

Please read instructions for use carefully before starting the assay

PM1-Alpha-ELISA

ELISA for the semi-quantitative determination of anti-PM1-Alpha antibodies in human serum or plasma

REF 25001 Σ 96 Determinations

BACKGROUND

Systemic autoimmune diseases are characterized by circulating antibodies against defined intracellular targets. Systemic sclerosis (SSc, Scl, Scleroderma) for example is characterized by antibodies to topoisomerase 1. Based on the characteristic 70kD protein band in the gel electrophoresis topoisomerase I is also known as Scl-70. Anti-PM/Scl antibodies represent a specific serological marker for a subset of patients with Scl, Polymyositis (PM) and especially with the PM/Scl overlap syndrome. Anti-PM/Scl reactivity is found in approximately 25% of PM/Scl patients and in 3-10% of Scl and PM patients. The majority of anti-PM/Scl antibodies are directed against an alpha helical epitope located at amino acid 231-245 of PM/Scl-100 termed as PM1-Alpha. In a recent investigation it was shown that an ELISA with PM1-Alpha as antigen represents a highly accurate test to detect anti-PM/Scl antibodies. 55% of PM/Scl patients and only 6% of controls had anti-PM1-Alpha antibodies.

INTENDED USE

The PM1-Alpha ELISA is intended to detect a highly specific subpopulation of anti-PM/Scl antibodies which contributes to the diagnosis of the PM/Scl overlap syndrome. Since patients with antibodies to PM/Scl tend to have a milder disease progression and a higher survival rate compared to patients with anti-Scl-70 the detection of anti-PM1-Alpha antibodies is important for the prognosis of patients with systemic sclerosis.

PRINCIPLE

Microtiter plates are coated with a semi-artificial peptide derived from the PM/Scl-100 sequence. Anti-PM/Scl antibodies bind to the immobilized peptide. After washing anti-human IgG conjugate to horseradish peroxidase (HRP) binds to the anti-PM/Scl antibodies. Unbound material is removed by another washing cycle.

Finally the binding of anti-PM/Scl antibodies is visualized by incubation of the TMB substrate resulting in the development of a blue colour turning into yellow after stopping the reaction with Stop Solution. The optical density of the yellow colour is measured spectrophotometrically at 450 nm.

A calibrator with known concentrations of anti-PM/Scl antibodies is tested simultaneously with the samples. Semi-quantitative results can be determined calculating the ratios of the OD value from the calibrator and the samples.

KIT COMPONENTS

Microtiter strips, antigen coated	MICROWELL	12 strips x 8 wells
Anti-IgG HRP-Conjugate	CONJ HRP G	1 x 15 mL
Concentrated Washing Buffer	WASHBUF B 25x	1 x 50 mL
TMB Substrate	SUB TMB	1 x 15 mL
Stop Solution (0.5 M H ₂ SO ₄)	STOP H₂SO₄	1 x 12 mL
Dilution Buffer	DILBUF B	1 x 60 mL
Calibrator	CAL	1 x 2 mL
Negative Control	CONTROL -	1 x 2 mL
Positive Control	CONTROL +	1 x 2 mL

MATERIAL NEEDED, BUT NOT PROVIDED WITH THE KIT

2-10 µL, 10-100 µL and 200-1000 µL pipettes, Multipipette, pipette tips, vials for diluting the specimen, graduated glass cylinder, microplate-reader, covering foil, microplate-washer (optional).

SPECIMEN COLLECTION & PREPARATION

Either Serum or Plasma can be used in this test. No additives or preservatives are necessary to maintain the integrity of the specimen.

Specimens should be stored at 2-8°C and assayed within 48 hours after collection. If the assay cannot be performed within 48 hours or if the specimen has to be shipped, cap the specimen and keep it frozen. Repeated freezing and thawing should be avoided. Frozen specimens should be thawed at room temperature (RT, 20-25°C) and mixed thoroughly by gentle inversion before assaying. The use of haemolysed or lipemic specimens is not recommended.

PREPARATION OF REAGENTS

Allow all reagents to come to RT before use. Unused microtiterstrips have to be resealed properly in the provided foil bag containing a desiccant.

