

# IN FOCUS: Canine Babesiosis

*Babesia* spp. are intra-erythrocytic, tick borne, protozoan parasites. Dogs and cats travelling on the Pet Travel Scheme (PETS) may be exposed to babesiosis and other parasitic diseases exotic to the UK. *Babesia* spp. are present worldwide, in the tropics and sub-tropics. In these areas, they are an important cause of morbidity and mortality. *Babesia* spp that affect dogs and cats are not currently thought to be established in the U.K.

## Morphology and Distribution

Broadly, the *Babesia* spp. are divided into large and small forms. The large forms are 2.5-4.5µm in length, approximately half or more of the diameter of a red blood cell (rbc). The small forms are less than half the diameter of a rbc and are approximately 1-2.5µm in length. The large *Babesia* of dogs, *B. canis*, can be divided into 3 further subspecies. *B. canis canis*, *B. canis vogeli* (both present in Europe) and *B. canis rossi* (South Africa). The tick vector for *B. canis canis* is considered to be *Dermacentor reticulatus*, a three-host tick present in mainland Europe but which has been reported in areas of the south and west of England. The small canine *Babesia*, *B. gibsoni*, is found in the Middle East, Asia, North Africa and North America and has also been reported in Europe. In affected dogs *B. canis* are found in a thin peripheral blood smear as pyriform shaped organisms, inside the red blood cell (rbc). They are often seen as pairs with the narrower apical regions apposed. (See picture).

## Life cycle

The infection is acquired from the tick vector. The dog is inoculated with *Babesia* spp. sporozoites when the tick has been attached for several days, towards the end of tick engorgement. The sporozoite stage of the parasite invades the dog rbc and subsequently divides. After division, the rbc ruptures and merozoites are released. The merozoites then re-invade new erythrocytes and continue the life cycle. It is the circulating parasites that are the source of infection for other ticks. Transmission may also occur via blood transfusion, where the donor is an infected animal. Infection can also persist at low levels in the dog, if it survives acute disease, acting as a reservoir of infection.

## Disease

Immunologically naive animals travelling from non-endemic areas into areas where babesiosis is present are highly susceptible to disease. Time of year is an important factor as disease incidence is related to tick activity. Clinical signs develop after the incubation period of approx 10-21 days. Fever, pallor, malaise, haemoglobinuria and splenomegally can all be part of the presenting signs. Haematology will commonly reveal anaemia (which is often a combination of both intra and extravascular haemolysis) of varying severity. Signs of regeneration may be seen on a blood film.

Thrombocytopaenia is also present. Immune mediated haemolytic anaemia may also be a feature; this can be responsible for destruction of red blood cells in addition to that caused by rupture from the dividing parasites. Slide agglutination and Coombs tests may also be positive. In the presence of these signs, together with a history of travel, babesiosis should be put on the list of differential diagnoses.

*B. canis canis*, present in Europe, can vary in its clinical presentation from a mild form to life threatening per-acute disease. *B. canis vogelli* is considered to be a mild infection, though a case of fatal babesiosis in an untravelling dog in the UK was found to be associated with a large babesia that was most closely related to *B. canis vogelli* (Holm et al., 2006). Splenectomised animals can be expected to suffer more severe disease.

## Diagnosis and treatment

The presence of *Babesia* spp. organisms can be shown on a stained peripheral blood smear. This is the most appropriate way to demonstrate infection in an acutely diseased animal. The parasitized rbc's are found in higher numbers in capillary beds. These are easily accessible in the ear tip. A fresh thin smear, stained with Giemsa, should be examined for the presence of parasites. Prompt diagnosis and treatment is important in overt disease. Additional tests include IFAT and ELISA for antibody detection and PCR for parasite detection. Treatment with Imidocarb is commonly used in the first instance. This is an off label use for this drug in the UK and informed owner consent should be gained before treatment. Imidocarb is painful to inject and side effects consistent with anti-cholinesterase signs are often seen. Supportive treatment may also be required.

## Prevention

For the animals travelling on the PETS, prevention of tick infestation by the use of acaricides should be recommended to the client. There are several preparations on the market licensed for this purpose. Advise the client to reapply the chosen product at the recommended intervals. Ideally daily inspection and removal of ticks should also be performed, not a task to be underestimated! A vaccine, based on a soluble antigen of *B. canis*, is available in Europe. This is aimed at a reduction of clinical signs associated with infection, but will not prevent the establishment of the parasite in the dog. As a result the dog may become a carrier of infection.

## Summary

- Babesiosis is an acute and potentially fatal disease
- Tick-borne parasitic infection
- Disease can vary from mild to severe
- Pyrexia, jaundice and anaemia may be present
- Infection can be diagnosed from a stained peripheral blood smear

## DACTARI

Up until the end of September 2006, there have been nine recorded cases of canine babesiosis, one suspected case, two cases of concurrent Babesia and Leishmania infection and one case of combined ehrlichiosis and babesiosis.

## Babesia testing at Test-A-Pet

We provide Geimsa staining of thin blood smears to demonstrate the presence of intraerythrocytic organisms, preferably from whole peripheral capillary blood (EDTA). Results are available within 24hours of us receiving the sample.

A *B. canis* IFAT is currently under development. For more information please see page four of this newsletter and our website.

Right: *Babesia canis* merozoites within erythrocytes. Geimsa stained, X 1280

