Anti-Borrelia ELISA Horse (IgG)

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

Technical data

Antigen	Antigen extracts of *Borrelia burgdorferi* sensu stricto and *Borrelia afzelii*
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	Equine serum or plasma, 1 : 101 in sample buffer
Reagents	Ready for use, with the exception of the wash buffer (10 x), 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 GE**

Clinical significance

In 1982 W. Burgdorfer found that ticks transmit "*Treponema*-like spirochaetes", which were later identified as the causative agent of Lyme borreliosis. In 1985 antibodies to *Borrelia (B.) burgdorferi* were reported in horses in New England, USA. The Gram-negative bacteria causing Lyme borreliosis are collectively referred to as *Borrelia burgdorferi* sensu lato. Among these, the genospecies *B. burgdorferi* sensu stricto, *B. garinii* and *B. 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 asymptomatically. 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, algesic muscles, uveitis, encephalitis, miscarriage, 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. As of late, a vaccine for horses is available.

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 horses. *Borrelia*-specific IgG antibodies can be detected approximately 4 to 6 weeks after infection and persist for months or years. For diagnosis of equine 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: a sensitive screening test, such as the EUROIMMUN Anti-Borrelia ELISA Horse (IgG), will identify practically all sera that react with *Borrelia* antigens. As a follow-up, the EUROIMMUN Anti-Borrelia EUROLINE Horse (order no. DN 2136-1601 GE) provides a secure confirmation of *Borrelia*-specific reactions.

Principle of the test

The ELISA test kit provides a semiquantitative in vitro assay for equine 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 and *Borrelia afzelii*. 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-horse IgG (enzyme conjugate) catalysing a colour reaction.

Sensitivity and specificity

To confirm assay sensitivity and specificity, 76 randomly collected sera from horses were analysed and results were compared to a commercially available ELISA. The sensitivity of the EUROIMMUN Anti-Borrelia ELISA Horse (IgG) amounted to 100% and the specificity to 98% not including borderline results.

n = 76		Precharacterisation		
		positive	borderline	negative
EUROIMMUN Anti-Borrelia ELISA Horse (IgG)	positive	11	11	1
	borderline	0	3	7
	negative	0	0	43

Literature

1. Burgdorfer W, et al. **Lyme disease – a tick-borne spirochetosis?** Science 216(4552):1317–1319 (1982).
2. Burgess EC, et al. **Foal mortality associated with natural infection of pregnant mares with Borrelia burgdorferi.** Eq Inf Diseases V (Proc. 5th Intern. Disease Conf.) Powell DG (Ed), Univ. Press of Kentucky 217-220 (1990) .
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4. Divers TJ, et al. **Equine Lyme Disease: A Review of Experimental Disease Production, Treatment Efficacy and Vaccine Protection.** In: 49th Ann Am Assoc Equine Pract Conv (2003).
5. Dzierzecka M, et al. **The use of chosen serological diagnostic methods in Lyme disease in horses. Part I. Indirect immunofluorescence and enzyme-linked immunosorbent assay (ELISA).** Pol J Vet Sci 5(2):71-77 (2002).
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7. 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).