SERION ELISA *classic* Chlamydia trachomatis IgA/IgG/IgM

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SERION ELISA classic Chlamydia trachomatis IgA/IgG/IgM

Enzyme immunoassay for detection of human antibodies

For sale in the U.S. for Research Use Only. Not for diagnostic procedures.

SERION ELISA classic Chlamydia trachomatis IgA Order no. ESR1372A
SERION ELISA classic Chlamydia trachomatis IgG Order no. ESR1372G
SERION ELISA classic Chlamydia trachomatis IgM Order no. ESR1372M

1 INTENDED USE
The SERION ELISA classic Chlamydia trachomatis IgA, IgG, and IgM tests are quantitative and qualitative immunoassays for detection of human antibodies in serum or plasma to Chlamydia trachomatis.

2 BACKGROUND
Chlamydiae are gram-negative intracellular bacteria. The following species cause disease in humans: Chlamydia trachomatis, Chlamydia pneumoniae, and Chlamydia psittaci. Chlamydia life cycle alternates between two distinct morphological forms: elementary bodies (EB) and reticular bodies (RB). The extracellular EBs are metabolically inert and are able to infect host cells where they transform into the metabolically active RBs. They multiply, recondense into EBS, and are released from the host cells to initiate another round of infection.

Chlamydia trachomatis is one of the most common sexually transmitted prokaryotic pathogens. The bacterium infects epithelia cells of the urogenital and respiratory tracts as well as cells of the conjunctiva. The World Health Organization (WHO) estimates that 90 million people annually become infected by Chlamydia trachomatis.

Chlamydia trachomatis infections may be asymptomatic in both females and males. Untreated infections can result in serious damage and complications. The serovars A to C cause ceratoconjunctivitis. Chronic infections during childhood can result in trachoma or blindness. Serovars D to K are pathogens of the urogenital tract responsible for urethritis, proctitis, and cervicitis. Salpingitis, endometritis, and perihepatitis are frequently the consequence of untreated cervicitis. Occasionally, fallopian tube obstructions and ectopic pregnancy, which are some of the most common reasons for infertility in women, may result. Furthermore, the risk of a premature delivery for infected pregnant women is also increased. The risk of transfer to the newborn during parturition is ~60%, with conjunctivitis or pneumonia as possible sequelae. In addition to urethritis, proctitis, epidymitis, and prostatitis, which may lead to infertility, are possible consequences for men.

Serovars L1 to L3 spread systemically through lymphatic tissue causing the invasive disease known as lymphogranuloma venereum. Stricture and stenosis are often the consequences, which have to be treated surgically.
The SERION ELISA *classic* Chlamydia trachomatis tests are based on a specific domain of the major outer membrane protein (MOMP). The use of this antigen increases the specificity of the test.

3 TEST PRINCIPLE SERION ELISA *classic*

The ELISA (Enzyme Linked Immunosorbent Assay) is an immunoassay which is particularly suited to the detection of antibodies. The reaction is based on the specific interaction of antibodies with their corresponding antigen. The test strips of the SERION ELISA *classic* microtiter plate are coated with specific antigens of the pathogen of interest. If antibodies are present in a sample, they bind to the fixed antigen. A secondary antibody, which has been conjugated with the enzyme alkaline phosphatase, detects and binds to the antigen-antibody complexes. The colorless substrate p-nitrophenylphosphate is then converted into a colored product p-nitrophenol. The signal intensity of this reaction product is proportional to the concentration of the antibody in the sample and is measured photometrically.
4 KIT COMPONENTS

