

# *Tritrichomonas foetus*: Jumping the species barrier

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*Tritrichomonas foetus* (formerly known as *Trichomonas foetus*) is a flagellate protozoan that has been recognised for decades as a cause of venereal disease and infertility in cattle. Artificial insemination has eradicated it in cattle in many developed countries, including the UK, and its incidence in cattle is dropping worldwide.

The significance to the veterinary world of *T. foetus* changed in the 1990s when cases of colitis caused by the organism started emerging in cats in the US. Since then it has been found in cats in many countries around the world, including the UK. While the epidemiology of *T. foetus* in cattle is very well understood and has been used to great effect in its control, comparatively little is still known about the epidemiology of *T. foetus* in cats. What is certain is its emerging importance in feline large bowel disease.

## LIFE CYCLE AND EPIDEMIOLOGY

The life cycle of *T. foetus* in cats is direct, via the faecal-oral route. Trophozoites are ingested from fresh faecal contamination, either from the environment or by grooming faeces from the coat. Cross contamination of fresh faeces is thought to occur most commonly in shared litter trays but will also occur in outdoor communal toileting areas or when marking territory. Breeding colonies, catteries and cat rescue shelters are all over-represented for clinical disease and studies have also shown prevalence to be higher in these groups, with prevalence in the USA as high as 31%. It is likely this increased prevalence and disease incidence is due to the close proximity of the cats to each other and the use of communal runs and litter trays. All cases in the UK in domestic cats appear to come from multi-cat households, with Siamese and Bengal breeds being over-represented. It is unknown if this is a genetic predisposition or if these breeds are more commonly kept in high risk environments.

The significance of venereal transmission in cats is unknown. While the prepuce of the cat seems able to support *T. foetus* infection it is still unclear whether transmission occurs in practice.

It is unknown whether *T. foetus* represents a zoonotic risk. Venereally transmitted trichomonads are normally species specific with, for example, *Trichomonas vaginalis* (*T. vaginalis*) being host-specific

to man. *Tritrichomonas foetus* has succeeded in crossing the species barrier from cattle to cats. Consistent establishment in the large bowels of cats will increase environmental contamination and human exposure to the parasite and this may have increased its zoonotic potential. While there is currently no evidence of this it is still recommended that good hygiene is maintained around domestic cats and litter trays, particularly as cats can pass known common protozoan zoonotic agents, such as *Giardia* spp. and *Toxoplasma gondii*, in their faeces.

## CLINICAL SIGNS

Some infected cats are clinically silent carriers, with clinical cases being more common in cats under 12 months old. Untreated clinical cases may self cure but could remain as carriers, intermittently shedding the organism. Colitis is the most common clinical sign, with malodorous chronic diarrhoea. Blood may be present in the stool, with large volumes of mucus (Fig. 1). Severely affected cats may become faecally incontinent. Chronic weight loss can occur, suggesting small bowel involvement (Fig. 2).



Fig. 1: Blood and large volumes of mucus may be present in the stool.



Fig. 2: Chronic weight loss, suggesting small bowel involvement, can occur.

## DIAGNOSIS

*Tritrichomonas foetus* infection should be considered as a differential in many cases of chronic large bowel diarrhoea in cats, especially when the possibility of infection with other parasites such as *Giardia* spp., *Isospora felis* and helminths has been ruled out. However, it is important to realise that, although *T. foetus* might be a differential for chronic diarrhoea in any cat, it is in effect only a significant differential diagnosis for young cats or older cats that reside in a multi-cat establishment. The probability of *T. foetus* causing diarrhoea in an adult in a single cat household, especially if it is an indoor cat, is extremely low.

Although there is no diagnostic test that can completely eliminate false negative results for *T. foetus*, there are some highly specific diagnostic tests available if infection with *T. foetus* is suspected.

### Direct smear examination of fresh faeces

If the faecal sample is fresh and warm and a small amount of faeces are mixed with saline then active trophozoites can be identified, but these must be differentiated from *Giardia* trophozoites: *T. foetus* trophozoites move in a 'forward jerky' motion, as opposed to the 'falling leaf' motion described for *Giardia*. Both *T. foetus* and *Giardia* have an undulating membrane, but *Giardia* has a concave sucker which it uses for attachment and is binucleate, compared with the single nucleus of *T. foetus*. These differences make the test highly specific in experienced hands, but if carried out in practice by less experienced staff this will reduce the test's specificity.

The detection of *T. foetus* by the direct smear method poses a number of problems that can reduce the test's sensitivity. The sample should be assessed within 20 minutes of being taken; false negative results will be obtained where the following are used:

- old faeces
- faeces contaminated with litter
- faeces that have been allowed to cool
- faeces from cats that have received antibiotic therapy up to seven days before testing.

### Faecal culture

The In-Pouch™ faecal culture method allows for the culture of faeces in media suitable for *T. foetus* growth, thereby increasing the sensitivity of faecal examination. The test has a high sensitivity if the pouch can be inoculated and cultured in the practice or if faeces can be delivered to a local diagnostic laboratory for culture within a few hours, and definitely on the same day, as the faeces are collected. Subsequent examination for parasites should be carried out by a competent person. However,

prolonged cooling of faeces, either before or after inoculation into a pouch, for example whilst in transit to a laboratory, results in the death of the parasite, leading to false negative results. Bacterial growth within the pouches is also a significant problem that limits the value of the test.

