Anti-Dengue Virus ELISA (IgG)

- Quantitative determination of antibodies against dengue virus
- Excellent supplement to the EUROIMMUN Dengue Virus NS1 ELISA
- Fully automatable

### Technical data

**Antigen**

Highly purified virus particles of dengue virus type 2. Due to the high structural similarity of dengue virus types 1 to 4 the use of a single virus type is sufficient for the reliable detection of antibodies against all four virus types.

**Calibration**

Quantitative, in relative units per milliliter (RU/ml)

- Calibration serum 1: 200 RU/ml
- Calibration serum 2: 20 RU/ml
- Calibration serum 3: 2 RU/ml

Recommended upper threshold of the reference range for non-infected individuals (cut-off): 20 RU/ml

**Sample dilution**

Serum or plasma, 1 : 101 in sample buffer

**Reagents**

Ready for use with the exception of the wash buffer (10x). Colour-coded solutions, in most cases exchangeable with those in other EUROIMMUN ELISA

**Test procedure**

30 min / 30 min / 15 min (room temperature), fully automatable

**Measurement**

450 nm, Reference wavelength between 620 nm and 650 nm

**Kit format**

96 break-off wells. Kit includes all necessary reagents

**Order no.**

El 266b-9601 G

### Clinical significance

Dengue viruses (DENV) belong to the flavivirus family. Dengue fever is the most frequent and the most rapidly spreading vector-borne viral infection in humans. There are four different dengue virus serotypes (DENV1 to DENV4). Vectors of these viruses are mosquitoes of the Aedes species (A. aegypti, A. albopictus); reservoir hosts are primates and particularly humans. DENV are mainly found in Latin America, Central Africa, India, South East Asia and in some parts of the Pacific islands. The fever is also regularly introduced to Europe. Infection with dengue viruses can cause a wide range of diseases. The classic dengue fever is a self-limiting, short-term disease which is accompanied by high fever of over 40°C, severe headache, muscle and joint pains, exanthema and lymph node swellings. Symptoms usually last 2-7 days. To date there is no specific antiviral therapy available, only the symptoms are treated. Primary infections usually have a mild course. An infection confers life-long immunity. Cross immunity to other serotypes, however, only exists in part and is timely limited. With secondary infection with another virus subtype, the risk of a severe disease course increases. This may include dengue haemorrhagic fever (DHF) and/or dengue shock syndrome (DSS). DHF expresses itself in the form of distinct haemorrhagic symptoms such as petechiae, black and tar-like stool, and nose and skin bleeds. Complications such as circulatory disturbances and even shock can occur. The average lethality of DHF amounts to 12%.

### Diagnostic application

The Anti-Dengue Virus ELISA (IgG and IgM) is suitable for the serological detection of an acute or a past dengue virus infection and supplements direct pathogen detection e.g. with the Dengue Virus NS1 ELISA. Seroconversion or an increase in the IgG antibody titer of at least 4 fold indicates an acute infection. In addition to diagnosis of the disease, serology can be used to gather epidemiological data.
Linearity

The linearity of the Anti-Dengue Virus ELISA (IgG) was determined by performing at least 4 serial dilutions of different serum samples. The linear regression $R^2$ was > 0.95 for all samples. The Anti-Dengue Virus ELISA (IgG) is linear in the tested concentration range of 9 RU/ml to 184 RU/ml.

Reference range

Levels of anti-dengue virus antibodies (IgG) were determined with the EUROIMMUN ELISA in a panel of 500 apparently healthy blood donors. 0.8% of the blood donors were anti-dengue virus positive (IgG) with a cut-off of 20 RU/ml. This may also be due to cross reactivity (e.g. antibodies against TBE through vaccination, see Cross reactivity).

Reproducibility

The reproducibility of the test was investigated by determining the intra- and inter-assay coefficients of variation using three sample sets. The intra-assay CVs are based on 20 determinations and the inter-assay CVs on four determinations performed in six different test runs.

<table>
<thead>
<tr>
<th>Sample</th>
<th>Intra-assay variation, n=20</th>
<th>Inter-assay variation, n=4 x 6</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean value (RU/ml)</td>
<td>CV (%)</td>
<td>Mean value (RU/ml)</td>
</tr>
<tr>
<td>1</td>
<td>90</td>
<td>4.7</td>
</tr>
<tr>
<td>2</td>
<td>113</td>
<td>4.5</td>
</tr>
<tr>
<td>3</td>
<td>114</td>
<td>4.4</td>
</tr>
</tbody>
</table>

Specificity and sensitivity

Study I: 44 clinically pre-characterised patient samples (origin: INSTAND, Germany) were tested with the EUROIMMUN Anti-Dengue Virus ELISA (IgG). The sensitivity was 100%, with a specificity of 100%.

Study II: 71 clinically pre-characterised patient samples (origin: WHO Collaborating Centre for Arbovirus and Haemorrhagic Fever Reference and Research, WHCC, Hamburg, Germany) were investigated with the EUROIMMUN Anti-Dengue Virus ELISA (IgG). The sensitivity was 100%, with a specificity of 100%. Borderline results were not included in the calculation.

Cross reactivity

The quality of the antigen used in the ELISA guarantees a high specificity of the test. Sera from patients with infections caused by various pathogens were analysed using the Anti-Dengue Virus ELISA (IgG). However, cross reactions with other flaviviruses cannot be ruled out. These were observed in patient samples positive for anti-TBE, anti-West Nile virus and Zika virus.

<table>
<thead>
<tr>
<th>Antibodies against</th>
<th>n</th>
<th>Anti-Dengue Virus ELISA (IgG) positive</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chikungunya virus</td>
<td>39</td>
<td>0%</td>
</tr>
<tr>
<td>TBE virus</td>
<td>124</td>
<td>25.8%</td>
</tr>
<tr>
<td>Hepatitis C virus</td>
<td>20</td>
<td>0%</td>
</tr>
<tr>
<td>West Nile virus</td>
<td>13</td>
<td>100%</td>
</tr>
<tr>
<td>Zika virus</td>
<td>79</td>
<td>100%</td>
</tr>
</tbody>
</table>