<table>
<thead>
<tr>
<th>Test Components</th>
<th>Pieces / Volume</th>
</tr>
</thead>
<tbody>
<tr>
<td>Break apart microtiter test strips each with eight antigen coated single wells,</td>
<td>12 pieces</td>
</tr>
<tr>
<td>(altogether 96) [MTP] 1 frame. The coating material is inactivated.</td>
<td></td>
</tr>
<tr>
<td><strong>Standard serum (ready-to-use) [STD]</strong></td>
<td></td>
</tr>
<tr>
<td>Human serum in protein-containing phosphate buffer; negative for anti-HIV Ab,</td>
<td>2 x 2ml</td>
</tr>
<tr>
<td>HBs-Ag (Hepatitis B-Virus surface antigen), and anti-HCV Ab;</td>
<td></td>
</tr>
<tr>
<td>preservative: &lt;0.1% sodium azide; coloring: Amaranth O</td>
<td></td>
</tr>
<tr>
<td><strong>Negative control serum (ready-to-use) [NEG]</strong></td>
<td>2ml</td>
</tr>
<tr>
<td>Human serum in protein-containing phosphate buffer; negative for anti-HIV Ab,</td>
<td></td>
</tr>
<tr>
<td>HBs-Ag (Hepatitis B-Virus surface antigen), and anti-HCV Ab;</td>
<td></td>
</tr>
<tr>
<td>preservative: &lt;0.1% sodium azide; coloring: Lissamin Green V</td>
<td></td>
</tr>
<tr>
<td><strong>Anti-human IgA, IgG, or IgM conjugate (ready-to-use) [APC]</strong></td>
<td>13ml</td>
</tr>
<tr>
<td>Anti-human IgA, IgG, or IgM polyclonal antibody,</td>
<td></td>
</tr>
<tr>
<td>Conjugated to alkaline phosphatase, stabilized with protein stabilization solution;</td>
<td></td>
</tr>
<tr>
<td>preservative: &lt;0.1% methylisothiazolone, &lt;0.1% bromnitrodioxane</td>
<td></td>
</tr>
<tr>
<td><strong>Washing solution concentrate (sufficient for 1000ml) [WASH]</strong></td>
<td>33.3ml</td>
</tr>
<tr>
<td>Sodium chloride solution with Tween 20 and 30mM Tris/HCl, pH 7.4;</td>
<td></td>
</tr>
<tr>
<td>preservative: &lt;0.1% sodium azide</td>
<td></td>
</tr>
<tr>
<td><strong>Dilution buffer (ready-to-use) [DILB]</strong></td>
<td>2 x 50ml</td>
</tr>
<tr>
<td>Protein-containing phosphate buffer with Tween 20;</td>
<td></td>
</tr>
<tr>
<td>preservative: &lt;0.1% sodium azide; coloring: 0.01g/l bromphenol blue</td>
<td></td>
</tr>
<tr>
<td><strong>Stopping solution (ready-to-use) [STOP]</strong></td>
<td>15ml</td>
</tr>
<tr>
<td>&lt;0.1N sodium hydroxide, 40mM EDTA</td>
<td></td>
</tr>
<tr>
<td><strong>Substrate (ready-to-use) [pNPP]</strong></td>
<td>13ml</td>
</tr>
<tr>
<td>Para-nitrophenylphosphate in solvent-free buffer;</td>
<td></td>
</tr>
<tr>
<td>preservative: &lt;0.1% sodium azide</td>
<td></td>
</tr>
<tr>
<td><strong>Quality control certificate with standard curve and evaluation table [INFO]</strong></td>
<td>2 pages</td>
</tr>
<tr>
<td>(quantification of antibodies in IU/ml or U/ml)</td>
<td></td>
</tr>
</tbody>
</table>

5 MATERIAL REQUIRED BUT NOT SUPPLIED

- Common laboratory equipment
- For IgM detection: SERION Rf-Absorbent (product no. Z200, 20ml)
- Photometer for microtiter plates with filter, wavelength 405nm, recommended reference wavelength 620nm-690nm (e.g. 650nm)
- Microtiter plate washer
- Incubator 37°C
- Moist chamber
- Distilled water
- Optional: SERION ELISA control
6 STORAGE AND STABILITY