### Polymerase chain reaction (PCR)

This is the most sensitive test available and has the advantage of being able to detect *T. foetus* DNA irrespective of the state of the trophozoites. It is the test of choice if elimination of the parasite is required from an individual or group of cats, but expense can be prohibitive, particularly in large groups of cats. Pooling of faeces from four different cats may allow the costs to be reduced. As *T. foetus* excretion can be intermittent, it is preferable for faeces to be collected from an individual cat over 24 hours and pooled for testing. Although the test is specific and does not require live organisms, bacterial DNA-ases will degrade released DNA, thereby reducing its sensitivity. It is not recommended that faeces be collected and stored for more than 48 hours, unless frozen, prior to the DNA being extracted.

### Colonic biopsies

These typically reveal inflammation with lymphocytic and plasma cell infiltration. The parasite may be detected directly by its adherence to the mucosal lining of the colon. Although the procedure is invasive it has the advantage of giving additional diagnostic information if *T. foetus* is not the cause of the colitis. It has a lower sensitivity than other more specific tests for *T. Foetus*, however.

## TREATMENT

The similarity between *T. foetus* and *Giardia* spp has led some clinicians to fall back on traditional chemotherapeutic agents used against *Giardia*, such as metronidazole or fenbendazole. However, these are ineffective in improving clinical signs or eliminating the parasite. The only consistently effective drug currently available to small animal veterinarians for treating *T. foetus* is **ronidazole**.

This antibiotic is closely related to metronidazole and can cause neurotoxicity in cats if given at too high doses or in patients with a hepatopathy. The recommended dose is 30 mg/kg q 24h for 1-2 weeks in clinical cases requiring treatment. This is normally sufficient to resolve clinical signs and eliminate the parasite. In refractive cases, higher doses of 50 mg/kg and q 12h dosing may be used, but these higher doses will greatly increase the risk of neurotoxicity and should never be used in feline patients with hepatic disease. For young kittens or cats with a hepatopathy a dose of **10 mg/kg q 24h for two weeks** is recommended. The bitterness of the powder means that it must be placed in capsules prior to administration (see below).

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Neurotoxicity is rare in treated cats, however the commoner neurological signs include lethargy, ataxia and seizures. These signs will usually resolve if the drug is discontinued but can last for several days. Life-threatening complications can develop if the treatment is continued in the face of these neurological signs so it is important that veterinarians stress to owners that treatment must be discontinued if these signs develop. If the signs develop after a few days of treatment often the parasite will already have been eliminated and continuing treatment is not worth the risk of further complications. Given that colitis will resolve without treatment in most clinical cases, and given the possible severe adverse effects of the drug, treatment should be reserved for severe or refractive cases or where prevention of shedding is required to eliminate the parasite from multi-cat establishments.

The drug should not be administered to nursing queens as the drug may be excreted in milk leading to toxicity in suckling kittens. Ronidazole is a teratogen and should not be used in pregnant queens. Anyone handling the drug should wear gloves and pregnant women should avoid handling the drug. The veterinarian prescribing the drug must stress the importance of not splitting the capsules (see below) as this will increase the risk of adverse effects in the handler and will greatly reduce compliance in the feline patient.

**Ronidazole is not licensed for use in cats; it should only be used with caution and with informed, signed owner consent.** Permission has been granted by the Veterinary Medicines Directorate (VMD) to use 100% pure chemical grade ronidazole to treat *T. foetus* infected cats. This is the form that is now used in the USA. In the UK, following Special Treatment Authorisation from the VMD (<http://www.vmd.gov.uk/>), ronidazole can be obtained upon receipt of a signed, named-animal prescription, as capsules from Nova Laboratories (Tel: 0116 223-0099). While the VMD has agreed to our use of this chemical in these cats, **they strongly recommend that detailed records are maintained and that no cat is treated without first obtaining informed, signed owner consent.** In addition, we should compile data on all possible adverse effects: send case information on any possible adverse effects to [Danielle.Gunn-Moore@ed.ac.uk](mailto:Danielle.Gunn-Moore@ed.ac.uk).

#### PREVENTION

*T. foetus* trophozoites are very sensitive to desiccation and can only survive outside the body in wet faecal material. As a result, prevention of spread of the parasite and elimination from multi-cat households hinges on preventing feline contact with fresh or damp faeces. Any of the following will help to reduce spread of the parasite:

- frequent collection of faeces - increasing the number of litter trays and increasing the

frequency of cleaning them will help to reduce transmission

- frequent washing or grooming of long-haired cats to reduce faecal contamination in the coat
- separating unweaned kittens' litter trays from the queen's litter tray - with platforms or covers to prevent the queen access to the kittens faeces and vice versa; this is very important as nursing queens cannot be treated to prevent shedding
- treatment of all infected cats - this can be achieved by identifying shedding cats first or treating all cats within the group and then testing for the parasite after two weeks' of treatment; nursing and pregnant queens need to be separated and the kittens and queens treated once the kittens are weaned; this method has the disadvantage that repeated testing can be very costly and large numbers of cats are exposed to the potential adverse side effects of ronidazole.

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These multiple choice questions are based on the above text. Answers appear on page 59.

**1. By what name was *Tritrichomonas foetus* formerly known:**

- Trichomonas vaginalis*
- Giardia lamblia*
- Hexamita meleagridis*
- Trichomonas foetus*
- Isospora felis*

**2. Which of the following area(s) does *T. foetus* infect in cats:**

- stomach
- liver
- kidneys
- colon

**3. Which of the following drugs is an effective treatment for *T. foetus* infection in cats:**

- fenbendazole
- metronidazole
- ronidazole
- albendazole

**4. Which of the following is a useful diagnostic test for *T. foetus* in cats:**

- ELISA
- IFAT
- PCR
- lymph node aspirate
- small intestinal biopsies



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