



## Anti-Borrelia EUROLINE Dog (IgM)



- Detection of specific antibodies for identification of acute *Borrelia* infections
- Excellent reproducible line blot system based on recombinant antigens
- Fully automated incubation and analysis possible

### Technical data

<b>Antigens</b>	Highly specific recombinant antigens purified by affinity chromatography: p18, p21, OspC (p25), p39, p41, p100
<b>Sample dilution</b>	Canine Serum or plasma, 1:51 in sample buffer
<b>Test procedure</b>	30 min / 30 min / 10 min, room temperature
<b>Test kit format</b>	16 or 32 membrane strips, kit includes all necessary reagents incl. a coloured conjugate for a better handling
<b>Automation</b>	Compatible with all commercial blot processing systems, e. g. EUROBlotOne or EUROBlotMaster from EUROIMMUN
<b>Order no.</b>	<b>DN 2136-1601 MC or DN 2136-3201 MC</b>
<b>Related products</b>	<b>DN 2136-1601 GC or DN 2136-3201 GC: Anti-Borrelia EUROLINE Dog (IgG)</b>

### 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 observed in dogs 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 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 serum of infected or vaccinated dogs.

### Application

For the serological detection of anti-*Borrelia* antibodies, several studies call for a two-stage strategy: a sensitive screening test, such as the EUROIMMUN Anti-Borrelia ELISA Dog (IgG or IgM) (order no. EI 2132-9601-2 GC and EI 2132-9601 MC), will identify practically all sera that react with *Borrelia* antigens. As a follow-up, the EUROIMMUN Anti-Borrelia EUROLINE Dog (IgG or IgM) provides a secure and sensitive differentiation between *Borrelia*-specific and non-specific reactions by using defined antigens as single bands.

IgM antibodies against *Borrelia* antigens can be found for a period of a few weeks in the early stage of infection. Since dogs do not present characteristic symptoms in the early phase of the disease, specific IgM antibodies are often no longer detectable once borreliosis is suspected in an animal.



Therefore, IgM determination is recommended as a supplement to the analysis of *Borrelia*-specific antibodies of class IgG, for example using the Anti-Borrelia EUROLINE Dog (IgG) (order no. DN 2136-1601 GC). 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.

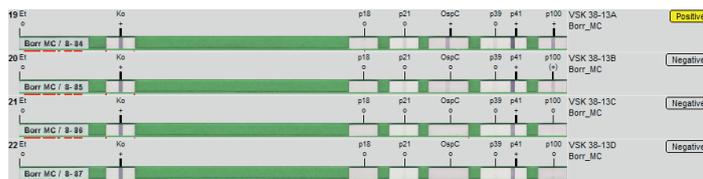
Direct detection of the pathogen using PCR techniques or cultivation is reliable only in tissue samples, but not in blood samples. Therefore, serological detection of antibodies is the method of choice for laboratory diagnosis of borreliosis in dogs. For diagnosis of canine borreliosis, clinical symptoms and differential diagnostics should always be taken into account alongside serological results.

## Principle of the test

The EUROLINE is a qualitative in vitro immunoassay, in which membrane strips printed with lines of purified, biochemically characterised antigens are used as solid phase. Each antigen is coated onto a separate membrane fragment, enabling the production process and thereby the efficiency of antibody detection to be optimized for each protein. Since antigen bands are located at defined positions, results can be evaluated visually without the need for additional equipment. Correct performance of all test steps is confirmed by staining of the control band.

## Computer-based evaluation

The EUROLinescan software from EUROIMMUN provides automated evaluation of EUROLINE analyses and detailed documentation of results. The incubated membrane strips are scanned from a work protocol using a flatbed scanner, or photographed by means of a camera system (EUROBlotOne) while still in the incubation tray. The EUROLinescan software identifies the bands, measures their intensity and automatically provides the final result for each sample. Archiving of potentially infectious material is no longer necessary. A results report can be created for each sample separately. The bidirectional communication with a laboratory information management system is enabled by EUROLinescan or, optionally, the laboratory management software EUROLabOffice 4.0.



Point in time (p.i.)	Blot strip no.	Band intensities measured in individual analyses using EUROLinescan							Result
		Ctrl	p18	p21	OspC	p39	p41	p100	
Week 5	8-34	73	4	16	<b>40</b>	10	<b>117</b>	<b>51</b>	positive
Week 7	8-35	73	1	9	11	3	<b>99</b>	<u>24</u>	negative
Week 11	8-36	72	2	4	2	2	<b>62</b>	3	negative
Week 15	8-37	73	1	4	0	2	<b>57</b>	3	negative

### Infection:

Results for serum samples taken at different points in time from an infected dog.

Evaluation of band intensities: bold numbers indicate positive, underlined numbers indicate borderline and unformatted numbers indicate negative results.

Ctrl.: Control, p.i.: post infection

## Sensitivity and specificity

In serum samples from 16 dogs infected with *Borrelia burgdorferi*, a positive result was found in 4 animals after five weeks, using the Anti-Borrelia EUROLINE Dog (IgM). The sensitivity amounted to 25%. Seven to 15 weeks after infection (p.i.), all serum samples were negative. In a control panel of 17 dogs with no contact to ticks, which had been vaccinated against leptospirosis at regular intervals, the Anti-Borrelia EUROLINE Dog (IgM) yielded a specificity of 100%.

n = 16		5 weeks p.i.	15 weeks p.i.
		EUROIMMUN Anti-Borrelia EUROLINE Dog (IgM)	positive
	borderline	0	0
	negative	12	16

## Literature

- 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).
- Krupka I, et 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).