



EUROLINE Tick-Borne Profile 1 Dog (IgG)



- Differential diagnosis of infections with *Anaplasma*, *Borrelia* and TBE virus with only one incubation
- Detection of coinfections
- Fully automated incubation and evaluation available



Technical data

Antigen	Recombinant antigens for <i>Borrelia</i> (VlsE and OspC (p25)), <i>Anaplasma</i> (MSP-2) and tick-borne encephalitis virus (gpE[TBEV])
Sample dilution	Canine serum or plasma, 1:51 in universal buffer
Test procedure	30 min / 30 min / 10 min; room temperature
Test kit format	16 membrane strips; kit includes all necessary reagents incl. a coloured conjugate for a better handling
Automation	Compatible with all commercial blot processing systems, e.g. EUROBlotOne or EUROBlotMaster from EUROIMMUN
Order no.	DN 2136-1601-11 GC



Clinical significance

The distribution area of ticks is continuously increasing due to global warming. Consequently, tick-borne diseases such as anaplasmosis, borreliosis and tick-borne encephalitis (TBE) occur more frequently in dogs as well. The pathogens *Anaplasma (A.) phagocytophilum*, *Borrelia (B.) burgdorferi* sensu lato and TBE virus are transmitted by ticks, with the hard-bodied tick *Ixodes (I.) ricinus* being the most common species in Europe.

Canine anaplasmosis manifests for instance with a reduced general condition and fever, weight loss, oedema of the joints, anaemia, haemorrhagia, polyarthritis, but also CNS symptoms as a result of inflammation and bleeding the meninges. Primary symptoms of canine borreliosis often include lethargy, loss of appetite and fever. Lameness caused by myositis or arthritis, enlargement of lymph nodes, neurological problems, kidney or heart damage can follow. An infection with TBE virus in dogs is often characterised for instance by fever, apathy, weakness, reduced consciousness, lethargy, anorexia, ataxia, hyperalgesia and neurological disturbances.

Even though most of the infections follow a subclinical course, canine anaplasmosis, borreliosis and TBE are serious diseases, which may have a severe outcome. Since the clinical symptoms are generally unspecific and very similar, differential diagnostics should include all three diseases. Coinfections can also occur because dogs may be infected with several tick-borne pathogens at once.



Diagnostic application

For direct detection of *A. phagocytophilum*, staining of a blood smear, cultivation or PCR are available. Direct detection of *Borrelia* using PCR or cultivation is reliable only in tissue samples, but not in blood samples. The sensitivity of direct detection strongly depends on the phase of infection. Since direct detection is not a routine method, serological antibody detection is the method of choice for laboratory diagnosis of borreliosis and anaplasmosis. TBE virus can be detected directly by means of PCR (during the viraemic phase) or indirectly using ELISA. The unspecific symptoms in anaplasmosis, borreliosis and TBE do not indicate the underlying disease, making diagnosis difficult. The EUROLINE Tick-Borne Profile 1 Dog (IgG) (DN 2136-1601-11 GC) provides useful information for differential diagnosis because it allows the simultaneous detection of antibodies against all of these three pathogens. By using specific antigens, the EUROLINE Tick-Borne Profile 1 Dog (IgG) provides a high specificity, with a very high sensitivity. The test is designed for screening.



Test principle

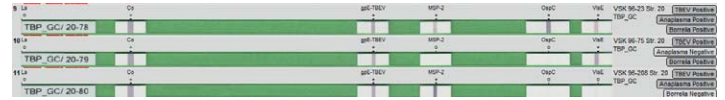
The EUROLINE is a qualitative in vitro immunoblot test that is based on purified and biochemically characterised antigens applied to membrane strips. Each antigen is fixed to a separate membrane fragment. This allows optimisation of the manufacturing conditions and efficiency of the antibody detection for each individual protein. The antigen bands are located at defined positions on the membrane, thus enabling visual evaluation of results without any additional means. A control band ensures correct performance of the individual incubation steps.



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.

Example of an incubation



TBEV: tick-borne encephalitis virus; Co: control

Strip no.	Band intensity for individual analyses, measured by means of EUROLinescan				
	Control	TBE gpE[TBEV]	Anaplasmosis MSP-2	Borreliosis OspC / VlsE	
20-78	53	47	35	70	28
20-79	55	42	0	2	50
20-80	51	47	93	2	2

Evaluation of band intensity: numbers in bold stand for positive results, underlined numbers for borderline and normal numbers for negative results.



Sensitivity and specificity

The sensitivity and specificity were determined by investigating randomly selected canine sera with the EUROLINE Tick-Borne Profile 1 Dog (IgG) and commercial diagnostic assays. Borderline results were not included into the evaluation.

Detailed results for *Anaplasma*:

With respect to the commercial indirect immunofluorescence test (IIFT) the EUROLINE Tick-Borne Profile 1 Dog (IgG) showed a sensitivity of 100% and a specificity of 91% for *Anaplasma*.

Detailed results for *Borrelia*:

The 21 samples tested as falsely negative for *Borrelia* are actually from dogs with past infections or immunisation. Acute infections were detected in 100% of cases. The specificity amounted to 100%.

Detailed results for TBE virus:

For the parameter TBE virus a comparison of the EUROLINE Tick-borne Profile 1 Dog (IgG) with a commercially available ELISA yielded a sensitivity of only 60%. The discrepant sera were subsequently investigated by IIFT and classified, whereby the sensitivity increased to 93%. The specificity amounted to 91%.

Overview of performance data for EUROLINE Tick-Borne Profile 1 Dog (IgG)

Parameter	Sensitivity [%]	Specificity [%]
<i>Anaplasma</i>	100	91
<i>Borrelia</i>	100	100
TBE virus	93	91

<i>Anaplasma</i> ; n = 53		Comparative test: IIFT	
		positive	negative
EUROLINE Tick-Borne Profile 1 Dog (IgG)	positive	32	2
	negative	0	19

<i>Borrelia</i> (all samples); n = 556		Comparative test: line blot	
		positive	negative
EUROLINE Tick-Borne Profile 1 Dog (IgG)	positive	155	2
	negative	21	378

<i>Borrelia</i> (only acute infections*); n = 506		Comparative test: line blot	
		positive	negative
EUROLINE Tick-Borne Profile 1 Dog (IgG)	positive	126	2
	negative	0	378

* Samples which presented the results "Contact" and/or "Vaccination" in the line blot, were not included in the evaluation.

TBE virus; n = 95		Comparative test: ELISA/IIFT	
		positive	negative
EUROLINE Tick-Borne Profile 1 Dog (IgG)	positive	26	6
	negative	2	61