<table>
<thead>
<tr>
<th>Reagent</th>
<th>Storage</th>
<th>Stability</th>
</tr>
</thead>
<tbody>
<tr>
<td>Microtiter strips (coated with antigen)</td>
<td>Unopened</td>
<td>See expiry date</td>
</tr>
<tr>
<td></td>
<td>After opening at 2-8°C in closed aluminum bag with desiccant</td>
<td>Minimum shelf life: four weeks</td>
</tr>
<tr>
<td>Control sera/Standard sera</td>
<td>Unopened / after opening at 2-8°C</td>
<td>See expiry date</td>
</tr>
<tr>
<td>Conjugate</td>
<td>Unopened / after opening at 2-8°C</td>
<td>See expiry date</td>
</tr>
<tr>
<td>Dilution buffer</td>
<td>Unopened / after opening at 2-8°C</td>
<td>See expiry date</td>
</tr>
<tr>
<td>Washing solution</td>
<td>Unopened / after opening at 2-8°C</td>
<td>Working dilution at 2-8°C</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Working dilution at room temperature</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Substrate</td>
<td>Unopened / after opening at 2-8°C</td>
<td>See expiry date</td>
</tr>
<tr>
<td>Stopping solution</td>
<td>Unopened / after opening at 2-8°C</td>
<td>See expiry date</td>
</tr>
</tbody>
</table>

7 TEST PROCEDURE SERION ELISA classic

7.1 Evidence of Deterioration

Optimum results can only be achieved if the instructions are strictly followed. Only use SERION ELISA classic reagents when using SERION ELISA classic immunoassays. The components must not be exchanged for reagents of other manufacturers. Standard and control sera of SERION ELISA classic immunoassays are defined exclusively for the test kit to be used and must not be used in other lots. Washing solution, substrate, and stop solution can be used for all SERION ELISA classic immunoassays irrespective of the lot and the test.

Each SERION ELISA classic test contains a ready-to-use sample dilution buffer. In some cases the use of special dilution buffers is necessary to guarantee consistent quality and reliable results. The dilution buffers can be used irrespective of the lots.

There are three different conjugate concentrations for each immunoglobulin class (IgA, IgG, IgM), indicated on the label as + (low), ++ (medium), and +++ (high). Conjugates with the same concentration and of the same immunoglobulin class are interchangeable and can be used for other SERION ELISA classic immunoassays irrespective of the lot and the test. Dilution or alteration of the reagents may result in a loss of sensitivity. Use aseptic techniques when removing aliquots from the reagent tubes to avoid contamination.

Reproducibility of test results is dependent on thorough mixing of the reagents. Agitate the tubes containing control sera before use and also all samples after dilution (e.g. by using a vortex mixer).
Be sure to pipette carefully and comply with the given incubation times and temperatures. Significant time differences between pipetting the first and last well of the microtiter plate when dispensing samples and control sera, conjugate, or substrate can result in different pre-incubation times which may influence the precision and reproducibility of the results. Avoid exposure of reagents to strong light during storage and incubation.

Adequate washing avoids non-specific reagent binding. Therefore, the washing procedure should be carried out carefully. All of the flat bottom wells should be filled with equal volumes of washing buffer. At the end of the procedure, ensure that the wells are free of all washing buffer in order to avoid uncontrolled dilution effects. Avoid foaming!

Reagents must be tightly closed after use to avoid evaporation and contamination. Take care not to mix up the caps of the bottles and/or vials.

The SERION ELISA classic immunoassay is only valid if the lot-specific validation criteria on the quality control certificate are fulfilled.

7.2 Sample preparation and Storage

Lipemic, hemolytic, or icteric samples (serum or plasma) should only be tested with caution. Obviously contaminated samples should not be tested. Serum or plasma (EDTA, citrate, heparin) collected according to standard laboratory methods are suitable samples. Samples must not be thermally inactivated.

