



EUROLINE Tick-Borne Profile 1 Horse (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, OspC (p25) und p100), <i>Anaplasma</i> (MSP-2) and tick-borne encephalitis virus (gpE[TBEV])
Sample dilution	Equine 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 GE



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 horses 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.

Clinical symptoms of equine anaplasmosis include high fever, depression, anorexia, oedema of the limbs, icterus, ataxia and reluctance towards physical activity. Primary symptoms of equine 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. Infections with TBE virus in horses manifest with a significantly poor general condition, increased body temperature, loss of appetite, weight loss, nervousness, anxiety, capriciousness, ataxia and cramps.

Even though most of the infections follow a subclinical course, equine 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 horses 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 Horse (IgG) (DN 2136-1601-11 GE) 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 Horse (IgG) provides a high specificity, with a very high sensitivity. The test is designed for screening.



Test principle

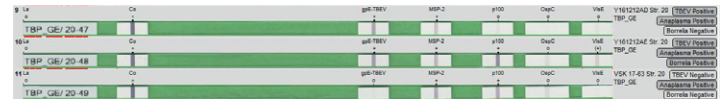
The EUROLINE is a qualitative in vitro immunoblot test that is based on purified and biochemically characterised antigens applied to membrane strips. Each antigen is fixed to a separate membrane fragment. This allows optimisation of the manufacturing conditions and the efficiency of antibody detection 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 using EUROLinescan					
	Control	TBE gpE[TBEV]	Anaplasmosis MSP-2	Borreliosis p100 / OspC / VlsE		
20-47	106	52	31	4	1	4
20-48	99	56	40	<u>77</u>	10	<u>19</u>
20-49	103	3	52	44	12	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 equine sera with the EUROLINE Tick-Borne Profile 1 Horse (IgG) and commercial diagnostic assays. Borderline results were not included in the evaluation.

Detailed results for *Anaplasma*:

In comparison with a commercially available ELISA, the EUROLINE Tick-Borne Profile 1 Horse (IgG) showed a sensitivity of 91% for the parameter *Anaplasma*, with a specificity of 100%.

Detailed results for *Borrelia*:

The data for *Borrelia* were obtained by investigating field sera. The investigation yielded a sensitivity of 94% and a specificity of 83% with respect to a commercial line blot. The assay is designed for screening and provides a high sensitivity. Positive results should be confirmed with a second test, e.g. the highly specific Anti-Borrelia EUROLINE Horse (IgG).

Detailed results for TBE virus:

In comparison of the EUROLINE Tick-Borne Profile 1 Horse (IgG) with the commercially available ELISA for the parameter TBEV, the sensitivity amounted to only 80%. The discrepant sera were retested and classified again using IIFT. Consequently, the sensitivity increased to 100%. The specificity amounted to 92%.

Overview of performance data for EUROLINE Tick-Borne Profile 1 Horse (IgG)		
Parameter	Sensitivity [%]	Specificity [%]
<i>Anaplasma</i>	91	100
<i>Borrelia</i>	94	83
TBE virus	100	92

<i>Anaplasma</i> ; n = 69		Comparative test: ELISA	
		positive	negative
EUROLINE Tick-Borne Profile 1 Horse (IgG)	positive	21	0
	negative	2	46

<i>Borrelia</i> ; n = 581		Comparative test: line blot	
		positive	negative
EUROLINE Tick-Borne Profile 1 Horse (IgG)	positive	147	71
	negative	10	353

TBE virus; n = 101		Comparative test: ELISA/IIFT	
		positive	negative
EUROLINE Tick-Borne Profile 1 Horse (IgG)	positive	26	6
	negative	0	69