

# Babesia spp.

## Babesiosis

This is a disease caused by a range of different protozoan parasite species including so-called large *Babesia* species (e.g. *Babesia canis*) and small *Babesia* species (e.g. *Babesia gibsoni*). They are mostly transmitted by haematophagous activity of ticks (i.e. through blood feeding) and require around 24-48 hours of tick attachment for infection to occur. Several tick species are implicated in the transmission of canine babesia; the geographic distribution of the ticks contribute to the distribution of *Babesia* organisms. Although ticks are the major means of transmission, blood transfusions and aggressive interactions (i.e. dog-on-dog biting) have been implicated in some cases.

Once in the dog *Babesia* organisms primarily target (invade and replica) red blood cells, causing haemolytic anaemia; however, they can also cause thrombocytopenia (low platelet counts) through immune-mediated mechanisms.

Canine babesiosis has a global distribution. Young to middle-aged dogs may be more predisposed, although any dog without immunity is predisposed. It appears that dogs with some immunity may remain carriers for years, and stress or other diseases may induce sudden onset of clinical signs.



## FAQs

### Can canine babesiosis occur in the UK?

The vast majority of dogs diagnosed with babesiosis in the UK have a history of travelled abroad or have been imported. However, an outbreak of *B. canis* infection in untravelled dogs has been reported recently in Essex, and *B. canis*-infected *Dermacentor reticulatus* ticks were found in that geographical area (DOI: 10.1186/s13071-018-2718-7). Cases of other *Babesia* infections in untravelled UK dogs have also occasionally been reported (e.g. *B. vulpes*, *B. vogeli*), and infection has been spread via blood transfusion, so the disease should remain a differential diagnosis for UK dogs with thrombocytopenia, regenerative anaemia and pigmenturia even if they have not travelled.

### What are the clinical signs of babesiosis?

These usually develop within a few days of infection. Signs can include fever, lethargy, weakness, pallor, jaundice and pigmenturia (red urine due to haemoglobinuria) and collapse in severe cases. Splenomegaly is common. Multiple organ failure can occur with some babesia infections.

## Reception Hours

Mon-Fri 9am - 5pm

## Contact Us

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## What clinical pathology changes occur with babesiosis?

Thrombocytopenia is very common. An anaemia, usually regenerative, due to direct haemolysis of red blood cells by the parasite, and sometimes associated with erythrocyte antibodies (i.e. positive autoagglutination or Coombs' test), is also often found.

## Can a blood smear diagnose *Babesia* spp. infection?

Sometimes infection with a large *Babesia* species may be identified on blood smear examination, but they are often hard to spot. Making a blood smear from blood collected from the periphery e.g. marginal ear vein, may help concentrate large *Babesia* organisms, as heavier parasitized erythrocytes accumulate here. Generally, blood smear examination is not very sensitive. Small *Babesia* species are very difficult to spot on blood smears.

## Is PCR useful for the diagnosis of babesiosis?

Yes, PCR is reliable and is usually performed on EDTA blood samples (splenic aspirates can also be used). The Acarus laboratory of the Molecular Diagnostic Unit has a generic *Babesia* spp. quantitative PCR that amplifies DNA from all *Babesia* species (large and small) followed by identification of the infecting species by DNA sequencing. Knowledge of the infecting species is important as treatment differs depending on *Babesia* species.

## Is serology useful to diagnose babesiosis?

Not really. Cross-reactivity between the different *Babesia* species occurs, which is problematic, and not all parasitaemic dogs are antibody positive.

## How do I treat babesiosis?

Treatment depends on the infecting species and clinical presentation, with large *Babesia* species generally being easier to treat than small *Babesia* species. No product is licensed for use in dogs for babesiosis in the UK. Imidocarb dipropionate is used in cattle for babesiosis so a small amount may be available from large animal vets to treat dogs with large *Babesia* species infections.

\*Drugs are not licensed for this purpose in the UK

Babesiosis type	Drug	Treatment protocol	Possible side effects of treatment
Large <i>Babesia</i> species e.g. <i>Babesia canis</i> ,	*Imidocarb dipropionate	6.6 mg/kg by intramuscular injection once, then repeat 2	Uncommon, but cholinergic side effects sometimes seen e.g. salivation, lacrimation, diarrhoea, vomiting – can pre-treat with

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Babesiosis type	Drug	Treatment protocol	Possible side effects of treatment
<i>Babesia vogeli</i> , <i>Babesia rossi</i>		weeks later (give SQ if severe thrombocytopenia)	atropine if concerned. Usually results in PCR negative results on blood.
Small <i>Babesia</i> species e.g. <i>B. gibsoni</i> , <i>B. vulpes</i> (also known as <i>Theileria annae</i> or <i>B. microti</i> -like)	Atovaquone plus azithromycin	Seek advice from a specialist before starting a 10-day treatment course.	Very difficult to clear infection and treatment not always effective. Some have used doxycycline/ metronidazole/ clindamycin or diminazene/ imidocarb/ clindamycin protocols for <i>B. gibsoni</i> infection.
Concurrent <i>Ehrlichia canis</i> infection	Doxycycline	10 mg/kg per day orally	<i>E. canis</i> and <i>B. vogeli</i> are both transmitted by the same tick vector so concurrent ehrlichiosis is treated with doxycycline. Doxycycline may have some activity for small <i>Babesia</i> species and is sometimes used for <i>B. gibsoni</i> infections.

## How do I prevent babesiosis?

Effective tick control! Owners should be instructed to avoid tick exposure whenever possible, remove any ticks found on a dog promptly and use a topical ectoparasiticide that is effective against ticks. A vaccine is available for babesiosis in some parts of the world, but not in the UK.

## What about cats?

Cats are less commonly affected by babesiosis than dogs and cases thus far in the UK have been restricted to imported cats. Feline babesiosis is most frequently reported in cats from South Africa due to *Babesia felis* infection (a small *Babesia* species). Diagnosis is based on PCR analysis of blood samples. Advice should be sought regarding treatment, which comprises primaquine.



*Last reviewed July 2021 by Emi Barker*

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