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CHLAMYDIAL INFECTIONS OF CATS
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The main chlamydial agent recognised in cats is *Chlamydophila felis* which was previously known as *Chlamydia psittaci* feline strain. There have been suggestions of other chlamydial agents occurring in cats but there is little evidence that they are clinically relevant. Chlamydial-like agents such as parachlamydia can frequently be isolated from cats but often from healthy cats.

**Prevalence of *Chalmydophila felis* in cats**

*Chalmydophila felis* is the infectious organism most often isolated from cats with conjunctivitis, particularly chronic conjunctivitis. It is found in up to 30% of cats with conjunctivitis (Wills et al, 1988). Surveys of feline patients presented to first opinion veterinary practices in the UK and USA have shown that conjunctivitis is one of the more common reasons for presentation accounting for up to 3% of cases (Lund et al, 1999). In addition, serological surveys in several countries have shown that a relatively high proportion (up to 9% or more) unvaccinated domestic cats have significant titres against chlamydophila, indicating prior infection (Gunn-Moore et al, 1995). These observations suggest that chlamydophila infection is relatively prevalent in the domestic pet cat population.

Risk factors for chlamydophila have not been well defined but it appears to be more common in cats from multicat households, pedigree cats and young cats, often under one year of age.

**Biology and pathogenesis**
The mode of transmission is uncertain but chlamydophila cannot survive in the environment and infection is probably dependent on close contact. Social interaction with transfer of ocular secretions through mutual grooming probably facilitates spread of infection. Clinical disease is related to ocular infection but the organism can be readily isolated from the gastro-intestinal tract and the genital tract of females although there is no clear evidence that this is related to any significant pathology.

Outer membrane proteins are present in chlamydial organisms and there are strong similarities between these proteins in different Chlamydia species. The most important of these are the PMPs (polymorphic membrane proteins) which are considered to be key virulence factors and crucial targets for inducing protective immune responses. Recently the presence of genes coding PMPs has been confirmed for *Chlamydophila felis* (Harley et al, 2007). It has also been shown that some isolates of chlamydial organisms contain plasmids and these may also be key virulence factors. We have preliminary evidence that the presence of plasmids is variable between *Chlamydophila felis* isolates.

**Clinical signs**
The incubation period for chlamydophila infections is 2-5 days. Initially there may be unilateral ocular signs but these invariably become bilateral within a day or two. There can be striking conjunctivitis with involvement of the nictitating membrane. Chemosis is a characteristic feature of chlamydosis. Ocular discharges are initially watery but later become mucoid or mucopurulent. There may be ocular discomfort and blepharospasm. Affected cats usually remain bright and any pyrexia or other systemic signs are mild. Respiratory signs are generally minimal. There is circumstantial evidence that chlamydophila infection can cause abortion.

**Diagnosis**
PCR is now regarded as the preferred diagnostic test. It is extremely sensitive and avoids problems with poor viability of the organism. Ocular swabs are used and close attention to
swabbing technique is necessary since the organism is intracellular and some cellular material is required. Local anaesthetic can be used in the eye prior to swabbing to facilitate the technique. Other methods for demonstrating the organism are less satisfactory.

Some cross reactivity occurs with other bacteria and titres of up to 1:32 are considered negative. Established or recent infections are associated with high titres often of 1:512 or greater.

**Treatment**

*Chlamydophila felis* is a bacterium and is sensitive to antibiotics. Tetracyclines are regarded as the treatment of choice and doxycycline is usually used since this can be administered orally just once a day at a dosage of 10 mg/kg. Treatment for one or two weeks will not usually eliminate infection, and it is recommended that treatment is continued for a minimum of 3–4 weeks (Dean et al, 2005). This is more important in cats from multicat environments particularly from breeding catteries as the goal of treatment is to eliminate infection. It may be less important for pet cats but inadequate duration may lead to recurrence of signs and chronic conjunctivitis. Systemic treatment has been shown to be more effective than topical ocular treatment (Sparkes et al, 1999) but ocular preparations may help to alleviate ocular discomfort. As with most antibiotics, there are some potential side effects with doxycycline although the risk is low. Oesophagitis and oesophageal strictures have been reported as a potential complication with the more acidic forms of doxycycline which represent the licensed veterinary product in most countries. There are also concerns over tooth discolouration in young kittens although this appears to be a rare problem. Alternative antibiotics can be considered but may prove less effective at eliminating infection. Fluoroquinolones and potentiated amoxicillin are two options. Azithromycin has been suggested and has the advantage of requiring relatively infrequent administration but is has been shown to have poor efficacy at eliminating infection and is not licensed for use in cats.

**Prevention and control**

Both inactivated and modified live vaccines are available usually as one component of a multivalent vaccine. They are effective at protecting against disease but do not prevent infection. Routine vaccination of pet cats is sometimes questioned usually on the basis that the disease caused by *Chlamydophila felis* is treatable and not life threatening. However infection is common (see above) and it can cause significant distress to affected cats which justifies consideration of inclusion of chlamydophila in routine vaccination protocols. It has been suggested that chlamydophila vaccination is sometimes associated with side effects but this is unsubstantiated. Pedigree cats from breeding colonies are at higher risk and routine vaccination will help to provide protection against disease.

The most common manifestation of infection in the breeding cattery is infection of litters of young kittens at around 5–8 weeks of age. If the queen is infected her kittens are likely to be protected initially by maternally derived immunity obtained from the colostrum, but they will become vulnerable to infection as this decays. Vaccination will not prevent this problem since the queen may become infected even though she is protected from disease and so clinical signs have occurred to alert the owner to infection. If chlamydophial infection is endemic in a colony and causing disease, the best solution is to treat all the cats in the cattery with doxycycline. It is crucial to maintain treatment for at least four weeks in this situation to ensure that infection is eliminated.

**References**

