

## Canine vector-borne diseases (CVBD)

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### Lyme Borreliosis

Lyme borreliosis is a bacterial disease caused by several species of the *Borrelia burgdorferi* sensu lato complex and is transmitted by ticks of the genus *Ixodes* (e.g. *I. ricinus*, *I. persulcatus*, *I. scapularis*).

#### Pathogen

- Bacteria of the order Spirochaetales, genus *Borrelia*
- Europe: *B. afzelii*, *B. garinii*, *B. burgdorferi* sensu stricto, *B. spielmanii*
- USA: *B. burgdorferi* sensu stricto

#### Vector

- Hard-shelled ticks of the genus *Ixodes*
- Europe: *Ixodes ricinus* (Castor Bean tick)
- USA: *Ixodes scapularis* (Deer tick), *Ixodes pacificus* (Western Black-legged tick)
- (East) Asia: *Ixodes persulcatus* (Taiga tick)

#### Distribution

- In the US, Lyme borreliosis is mostly localized to states in the north-eastern, mid-Atlantic, upper north-central regions, and to several counties in north-western California
- In Europe, Lyme borreliosis is found in Germany, Austria, Switzerland, Czech Republic, Slovakia, France, Portugal, United Kingdom, Ireland, Scandinavia and many regions in eastern Europe including Russia
- Occurrence also confirmed in Asia (China, Japan, Korea)

**Clinical Signs and Diagnosis**

- Although many dogs are seropositive (2–10 %), a small fraction of the infected dogs are reported with clinical signs
- Common acute clinical signs in dogs include fever, shifting leg lameness, lethargy, lymphadenopathy and general malaise
- Additionally, several distinct clinical syndromes may be recognized including polyarthritis and protein-losing nephritis
- Diagnosis is based primarily on clinical findings
- Different serology tests are available (e.g. C6-peptide ELISA, whole-cell-antigen ELISA, Western blotting)

**Treatment**

- Dogs with clinical signs and positive for *B. burgdorferi* antibodies are treated either with doxycycline 10 mg/kg twice daily for 30 days or amoxicillin 20 mg/kg twice or three times a day also for 30 consecutive days

**Prevention**

- Six canine vaccines are available worldwide: four from the USA, one from Germany/ France and one available in the Czech Republic. A frequent revaccination program, little or missing cross-reactivity of the antibodies between the *Borrelia* genospecies in Europe, and serological differentiation of vaccinated and naturally infected dogs have to be considered
- Regular tick control is highly recommended, e.g. the use of a parasiticide with repellent activity, such as (K9)Advantix® spot-on (combination of imidacloprid and permethrin)

**Special Characteristics**

- Lyme borreliosis is the most commonly reported human tick-borne infection in Europe and North America
- Clinical signs may vary with the location of bacterial host entry and the *Borrelia* species infecting: in the US, typical clinical symptoms in humans include a rash around the area of the tick bite (erythema migrans), flu-like symptoms, and arthritis while in Europe in addition to the previously listed signs cutaneous and neurologic symptoms seem to be more frequent