7.2.1 Dilution of Samples

Before running the test, samples (V₁) must be diluted in dilution buffer (V₂) as follows:

**SERION ELISA classic Chlamydia trachomatis IgA**

<table>
<thead>
<tr>
<th>V₁ + V₂ = 1:100</th>
<th>add</th>
<th>10ul</th>
<th>sample</th>
</tr>
</thead>
<tbody>
<tr>
<td>each up to</td>
<td>1000ul</td>
<td>dilution buffer (= 1:100)</td>
<td></td>
</tr>
</tbody>
</table>

**SERION ELISA classic Chlamydia trachomatis IgG**

<table>
<thead>
<tr>
<th>V₁ + V₂ = 1:100</th>
<th>add</th>
<th>10ul</th>
<th>sample</th>
</tr>
</thead>
<tbody>
<tr>
<td>each up to</td>
<td>1000ul</td>
<td>dilution buffer (= 1:100)</td>
<td></td>
</tr>
</tbody>
</table>
SERION ELISA *classic* Chlamydia trachomatis IgM

**Interference by rheumatoid factors**
Rheumatoid factors are autoantibodies mainly of the IgM class which preferentially bind to IgG immune complexes. The presence of non-specific rheumatoid factor IgM antibodies can lead to false-positive results in the IgM assay. Furthermore, the possibility exists that weak-binding pathogen-specific IgM antibodies may be displaced by stronger-binding IgG antibodies leading to a false-negative IgM result. Therefore, it is necessary to pretreat samples with rheumatoid factor absorbent prior to specific IgM detection (SERION Rf-Absorbent, product no. Z200, 20ml/100 tests). Rf-absorption is performed by incubating sample in Rf-dilution buffer for 15 minutes at room temperature or overnight at 4°C. The test procedure is described in a separate instruction manual.

Before running the test, rheumatoid factor absorbent (V₁) must be diluted 1:4 in dilution buffer (V₂).

\[
V₁ + V₂ = V₃ \ (1:4) \quad \text{add} \quad 200\mu l \quad \text{Rf-Absorbent}
\]

\[
\quad \text{each up to} \quad 800\mu l \quad \text{Rf-dilution buffer}
\]

Samples (V₄) must be diluted in this Rf-dilution buffer (V₃):

\[
V₄ + V₃ = 1:100 \quad \text{add} \quad 10\mu l \quad \text{sample}
\]

\[
\quad \text{each up to} \quad 1000\mu l \quad \text{Rf-dilution buffer}
\]

After dilution and before pipetting into the microtiter plate, samples must be mixed thoroughly to prepare a homogenous solution.

### 7.2.2 Sample Storage

Samples should not be stored for more than 7 days at 2-8°C. Extended storage is possible at ≤ -20°C. Avoid repeated freezing and thawing of samples. Diluted samples can be stored at 2-8°C for one week.

### 7.3 Preparation of Kit Reagents

Bring all reagents to room temperature before use.

#### 7.3.1 Microtiter Test Strips

The microtiter test strips labeled with abbreviations for pathogen and immunoglobulin class are packed with a desiccant in an aluminum bag. To open the aluminum bag of the microtiter plate, please cut off the top of the marked side only in order to guarantee proper resealing. Take unrequired wells out of the frame and put them back into the aluminum bag. Close bag carefully.
to ensure airtight conditions. Do not use the strips if the aluminum bag is damaged or if the bag with remaining strips and desiccant was not properly resealed.

7.3.2 Control Sera / Standard Sera (ready-to-use)

Control and standard sera are ready-to-use and must not be diluted further. For each test run – independent of the number of microtiter test strips to be used – control and standard sera must be included. Standard and cut-off sera should be set up in duplicate. Do not treat control sera with Rf-absorbent.

7.3.3 Anti-human IgA, IgG, or IgM AP-Conjugate (ready-to-use)

The required conjugate concentration (+, ++, ++++) is indicated on the quality control certificate. Please refer also to the specification on the label.

7.3.4 Washing Solution (Concentrate)

Dilute washing buffer concentrate \( V_1 \) 1:30 with distilled water to a final volume of \( V_2 \).

Example:

<table>
<thead>
<tr>
<th>Buffer concentrate ( V_1 )</th>
<th>Final volume ( V_2 )</th>
</tr>
</thead>
<tbody>
<tr>
<td>33.3ml</td>
<td>1000ml</td>
</tr>
<tr>
<td>1.0ml</td>
<td>30ml</td>
</tr>
</tbody>
</table>

7.3.5 Dilution Buffer for Samples (ready-to-use)

7.3.6 Substrate (ready-to-use)

Substrate in unopened bottle may have a slight yellow color which does not reduce the quality of the product!

