



Anti-Borrelia ELISA Dog (IgG)



- Highly sensitive screening test for the detection of canine anti-*Borrelia* antibodies
- Detects all relevant *Borrelia* species of the *Borrelia burgdorferi sensu lato* group
- Fully automatable



Technical data

Antigen	Antigen extracts of <i>Borrelia burgdorferi sensu stricto</i> , <i>Borrelia afzelii</i> and <i>Borrelia garinii</i>
Calibration	Semiquantitative evaluation using ratio values: Extinction value of the sample over the extinction value of the calibrator
Result interpretation	EUROIMMUN recommends interpreting results as follows: Ratio < 0.8: negative Ratio ≥ 0.8 to < 1.1: borderline Ratio ≥ 1.1: positive
Sample dilution	Canine serum or plasma, 1 : 101 in sample buffer
Reagents	Ready for use, with the exception of the wash buffer (10x), colour-coded solutions
Test procedure	30 min (37°C) / 30 min (37°C) / 15 min (room temperature), fully automatable
Measurement	450 nm, reference wavelength between 620 nm and 650 nm
Test kit format	96 break-off wells, kit includes all necessary reagents
Order no.	EI 2132-9601-2 GC
Related products	EI 2132-9601 MC: Anti-Borrelia ELISA Dog (IgM)



Clinical significance

In 1982 W. Burgdorfer found that ticks transmit "*Treponema*-like spirochaetes", which were later identified as the causative agent of Lyme borreliosis. Only two years later, in 1984, the disease was also described in dogs. The Gram-negative bacteria causing Lyme borreliosis are collectively referred to as *Borrelia (B.) burgdorferi sensu lato*. Among these, the genospecies *Borrelia burgdorferi sensu stricto*, *Borrelia garinii* and *Borrelia afzelii* are pathogenic for dogs. Whereas in the U.S. only *B. burgdorferi sensu stricto* is relevant, 80% of pathogens found in European ticks are *B. garinii* or *B. afzelii*.

The bacteria are transmitted to humans and animals by ticks of the *Ixodes* species. Dogs are at a higher risk due to their frequent contact with ticks. However, most of the infections in dogs are asymptomatic, and less than 5% of bites from infected ticks lead to clinical symptoms. The first symptoms of Lyme borreliosis in dogs are rather unspecific and include lethargy, loss of appetite and fever. Erythema migrans, which is typically found in humans, is not relevant in dogs since it generally cannot be observed due to fur or dark skin. The first specific symptom in dogs is lameness due to myositis or arthritis, which generally occurs weeks or months after infection. Neurological impairments or damage to the kidneys (glomerulonephritis) or the heart (myocarditis) are rarely described. Infection does not confer strong long-term immunity. Reinfection is therefore possible. Various vaccines are available for dogs. Specific antibodies against *Borrelia burgdorferi* can be found in the sample of infected or vaccinated dogs.



Application

Direct detection of the pathogen using PCR techniques or cultivation is reliable only in tissue samples, but not in blood samples. Therefore, serological detection of antibodies is the method of choice for laboratory diagnosis of borreliosis in dogs. For diagnosis of canine borreliosis, clinical symptoms and differential diagnostics should always be taken into account alongside the serological results. For the serological detection of anti-*Borrelia* antibodies, several studies call for a two-stage strategy: with its wide antigen spectrum, the Anti-Borrelia ELISA Dog (IgG) achieves a high sensitivity and is therefore ideally suited for use as a screening test and will identify practically all sera that react with *Borrelia* antigens. As a follow-up, the EUROIMMUN Anti-Borrelia EUROLINE Dog (order no. DN 2136-1601 GC or MC) provides a secure and highly sensitive confirmation of *Borrelia*-specific reactions.

Borrelia-specific IgG antibodies can be detected approximately 4 to 6 weeks after infection and persist for months or years. Therefore, it is recommended that IgG determination is supplemented by an analysis of *Borrelia*-specific antibodies of class IgM, for example using the EUROIMMUN Anti-Borrelia ELISA Dog (IgM) (order no. EI 2132-9601 MC). In this way, the serological detection rate for all stages of the disease can be further increased and acute infections may be differentiated from old infections or vaccine-derived antibodies.

Principle of the test

The ELISA test kit provides a semiquantitative in vitro assay for canine antibodies of the IgG class against *Borrelia* antigens in serum or plasma. The test kit contains microtiter strips each with 8 break-off reagent wells coated with a mix of whole antigen extracts of *Borrelia burgdorferi sensu stricto*, *Borrelia afzelii* and *Borrelia garinii*. In the first reaction step, diluted samples are incubated in the wells. In the case of positive samples, specific IgG antibodies (also IgA and IgM) will bind to the antigens. To detect the bound antibodies, a second incubation is carried out using an enzyme-labelled anti-dog IgG (enzyme conjugate) catalysing a colour reaction.

Sensitivity and specificity

To confirm the assay sensitivity, 64 sera from dogs experimentally infected with *Borrelia burgdorferi sensu stricto* (sampled 5-15 weeks after infection) and 6 sera from dogs vaccinated against lyme borreliosis (sampled 4-8 weeks after vaccination) were tested using the EUROIMMUN Anti-Borrelia ELISA Dog (IgG). As specificity controls 17 dogs without any tick contact (laboratory-reared dogs) and 8 dogs testing positive for antibodies against *Leptospira interrogans* were investigated. Sensitivity and specificity of the ELISA amounted to 100%.

n = 95		Precharacterisation	
		positive	negative
EUROIMMUN Anti-Borrelia ELISA Dog (IgG)	positive	70	0
	borderline	0	0
	negative	0	25

Literature

1. Appel MJ, et al. **Experimental Lyme disease in dogs produces arthritis and persistent infection.** J Infect Dis 167(3):651-664 (1993).
2. Barthold SW, et al. **Serologic responses of dogs naturally exposed to or vaccinated against Borrelia burgdorferi infection.** J Am Vet Med Assoc 207(11):1435-1440 (1995).
3. Burgdorfer W, et al. **Lyme disease – a tick-borne spirochetosis?** Science 216(4552):1317-1319 (1982).
4. Krupka I, al. **Lyme borreliosis in dogs and cats: background, diagnosis, treatment and prevention of infections with Borrelia burgdorferi sensu stricto.** Vet Clin North Am Small Anim Pract 40(6):1103-1119 (2010).
5. Rauter C, et al. **Prevalence of Borrelia burgdorferi sensu lato genospecies in Ixodes ricinus ticks in Europe: a metaanalysis.** Appl Environ Microbiol 71(11):7203-7216 (2005).
6. Töpfer KH, et al. **Characterization of the humoral immune response in dogs after vaccination against the Lyme borreliosis agent.** A study with five commercial vaccines using two different vaccination schedules. Vaccine 25(2):314-326 (2007).

The Anti-Borrelia ELISA Dog (IgG) is officially registered according to § 17c TierSG (German epizootic diseases act), registration number: FLI-B 657.