

# Babesiosis Information

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## Tests available at VBDDL: Serology, Microscopic Slide Review and PCR tests

There are at least 8 genetically unique *Babesia* species or subspecies that can infect dogs and two in cats including; *Babesia canis canis*, *B. c. vogeli*, *B. c. rossi*, *B. gibsoni*, *B. conradae*, *Theileria annae*, *B. felis* (Feline), *B. canis presentii* (Feline) and several unnamed yet genetically unique *Babesia* spp. This may affect test interpretation because most laboratories only test for 2 canine species and cross reactivity in IFA tests is not always present. Knowledge of which species are tested for is important for both antibody and DNA testing.

## Risk factors

- Breed
  - American Pit Bull Terriers: *Babesia gibsoni*
  - Greyhounds: *Babesia canis vogeli*
- History of tick attachment
- Splenectomized animals develop more severe clinical disease.
- Immune suppression may cause clinical signs and increased parasitemia in chronically infected dogs.
- History of a recent dog-bite wound is a risk for *B. gibsoni* (Asia) infection.
- Recent blood transfusion from a subclinically infected donor.

## Disease (one or more of the following are good reasons to test)

- Anemia (typically regenerative)
- Thrombocytopenia (more common than anemia in some studies and can occur without anemia)
- Hyperglobulinemia
- Splenomegaly
- Icterus
- Pigmenturia
- Screening of blood donors
- Screening of breeding animals
- Normal? Some recovered animals have no detectable abnormalities yet remain persistently infected

## Testing

- Polymerase chain reaction (PCR): Amplification of a specific piece of DNA from the organism of interest. Since *Babesia* lives in red blood cells, **EDTA** anticoagulated whole blood (**2mls**) is the sample of choice for *Babesia* PCR testing. Obtain samples BEFORE treatment, since treatment may reduce number of organisms and result in false negative test results. The PCR test used by the VBDDL can detect parasitemias of 0.00000073% or about 1300 fold fewer organisms than microscopy.
- Indirect fluorescent antibody (IFA): Detection of antibodies against the organism of interest. **Serum (2mls)** is the sample type required for antibody testing.
- Light microscopy: Detection of *Babesia* organisms in red blood cells. Parasitemia of infected animals can range from 0.0001% to >10% of the red blood cells. Thin stained peripheral blood smears are the typical sample tested. Smears made from capillary blood (ear or toenail) may improve organism recovery.

## Treatment (see pg 2)

## **Treatment**

- Imidocarb dipropionate (FDA approved; 6.6 mg/kg SC or IM every 1–2 weeks) or diminazine aceturate (not FDA approved; 3.5–7 mg/kg SC or IM every 1–2 weeks) decrease morbidity and mortality in affected animals. This may completely clear *B. canis* infections but not *B. gibsoni*.
- Combination therapy of azithromycin (10 mg/kg PO q24h for 10 days) and atovaquone (13.5 mg/kg PO q12h for 10 days) is the treatment of choice and the only treatment that can potentially clear *B. gibsoni* (Asia) infections in dogs. In a controlled study 85% of dogs cleared the infection after treatment.
- Metronidazole (25–50 mg/kg PO q24h for 7 days), clindamycin (12.5–25 mg/kg PO b.i.d. for 7–10 days), and doxycycline (10 mg/kg PO b.i.d. for 7–10 days) have been reported to decrease clinical signs but not to clear infections.
- Primaquine phosphate (1 mg/kg IM, single injection) is the treatment of choice for *B. felis*.

## **Insights gained from VBDDL associated research.**

- “An association between dog breed and *B. gibsoni* infections was detected. *Babesia gibsoni*-infected dogs were more likely to be American pit bull terriers and *B. canis vogeli* infected dogs were more likely to be greyhounds.” From PhD research of Dr. Adam J. Birkenheuer.  
Published article: Birkenheuer AJ, Levy MG, Stebbins M, Poore M, Breitschwerdt E. Serosurvey of antiBabesia antibodies in stray dogs and American pit bull terriers and American staffordshire terriers from North Carolina. [J Am Anim Hosp Assoc](#). 2003 Nov-Dec;39(6):551-7.
- “A combination of atovaquone and azithromycin is the 1st described treatment that will either eliminate *B. gibsoni* (Asian genotype) infections or suppress the parasitemia below the limit of detection in the majority of treated dogs.”  
Published article: Birkenheuer AJ, Levy MG, Breitschwerdt EB. Efficacy of combined atovaquone and azithromycin for therapy of chronic *Babesia gibsoni* (Asian genotype) infections in dogs. *J Vet Intern Med*. 2004 Jul-Aug;18(4):494-8.
- A report “describes the use of atovaquone and azithromycin for the treatment of dogs naturally infected with *B. conradae* and reports the re-emergence of *B. conradae* in southern California.”  
Published article: Di Cicco MF, Downey ME, Beeler E, Marr H, Cyrog P, Kidd L, Diniz PP, Cohn LA, Birkenheuer AJ. Re-emergence of *Babesia conradae* and effective treatment of infected dogs with atovaquone and azithromycin. *Vet Parasitol*. 2012 Jun 8;187(1-2):23-7. doi: 10.1016/j.vetpar.2012.01.006. Epub 2012 Jan 8.