Highly specific screening test for the detection of canine anti-Anaplasma antibodies
Based on recombinant antigen
Fully automatable

Technical data

Antigen
Recombinantly produced and purified Anaplasma phagocytophilum antigen

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
Canine serum or plasma, 1:101 in sample buffer

Reagents
Ready for use, with the exception of the wash buffer (10x), 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 220m-9601 GC

Clinical significance

Anaplasmosis is a disease which is transmitted to animals and humans by ticks of the Ixodes genus. It is caused by Anaplasma (A.) phagocytophilum (formerly: Ehrlichia phagocytophila). A. phagocytophilum is distributed worldwide, its prevalence depends on the occurrence of the transmitting vectors. The seroprevalence varies greatly between regions and is given as 0 to 56%. There are different names for the clinical image of an infection with A. phagocytophilum in dogs: granulocytic ehrlichiosis (obsolete), canine granulocytic anaplasmosis, and, simply, and most frequently used: anaplasmosis.

A. phagocytophilum is a Gram-negative, obligate intra-cellular bacterium which attacks mostly neutrophilic granulocytes, but also, in rare cases, eosinophilic granulocytes. The clinical symptoms of canine anaplasmosis are reduced general condition with fever, weight loss, vomiting, dyspnoea, spleno- and hepatomegaly, lymphadenopathy, oedema of the limbs, leukopenia, anaemia, haemorrhage, polyarthritis, but also symptoms of the CNS as a result of inflammatory processes and bleeding in the meninges. Some dogs are able to eliminate the pathogen, in others the infection is subclinical or chronic. In chronic cases, changing lameness occurs due to polyarthritis and swelling of the joints. Borreliosis should be excluded by differential diagnosis. There are no vaccines available.

Antibodies against A. phagocytophilum occur in the serum of specifically infected animals after 7 to 14 days. Different techniques, such as ELISA or indirect immunofluorescence (IIF), are used for the serological detection of antibodies. It should be noted that many dogs that show specific antibodies against A. phagocytophilum are not clinically conspicuous. For diagnosis, it is hence necessary to investigate two consecutive blood samples. A twofold titer increase or a seroconversion are diagnostically relevant. If the first blood sample tests negative, a second sample should be examined after two weeks in cases of suspected anaplasmosis since dogs do not produce antibodies in the early phase of infection.
**Application**

The direct detection of *A. phagocytophilum* by staining or culture is possible, but not conducted routinely since these methods are too complicated for screening diagnostics. PCR is commonly used. The sensitivity of the direct detection depends on the phase of infection as there are “silent phases” when the anaplasms are virtually not detectable in the blood. It is only in reproductive phases (fever attacks) that a reliable direct detection is possible. It is compulsory to use whole blood for PCR. Therefore, serological detection of antibodies is the method of choice when it comes to laboratory diagnosis of canine granulocytic anaplasmosis. Owing to the use of a specific recombinant antigen, the Anti-*Anaplasma phagocytophilum* ELISA Dog (IgG) has a high specificity and very high sensitivity.

**Principle of the test**

The ELISA test kit provides a semiquantitative in vitro assay for canine antibodies of the IgG class against *Anaplasma phagocytophilum* antigens in serum or plasma. The test kit contains microtiter strips each with 8 break-off reagent wells coated with recombinantly produced and purified *Anaplasma phagocytophilum* antigen. 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-dog IgG (enzyme conjugate) catalysing a colour reaction.

**Reproducibility**

The reproducibility was investigated by determining the intra- and inter-assay coefficients of variation (CV) using three sera. The intra-assay CVs are based on 20 determinations and the inter-assay CVs on 4 determinations performed in 6 different test runs.

<table>
<thead>
<tr>
<th>Serum</th>
<th>Intra-assay variation, n=20</th>
<th>Inter-assay variation, n=4x6</th>
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<tbody>
<tr>
<td></td>
<td>Mean value (Ratio) CV (%)</td>
<td>Mean value (Ratio) CV (%)</td>
</tr>
<tr>
<td>1</td>
<td>1.1 2.2</td>
<td>1.2 5.0</td>
</tr>
<tr>
<td>2</td>
<td>1.9 3.5</td>
<td>2.1 4.6</td>
</tr>
<tr>
<td>3</td>
<td>3.3 4.9</td>
<td>3.6 5.8</td>
</tr>
</tbody>
</table>

**Sensitivity and specificity**

59 randomly selected dog sera were investigated using the Anti-*Anaplasma phagocytophilum* ELISA Dog (IgG) and a commercial immunofluorescence test (IIFT). The test results were compared and showed a sensitivity of 97% and a specificity of 96% (borderline sera were not included in the calculation).

<table>
<thead>
<tr>
<th>n = 59</th>
<th>Precharacterisation (IIFT)</th>
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<tbody>
<tr>
<td></td>
<td>positive</td>
</tr>
<tr>
<td>EUROIMMUN Anti-Anaplasma ELISA Dog (IgG)</td>
<td>33</td>
</tr>
<tr>
<td></td>
<td>positive</td>
</tr>
<tr>
<td></td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>1</td>
</tr>
</tbody>
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**Literature**