7.3.7 Stopping Solution (ready-to-use)
7.4 Overview – Test Procedure

SERION ELISA classic
Chlamydia trachomatis IgA/IgG/IgM quantitative

In case of IgM detection absorption of rheumatoid factor, see section 7.2.1;
Incubation 15 minutes at room temperature or overnight at 4°C

Sample dilution¹
1:100

Pipette diluted samples and ready-to-use control/standard sera into the microtiter wells (100ul/well)

↓

INCUBATION 60 min / 37°C moist chamber

↓

WASH (4 x 300ul/well DIL WASH)²

↓

Pipette conjugate solution APC (100ul/well)

↓

INCUBATION 30 min / 37°C moist chamber

↓

WASH (4 x 300ul/well DIL WASH)²

↓

Pipette substrate solution pNPP (100ul/well)

↓

INCUBATION 30 min / 37°C moist chamber

↓

Pipette stopping solution STOP (100ul/well)

READ EXTINCTION at 405nm

¹Special dilution buffers for the following SERION ELISA classic tests: Borrelia burgdorferi IgG, IgM, EBV EA IgG, and Hantavirus Puumala IgG, IgM
²For manual use: tap plate at the end of each wash procedure on paper towel.
7.5 Manual Test Procedure

1. Place the required number of wells in the frame and prepare a protocol sheet.
2. Add each 100ul of diluted sample or ready-to-use controls into the appropriate wells of microtiter test strips. Spare one well for substrate blank, e.g.:

<table>
<thead>
<tr>
<th>Well</th>
<th>Quantitative ELISA</th>
</tr>
</thead>
<tbody>
<tr>
<td>A1</td>
<td>Substrate blank</td>
</tr>
<tr>
<td>B1</td>
<td>Negative control</td>
</tr>
<tr>
<td>C1</td>
<td>Standard serum</td>
</tr>
<tr>
<td>D1</td>
<td>Standard serum</td>
</tr>
<tr>
<td>E1</td>
<td>Sample 1 . . .</td>
</tr>
<tr>
<td>F1</td>
<td>Sample 2 . . .</td>
</tr>
</tbody>
</table>

3. Sample incubation for 60 minutes (+/- 5 min.) at 37°C (+/- 1°C) in moist chamber.
4. After incubation wash all wells with washing solution (by automated washer or manually):
   - aspirate or shake out the incubation solution
   - fill each well with 300ul washing solution
   - aspirate or shake out the washing solution
   - repeat the washing procedure 3 times (altogether 4 times!)
   - dry by tapping the microtiter plate on a paper towel
5. Addition of conjugate
   Add 100ul of the ready-to-use IgA/IgG/IgM conjugate to the appropriate wells (except substrate blank).
6. Conjugate incubation for 30 minutes (+/- 1 min.) at 37°C (+/- 1°C) in moist chamber.
7. After incubation wash all wells with washing solution (see above).
8. Addition of substrate
   Add 100ul of ready-to-use substrate solution to each well (including well for substrate blank!).
9. Substrate incubation for 30 minutes (+/- 1 min.) at 37°C (+/- 1°C) in moist chamber.
10. Stopping of the reaction
    Add 100ul stopping solution to each well, shake microtiter plate gently to mix.
11. Read extinction
    Read optical density (OD) within 60 minutes at 405nm against substrate blank, reference wavelength between 620nm and 690nm (e.g. 650nm).

7.6 Automated Test Procedure

SERION ELISA are suited for processing on automat and evaluated for use with Immunomat™ and Gemini as well as with DYNEX DSX® and DS2®. The automated processing is performed analogous to manual use. Please note that under special working conditions internal laboratory adaptations of the substrate incubation times may be necessary.

7.7 Positive Control / Accuracy Control

For the periodic verification of the test method, in order to fulfill the requirements of laboratory internal quality management systems, we recommend using SERION ELISA controls to
determine precision and accuracy of SERION ELISA classic test runs. The use of SERION ELISA controls is described in specific instruction manuals.

