started on injectable, he can be switched to oral the next day.

Oral works as well as injectable, cheaper and avoids PAINFUL daily injections.

Minimum 12 weeks (and 2 weeks after being clinically well, without effusions, N haematology and bioch).

On empty stomach (after fasting 12h overnight, then syringe water, wait 2h to feed).

Cost-limited clients? Mefloquine, give with food to prevent vomiting.

Need advice on the treatment of FIP?
If advice is needed on the diagnosis and treatment of a suspected case of FIP, please email
fipadvice@gmail.com

Feline upper respiratory tract infection

Most common primary organisms:

- Herpesvirus
- Calicivirus
- Chlamydia felis
- Mycoplasma
- Bordetella bronchiseptica

Secondary infections:

- Staph.
- Strept.
- Pasteurella

HERPESVIRUS

Severe ocular & respiratory signs

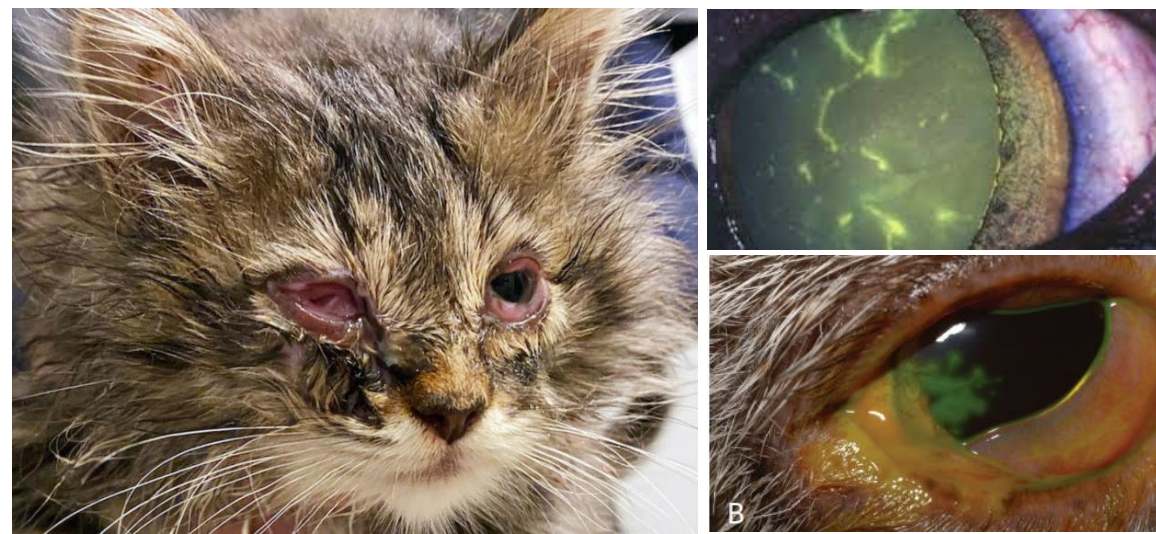
Turbinate lysis

Conjunctivitis

Keratitis

Dendritic ulcers – pathognomonic

Facial ulcers



CALICIVIRUS

Mild respiratory signs

Tongue ulcers

Chronic gingivostomatitis

Rare: limp after vaccine



CHLAMYDIA FELIS

Conjunctivitis

Chemosis (starts unilateral)

Abortion



MYCOPLASMA & BORDETELLA

Ocular + nasal discharge

LRT: fever, cough.

Diagnosis:

Often based on clinical signs.

Culture of nasal discharge? NO.

Can do PCRs of conjunctival or pharyngeal swabs - but negative doesn't rule it out and healthy cats can test positive.

Treatment of URT infection:

- High calory diet, mirtazapine, feeding tube.
- Nebulise. **Never nebulise cats with mucolytics or anything other than saline - can cause bronchospasm.**
- Analgesia.
- Antibiotics?

If clinical for <10 days: wait until it resolves; only give Doxy if purulent nasal discharge AND fever or anorexia.

If clinical for >10 days: Doxy 10d.

Journal of Veterinary Internal Medicine

ACVIM
American College of Veterinary Internal Medicine

Open Access

Guideline and Recommendation

J Vet Intern Med 2017;31:279–294

**Antimicrobial use Guidelines for Treatment of Respiratory Tract
Disease in Dogs and Cats: Antimicrobial Guidelines Working Group
of the International Society for Companion Animal Infectious
Diseases**

Additional treatment for Herpes:

Famciclovir.

Eyes – Trifluridine. No steroids.

Additional treatment for Calici:

No strong evidence that any antiviral or interferon helps clinical signs.