Dilution Buffer: ready to use

HRP Conjugate: ready to use

Substrate Solution: ready to use

Stop Solution: ready to use

Calibrator and Controls: ready to use

Concentrated Washing Buffer:

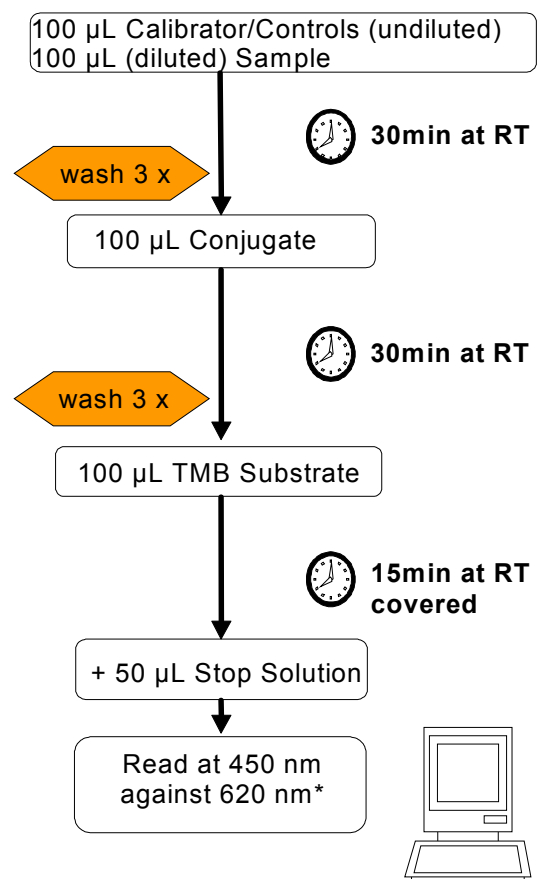
The Concentrated Washing Buffer has to be diluted 1:25 in aqua bidest. (Example: One strip requires 40 mL of Washing Buffer, therefore 1.6 mL concentrated Washing Buffer have to be diluted to a final volume of 40 mL with aqua bidest.). The resulting Washing Buffer is stable for one week at RT.

ASSAY PROCEDURE

1. Create a pipetting scheme. It is a must to test the Calibrator in duplicate and this is highly recommended for Controls.
2. Dilute patient samples **1:101** in Dilution Buffer (10 µL serum + 1 mL Dilution Buffer for double determination / 5 µL serum + 0.5 mL Dilution Buffer for single determination).
3. Place the required coated wells into a frame. Properly reseal the aluminium bag with the remaining strips and desiccant.
4. Pipette 100 µL of Calibrators, Controls and diluted patient samples into the antigen coated wells according to the pipetting scheme.
5. Cover the plate and incubate for 30 min at RT.
6. Wash the plate manually or with an appropriate ELISA plate washer at least 3 times with minimally 300 µL per well. Remove residual liquid by dunking the microplate on a tissue.

7. Add 100 µL of anti-IgG HRP conjugate to all wells. Cover the plate and incubate for 30 min at room temperature.
8. Repeat washing procedure as described in step 6.
9. Add 100 µL of TMB Substrate to each well, cover the plate and incubate for 15 min at RT (TMB substrate is light sensitive).
10. Pipette 50 µL of Stop Solution in the same order as the substrate to each well. It is recommended to mix the solution in the wells by carefully knocking on the frame. Read OD at 450 nm (reference wave length 620 nm*) using an appropriate microplate reader and calculate the results of patient samples and controls as described on page 3.

TESTING SCHEME AI-LINE ELISA



* The measurement against the reference wave length from 620 nm is optional.



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CALCULATION OF RESULTS

Calculate the ratios between the OD value [Δ 450 nm – 620 nm] of each patient sample and the mean OD value [450 nm] of the Calibrator. Do the same for the controls. Multiply all obtained ratios by the conversion factor (F). This conversion factor is lot specific and is stated on the Quality Control Certificate. Resulting values are expressed as relative units (RU).

Calculation:

$$RU \text{ sample} = \frac{OD \text{ Sample}}{OD \text{ Calibrator}} \times F$$

Example:

OD Calibrator = 1.9
OD Sample = 0.6
Conversion factor F = 10

$$RU \text{ sample} = \frac{OD \text{ Sample}}{OD \text{ Calibrator}} \times 10$$

$$RU \text{ sample} = \frac{0.6}{1.9} \times 10$$

$$RU \text{ sample} = 3.2 \text{ RU}$$

RESULT INTERPRETATION

For interpretation of the results use the following cut-off values.