8. TEST EVALUATION

8.1 SERION ELISA classic Chlamydia trachomatis IgA/IgG/IgM

The mathematical curve fitting for antibody quantification with SERION ELISA classic immunoassays is based on the 4-parameter logistic (4PL) function.

\[
\text{Activity (U/ml)} = \frac{C}{1 + \left(\frac{D-A}{OD(\text{Patient})*F-A}\right)^B}
\]

The 4 parameters A, B, C, and D are representative for the exact shape of the standard curve:
- Parameter A: Lower asymptote (OD)
- Parameter B: Slope of the curve
- Parameter C: Inflection point
- Parameter D: Upper asymptote (OD)

Institut Virion\Serion GmbH establishes a lot-specific 4PL standard curve for each SERION ELISA classic immunoassay in multiple test runs under optimal test conditions. The four parameters are indicated on the quality control certificate of each individual SERION ELISA classic test.

For the adaptation of the test level to the given 4PL standard curve, the correction factor F is calculated by dividing the standard reference OD value indicated on the quality control certificate with the measured, and consequently test run-specific, standard OD value.

\[
F = \frac{\text{STD reference OD value}}{\text{measured STD OD value}}
\]

By multiplying the OD values obtained from samples with the correction factor F, the level of each individual test run is adjusted to the given 4PL standard curve. Thereby, interassay deviations are compensated for and antibody activities can be directly evaluated from the 4PL standard curve.

After subtraction of the substrate blank from all measured OD values and calculation of the mean OD value of the standard serum (STD), tested in duplicate, a range of possibilities are available for the evaluation of antibody activities from the optical measurement signals (OD) of samples. They are described in separate manuals.

8.2 Borderline Ranges

The borderline ranges of the SERION ELISA classic Chlamydia trachomatis IgA/IgG/IgM tests are specified on the quality control certificates and indicate the range of borderline test results. Values below this range indicate a negative value; values above the borderline range indicate a positive value.
8.3  **Limits of Quantification**

The limits of quantification are specified on the quality control certificate of the SERION ELISA *classic* Chlamydia trachomatis IgA/IgG/IgM. The linearity of dilution within this range has been demonstrated in comprehensive evaluation studies. In case a sample shows a test result above the upper limit of quantification, the sample may be tested at a higher dilution. The resulting antibody activity must then be multiplied by the additional dilution factor.

8.4  **Automated Evaluation / Software**

For the automated evaluation of optical measurement signals, the software SERION easyANALYZE, the software SERION evaluate, as well as the Microsoft® Excel®-based software tool SERION activity are available on request.

8.5  **Criteria of Validity**

- The substrate blank must be <0.25 OD.
- The negative control must be negative.
- By use of quantitative SERION ELISA *classic* tests, the mean OD value (after subtraction of the substrate blank!) of the standard serum must be within the validity range which given on the lot-specific quality control certificate.
- By use of qualitative SERION ELISA *classic* tests, the OD value of the positive control and the mean OD value of the cut-off serum must be within the validity ranges which are given on the lot-specific quality control certificate of the kit (after subtraction of the substrate blank!).
- The variation of OD values of the standard serum or cut-off serum must not be higher than 20%.

If these criteria are not met, the test is not valid and must be repeated.

9  **SAFETY MEASURES**

9.1  **Statements of Warning**

The SERION ELISA *classic* is designed for use by qualified personnel who are familiar with good laboratory practice. All kit reagents and samples should be handled carefully using established good laboratory practice.

- This kit contains human blood components. Although all control and cut-off sera have been tested and found negative for anti-HIV ab, HBs-Ag (Hepatitis B-Virus surface Antigen), and anti-HCV ab, they should be considered potentially infectious.
- Do not pipette by mouth.
- Do not smoke, eat, or drink in areas in which samples or kit reagents are handled.
- Wear disposable gloves, laboratory coat, and safety glasses while handling kit reagents or samples. Wash hand thoroughly afterwards.
- Samples and other potentially infectious material should be decontaminated after the test run.
- Reagents should be stored safely and be inaccessible to unauthorized access, e.g. children.

9.2 Disposal

Please observe the relevant statutory requirements!