Additional treatment for Mycoplasma, Bordetella, Chlamydia:

Doxy. NOT AMOXI-CLAV (ineffective for all Mycoplasma and most Bordetella/Chlamydia)

SHELTER MEDICINE

There should be 4 areas:

1. Healthy, FIV and FeLV-negative cats;
2. Infectious cats;
3. Lactating queens and kittens;
4. Quarantine for new cats - 6 weeks (the time it may take to detect FIV/FeLV in a recently infected cat).

New cats should be tested for:

1. FeLV antigen (any age)
2. FIV antibodies (when >6 months of age, due to false+ from maternal antibodies)
3. NOT respiratory infections



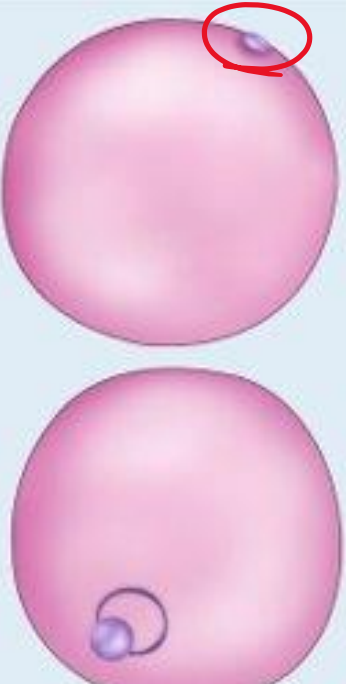
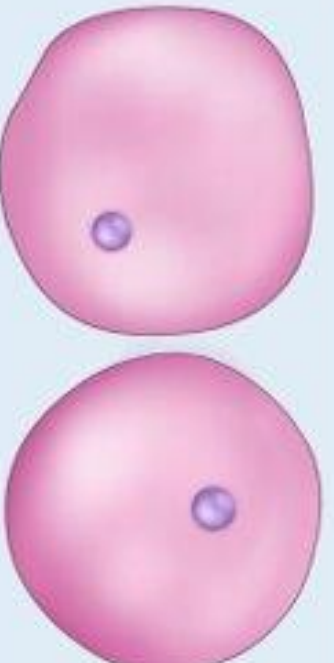
Shelter cats should be vaccinated for P + H + C:

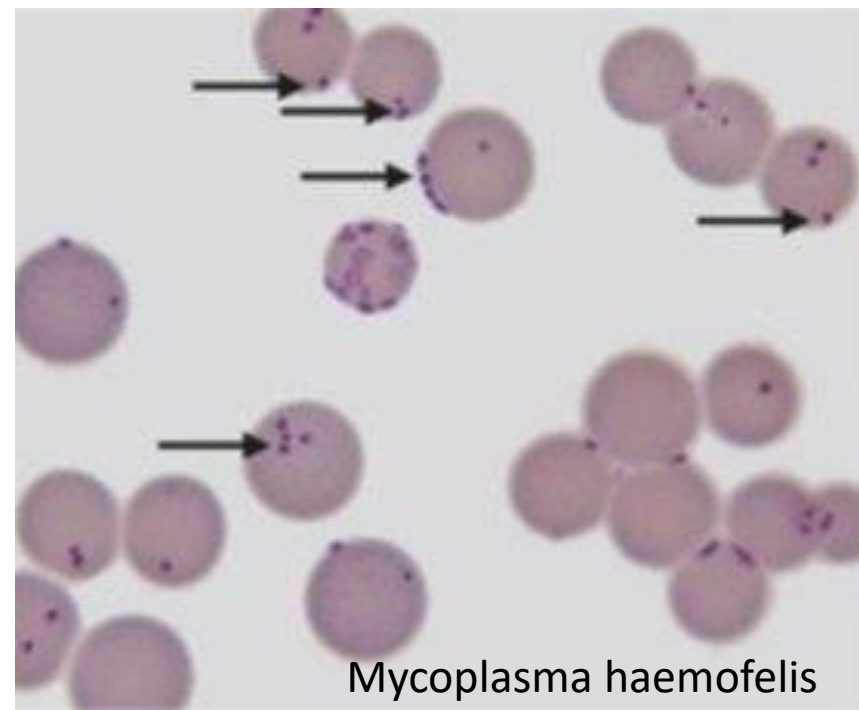
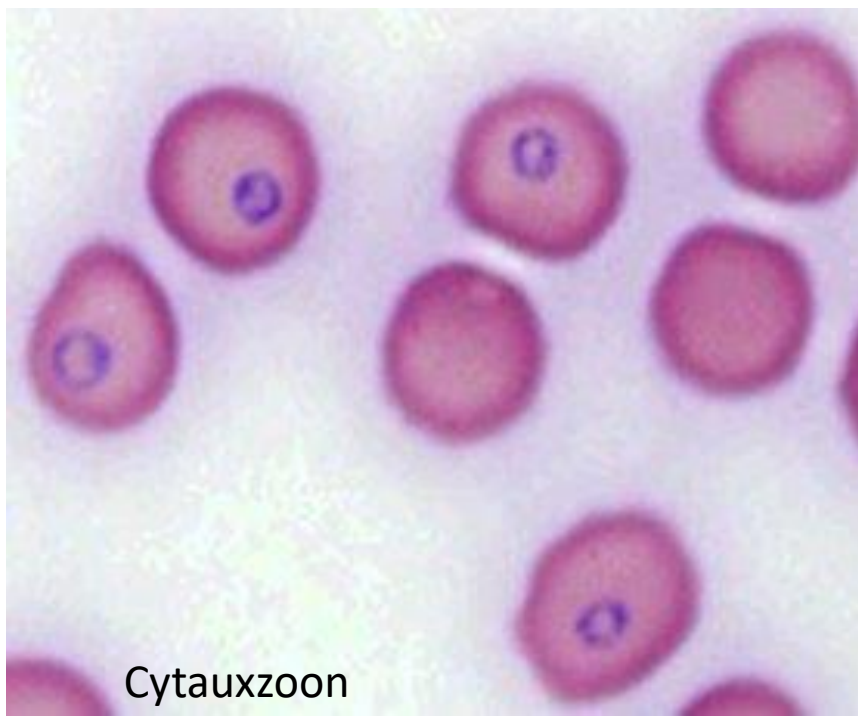
1. From 6 weeks old, then every month until 4 months old.
2. If > 4months old: 2 vaccines 1 month apart.

