

Lyme Borreliosis

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For ACVIM 2006 Consensus Statement for Lyme Disease; control+click: [Lyme](#)

Tests available at VBDDL: ELISA serology using C-6 peptide

Lyme disease affecting dogs, cats, horses and humans is caused by the spiral-shaped bacterium, or spirochete, *Borrelia burgdorferi* (or *Borrelia afzelii* and *Borrelia garinii* in Europe) which enters a host's system via the bite of a nymphal or female adult *Ixodes* spp tick. The tick population has been noted to follow the shifting deer population although ticks cannot actually acquire spirochetes from feeding on deer. Instead, the reservoir host is found to be small rodents.

Risk factors

- History of tick attachment
- Travel or residence in *Borrelia* endemic regions.
- Breed
 - Labrador Retriever
 - Golden Retriever

Disease

- Fever
- Lethargy
- Lameness, intermittent and self-limiting without antibiotic therapy.
- Lymphadenopathy
- Encephalitis
- Acute renal failure (particularly in Labrador and Golden Retrievers).

Testing for dogs – Requires 2mls serum or whole blood. The C-6 peptide of *Borrelia burgdorferi* is a highly specific diagnostic peptide that is used to detect *B.burgdorferi* antibodies in dog sera. A positive C6 antibody reaction indicates prior exposure to *B. burgdorferi* and is most likely indicative of active infection. Infection with closely related bacteria or prior vaccination with a “Lyme Disease” vaccine will not result in antibodies to *B.burgdorferi* C-6 peptide. However, when used as an annual screening test, occasional false positive test results should be anticipated. Questionable *B.burgdorferi* positive test results may be confirmed by Western immunoblot or quantitative C6 testing (not available at VBDDL).

Treatment – Based upon current data, treatment of C-6 antibody positive dogs is not recommended by the clinical advisors of the VBDDL unless there is concurrent clinical disease. Although antibiotic treatment (tetracycline derivatives) can enhance the resolution of lameness, no antibiotic has been proven to be curative.

Prevention - Vaccines are available to protect dogs against Lyme disease. No such vaccine has been developed for cats or horses. Tick prevention throughout the year and careful grooming are the best protections against these spirochetes as well as other vector borne diseases transmitted by the same ticks such as Anaplasmosis, Babesiosis, and Bartonellosis. (Note: some canine products can be toxic to cats. Owners should consult their veterinarian to determine the most appropriate preventive strategies for their pet.)

Insights gained through VBDDL associated research:

- In 2004 *B. burgdorferi* exposure status was evaluated utilizing C6 peptide-based ELISA assay on 1,666 canine serum samples submitted to the VBDDL from southeastern and mid-Atlantic states. The proportion of seroreactive dogs in NC was markedly lower ($p < 0.008$) than that observed in dogs from Virginia, Maryland, and Pennsylvania supporting the hypothesis that *B. burgdorferi* transmission seemed to occur infrequently in North Carolina dogs as compared to dogs residing in other southeastern and mid-Atlantic states. The utility of dogs as a sentinel to characterize the risk of *B. burgdorferi* transmission to humans in a defined geographical location was noted. Published article: Duncan AW, Correa MT, Levine JF, Breitschwerdt EB. [The dog as a sentinel for human infection: prevalence of *Borrelia burgdorferi* C6 antibodies in dogs from southeastern and mid-Atlantic states.](#) Vector Borne Zoonotic Dis. 2004;4:221-9.
- More recent projects have shown that the seroprevalence of *Borrelia burgdorferi* infections in dogs in N.Carolina has been increasing (unpublished data).
- PCR testing of individual *Ixodes affinis* (n=155) and *I. scapularis* (n=298) ticks for the presence of *Borrelia* DNA showed that in *I. affinis*, *B. burgdorferi* and *B. bissettii* were identified in 33.5% and 27.9% *I. affinis* respectively. Testing of *I. scapularis* yielded no *Borrelia* PCR-positive results. This study highlighted the potential importance of *I. affinis* in the maintenance of the enzootic transmission cycle of *B. burgdorferi* in North Carolina. The lack of *Borrelia* DNA in *I. scapularis* highlighted the need to better define the transmission cycle for *B. burgdorferi* in the southeastern USA. This study also prompted the development of PCR primers to differentiate common ticks since taxonomic identification can be challenging. Published article Maggi RG, Reichelt S, Toliver M, Engber B. [Borrelia species in Ixodes affinis and Ixodes scapularis ticks collected from the coastal plain of North Carolina.](#) Ticks Tick Borne Dis. 2010;1:168-71.