Anti-MERS-CoV ELISA Camel (IgG)

- **First commercially available ELISA for specific detection of anti-MERS-CoV antibodies in camels**
- **Specific determination of anti-MERS-CoV antibodies in serum or plasma based on a recombinant protein**
- **Fully automatable**

Technical data

Antigen	Recombinant structural protein of MERS coronavirus (MERS-CoV)
Evaluation	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	Camelid 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 2604-9601 GK**

Clinical significance

"Middle East Respiratory Syndrome" (MERS) was first reported in humans in 2012 and is caused by a novel coronavirus (MERS-CoV). So far, all human MERS-CoV infections have originated in the Middle East, particularly in Saudi Arabia. About 40 % of known cases of this disease were fatal. Confirmed host organisms for MERS-CoV alongside bats are dromedary camels, which frequently show high titers of neutralising antibodies and are currently discussed as a potential source of sporadic infections in humans. Transmission between humans takes place via aerosols and smear infections. Respiratory secretions of the upper respiratory tract of infected persons play a particularly important role as they can be passed on by sneezing, coughing, and via contaminated hands. The highest viral load is detected in the lower respiratory tract of patients, smaller quantities are found in urine and stool. Similar results were obtained for infected camels and seroprevalence in adult camels is up to 100 % in endemic areas in Arabian and African countries, differing from that of younger camels under the age of 2 years (up to 72 %). In newborn camels, it is assumed that the virus multiplies and is shed, as time is needed to generate neutralising antibodies. During this time the calves might be a source of infection for humans. However, clinical disease associated with a MERS-CoV infection is rare and mild in camels.

Application

The most reliable laboratory diagnostic methods for confirmation of suspected MERS-CoV infections include the direct detection of MERS-CoV using polymerase chain reaction (PCR) and the detection of antibodies against MERS-CoV using indirect immunofluorescence (IIFT), ELISA, or neutralisation tests. The EUROIMMUN Anti-MERS-CoV ELISA Camel (IgG) contains a recombinant structural protein of MERS-CoV, which is known to be well suited for diagnostics as it combines high sensitivity and high specificity. IgG antibodies can be detected approximately 3 weeks after infection and persist for years. Cross reactions with other coronaviruses, especially bovine coronavirus, need to be taken into account in serological diagnostics, which, however, can be reduced using the recombinant protein as antigen. Thus, positive results should be confirmed using a different test method, ideally a neutralisation assay.

Principle of the test

The test kit contains microplate strips each with 8 break-off reagent wells coated with recombinant structural protein of MERS-CoV. 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-camel IgG (enzyme conjugate) catalysing a colour reaction.

Sensitivity and specificity

To confirm assay sensitivity, 151 sera from camels collected in Dubai were analysed and results were compared to in-house assays of the Institute of Virology, University of Bonn, Germany. To assess assay specificity, 20 sera from camels collected in Germany with negative predictive value and, additionally, 13 camel sera from the UAE negative for MERS-CoV antibodies but positive for bovine coronavirus antibodies in a recombinant IFA were tested. Sensitivity and specificity of the EUROIMMUN Anti-MERS-CoV ELISA Camel (IgG) both amounted to 100%.

n = 184		Precharacterisation	
		positive	negative
EUROIMMUN Anti-MERS-CoV ELISA Camel (IgG)	positive	151	0
	negative	0	33

Literature

1. Corman VM, et al. **Antibodies against MERS Coronavirus in Dromedary Camels, Kenya, 1992-2013.** Emerg Infect Dis 20(8): 1319-1322 (2014).
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4. Meyer B, et al. **Serological assays for emerging coronaviruses: Challenges and pitfalls.** Virus research 194:175-183 (2014).
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