INFECTION	SURVIVAL TIME OUTSIDE HOST	VIRUS SHEDDING	MODE OF TRANSMISSION	PREVENTION OF INFECTION
FCV	up to 1 month (Radford et al., 2009)	continuous	direct contact (sneezed droplets) and indirect transmission	vaccination; excellent hygiene; sneeze barriers
FHV	12 – 18 hours	intermittent, lasts 7-14 days	direct contact, sneezed droplets	Vaccination reduces the risk of clinical signs, but not infection; stress reduction essential
FelV	hours to days	continuous	direct contact essential - especially via saliva, faeces; bites, transplacental, milk rare	Test all cats before mixing them, vaccination may be considered
FIV	minutes	continuous *	direct contact essential – mainly biting; transplacental rare	Test all cats before mixing them
FPV	up to 1 year	usually only 24-48 hours, but can be up to 6 weeks	faecal-oral route, indirect, transplacental	Vaccination is highly recommended for all cats; excellent hygiene and disinfection

INFECTION	SURVIVAL TIME OUTSIDE HOST	SHEDDING	MODE OF TRANSMISSION	PREVENTION OF INFECTION
<i>Chlamydia felis</i>	only a few days at room temperature (Greene and Sykes, 2006)	in ocular secretions, usually for about 2 months, but can be much longer	mainly direct since organism is fragile; but indirect (e.g. on hands) is possible since elementary body can survive outside host	Vaccination can be considered.
<i>B. bronchiseptica</i>	up to 24 weeks in water and moist environment	in oropharyngeal and nasal secretions, up to 19 weeks	mainly direct and indirect from coughed aerosol	Interspecies transmission between cats and dogs is possible. Vaccination may be considered.
Protozoa (<i>Giardia</i> , <i>Isospora</i> , <i>Tritrichomonas</i>)	Oocysts survive months to years in environment.	in faeces	ingestion usually	regular steam cleaning of environment; check water and food if suspected sources of infection

Parasites infecting red blood cells

<i>Cytauxzoon</i> spp.	<i>Babesia</i> spp. <i>Theileria</i> spp.	<i>Mycoplasma haemofelis</i> (<i>Haemobartonella felis</i>)	Howell-Jolly particle
			
rare	rare	common	common
1–2 μ m Often signet shape; occasionally safety pin form	Indistinguishable from <i>C. felis</i> . Not endemic in USA; Fever & icterus uncommon	Usually on the edge or across the surface of RBC; Rarely in a ring form. Younger age; male sex	1–2 μ m with only chromatin stain, no cytoplasm around it



Diagnosis: Blood smear has sensitivity <37% → if you don't see it, do PCR on edta sample

Cat donors should be screened for:

- FIV FeLV
- Mycoplasma haemofelis
- Candidatus Mycoplasma haemominutum
- Candidatus Mycoplasma turicensis

If +, do not use as a donor.

