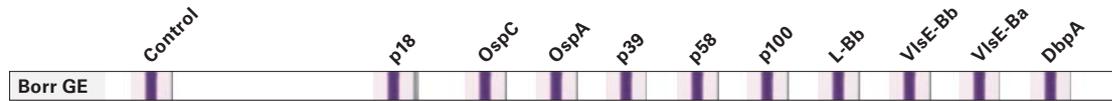




## Anti-Borrelia EUROLINE Horse (IgG)



- Simultaneous detection of 9 different Borrelia-specific antibodies against recombinant antigens
- Differentiation between vaccine- and infection-derived antibodies
- Fully automated incubation and analysis possible

### Technical data

<b>Antigens</b>	Highly specific recombinant antigens purified by affinity chromatography: p18, OspC (p25), p39, p58, p100, Lipid-Bb, VlsE-Bb, VlsE-Ba, DbpA and vaccine antigen OspA (p31)
<b>Sample dilution</b>	Equine serum or plasma, 1:51 in universal 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 GE or DN 2136-3201 GE</b>

### Clinical significance

In 1982 W. Burgdorfer found that ticks transmit "Treponema-like spirochaeta", which were later identified as the causative agent of Lyme borreliosis. In 1985 antibodies to *B. burgdorferi* were reported in horses in New England, USA. 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 horses. 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. Due to their pasturing, the risk of infection is clearly increased in horses. However, the majority of infections in horses proceed asymptotically. To date, a large number of clinical symptoms which usually only appear several weeks or months after infection could be assigned to an infection with *Borrelia burgdorferi*. They encompass, amongst others, arthritis, alternating lameness, algescic muscles, uveitis, encephalitis, abortion, fever and lethargy. Erythema migrans, which is typically found in humans, is not relevant in horses since it generally cannot be observed due to fur or dark skin. A vaccine for horses has been available since 2015.

### 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 Horse (order no. EI 2132-9601 GE), will identify practically all sera that react with *Borrelia* antigens. As a follow-up, the EUROIMMUN Anti-Borrelia EUROLINE Horse (IgG) provides a secure and sensitive differentiation between *Borrelia*-specific and non-specific reactions by using defined antigens as single bands. Due to borreliosis vaccination, OspA is of particular importance. It is the most important surface protein of *Borrelia* in both ticks and culture (vaccine production). Antibodies against OspA are produced mainly after vaccination. Infections only very rarely lead to OspA antibody titers, because after blood contact there is a transition to OspC as the most important surface protein in infected animals. Therefore, differentiation between vaccination and infection is possible.

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 horses. For diagnosis of equine borreliosis, clinical symptoms and differential diagnostics should always be taken into account alongside the serological results.



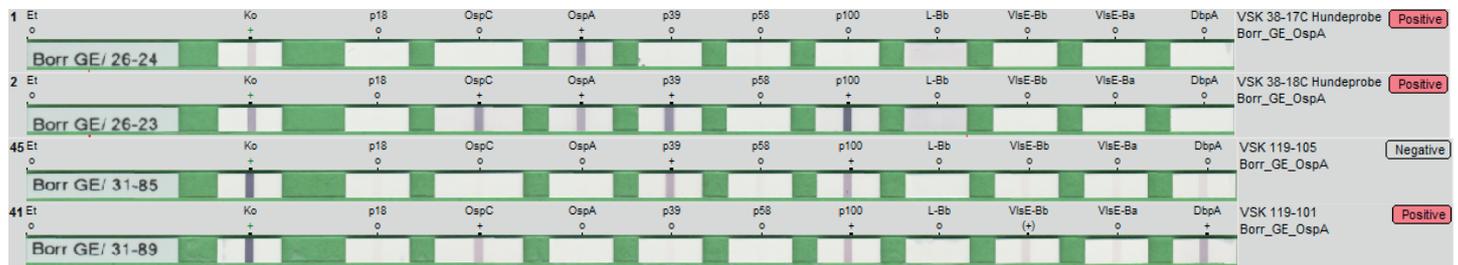
## Principle of the test

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 program 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 (EUROBlotScanner), or photographed by means of a camera system (EUROBlotCamera and EUROBlotOne) while still in the incubation tray. EUROLinescan 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.



Strip no.	13Band intensities measured for individual analysis using EUROLinescan											Result
	Control	p18	OspC	OspA	p39	p58	p100	L-Bb	VisE-Bb	VisE-Ba	DbpA	
26-24	22	1	0	<b>64</b>	1	3	1	1	0	0	0	positive, vaccination
26-23	55	1	<b>63</b>	<b>45</b>	<b>76</b>	1	<b>115</b>	0	0	1	1	positive, infection or vaccination
31-85	123	4	8	0	2	3	9	1	1	1	2	negative
31-89	119	<b>21</b>	8	2	<u>13</u>	2	<b>108</b>	2	<b>78</b>	<b>46</b>	<b>24</b>	positiv, infection

Evaluation of band intensities: bold numbers=positive, underlined numbers=borderline, unformatted numbers=negative



## Sensitivity and specificity

To confirm assay sensitivity and specificity, 59 randomly collected sera from horses were analysed and results were compared to a commercially available lineblot. The sensitivity of the EUROIMMUN Anti-Borrelia EUROLINE Horse (IgG) amounted to 100% and the specificity to 98% not including borderline results.

n=59		Precharacterisation		
		positive	borderline	negative
EUROIMMUN Anti-Borrelia EUROLINE Horse (IgG)	positive	9	0	1
	borderline	0	1	0
	negative	0	2	46



## Literature

- Burgdorfer W, Barbour AG, Hayes SF, Benach JL, Grunwaldt E, Davis JP. Lyme disease - A Tick - Borne Spirochetosis? Science 216 (1982) 1317-1319.
- Butler CM, Houwers DJ, Jongejan F, van der Kolk JH. Borrelia burgdorferi infections with special reference to horses. A review. Vet. Q. 27 (2005) 146-156.
- Cohen ND and Cohen D. Borreliosis in horses: a comparative review. Equine Comp. 12 (1990) 1449-1458.