Do not treat, unless cat is immunosuppressed.

Treatment:

M. HAEMOFELIS:

Doxy 28 days.

Food or syringe water after the tablet.

If possible use doxy paste (Bova UK) - no risk of oesophagitis or stricture, no need to give water after.

Infection not always cured – if haemolysis recurs, doxy 28d (10mg/kg SID) followed by marbo or prado 14d.

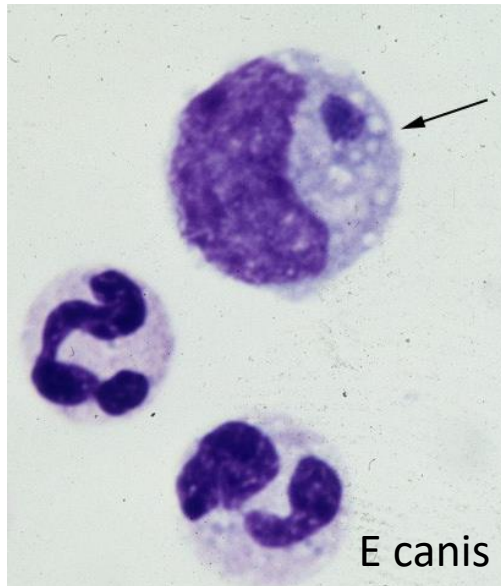
M felis can cause 2ry IMHA but steroids are rarely needed.

CANDIDATUS:

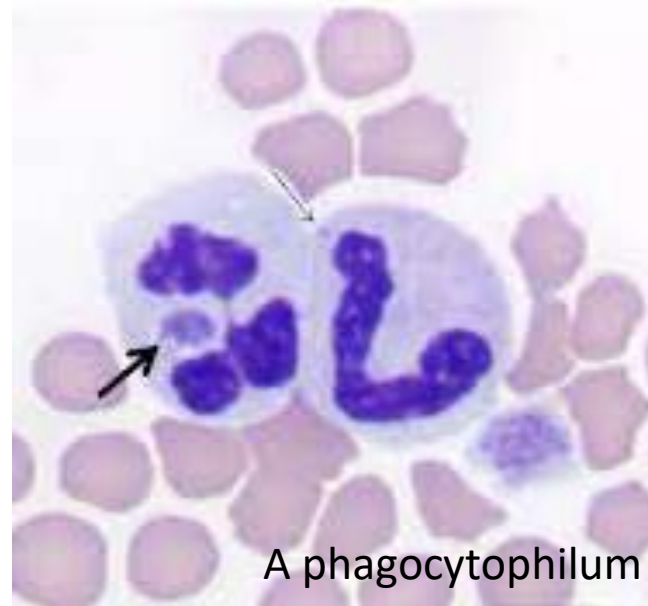
Doxy 28d in immunosuppressed cats with haemolysis.

Rare haemoparasites in cats:

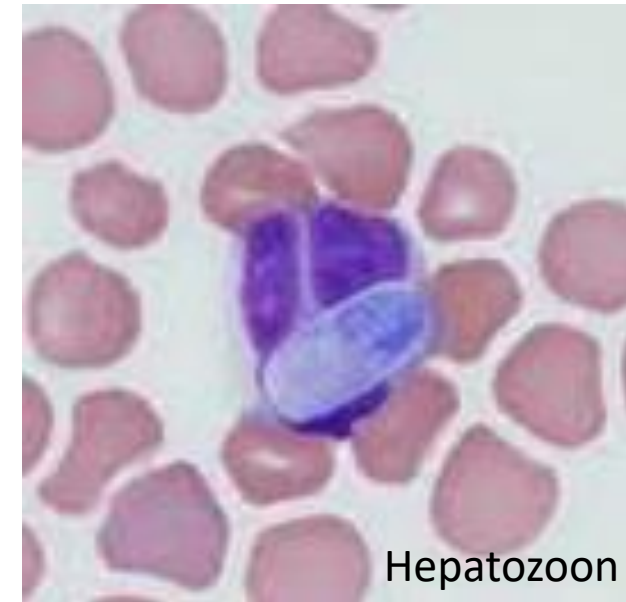
- Fever, anorexia, lymphadenomegaly, splenomegaly, joint pain
- Non-reg anaemia, thrombocytopenia, ↑globulins
- *E. canis*, *A. phagocytophilum*, *Rickettsia* (not seen on blood smear), *Borrelia* (not seen on blood smear) → Doxy
- Hepatozoon → Doxy + Imidocarb



Infected cell: monocyte
→ which parasite is this?



Infected cell: neutrophil
→ which parasite is this?



Pill shape → which
parasite is this?