< 1 RU Negative
1-1.5 RU Borderline
> 1.5 RU Positive

The cut-off values were determined using disease controls and normal sera.

VALIDATION CRITERIA

The OD value of the Calibrator and the RU values of the Controls have to meet the ranges stated on the QC-Certificate. Otherwise, the test conditions should be verified and the test should probably be repeated.

REFERENCE RANGES

The average value of samples from apparently healthy controls was found at 0.5 RU (Standard Deviation 0.3 RU). Each laboratory should establish its own reference ranges.

MEASURING RANGE

0.1 up to 10 relative units (RU).

PRECISION

Variability and reproducibility was evaluated with three different positive sera. The Intra-assay variability for a quadruplicate measurement was below 7%. The Inter-assay variability, determined with duplicates taken from three different runs, was below 10%.

SPECIFICITY

The analytical specificity in comparison to a validated Reference system was found at 89.5%.

SENSITIVITY

The analytical sensitivity in comparison to validated Reference systems was found at 96 and 100%, respectively.

LITERATURE

1. Tan EM: **Antinuclear antibodies: diagnostic markers for autoimmune diseases and probes for cell biology.** *Adv Immunol* 1989, **44**:93-151.
2. Blüthner M, Mahler M, Müller DB, Dunzl H, Bautz FA: **Identification of an alpha-helical epitope region on the PM/Scl-100 autoantigen with structural homology to a region on the heterochromatin p25beta autoantigen using immobilized overlapping synthetic peptides.** *J Mol Med* 2000, **78**:47-54.
3. Mahler M, Rajmakers R, Dähnrich C, Blüthner M, Fritzler MJ: **Clinical evaluation of autoantibodies to a novel PM/Scl peptide antigen.** *Arthritis Research and Therapy*. 2005, **7**: No 3.
4. Mahler M, Rajmakers R: **Novel aspects of autoantibodies to the PM/Scl complex: clinical, genetic and diagnostic insights.** *Autoimmun Rev* 2007, **6**:432-437.
5. Mahler M, Ngo J, Schulte-Pelkum J, Luettich T, Fritzler MJ: **Limited reliability of the indirect immunofluorescence technique for the detection of anti-Rib-P antibodies.** *Arthritis Res Ther* 2008, **10**:R131.
6. Mahler M, Fritzler MJ: **PM1-Alpha ELISA: The assay of choice for the detection of anti-PM/Scl autoantibodies?** *Autoimmun Rev* 2009, **8**:373-378.

PRECAUTIONS FOR USERS

- In compliance with article 1 paragraph 2b European directive 98/79/EC the use of *in-vitro* diagnostic medical devices is intended to secure suitability, performance and safety of the product by the manufacturer. Therefore the test procedure, information, precautions and warnings stated in the instructions for use have to be followed strictly. The kit has only to be used as described on page 1 (intended use).
 - The test must be performed according to this instruction, which contains all necessary information, precautions and warnings. The use of the test kit with analyzers and similar equipment has to be validated. Any change in design, composition of the test procedure as well as for any use in combination with other products not approved by the manufacturer is not authorized; the user himself is responsible for such changes resulting in false results and other incidents. The manufacturer is not liable for any results obtained by visual analysis of patient samples.
 - The kit is intended for use by trained and qualified professionals carrying out research or diagnostic activities only. Pregnant women should not perform the test.
 - Laboratory equipment has to be maintained according to the manufacturer's instructions and must be tested for its correct function before use.
 - For *in-vitro* diagnostic use only. Use only once. Do not use components exceeding the expiry date. Do not combine reagents of other suppliers or kit components of different lots (unless specified on page 1) with this kit.
 - Do not use kit components when the package of the component is damaged. Please check all solutions prior to use for microbiological contamination. Cap vials tightly immediately after use to avoid evaporation and microbiological contamination. Do not interchange screw caps of the reagent vials.
 - The kit was evaluated for use at the temperatures specified in the Testing scheme (see page 2). Higher or lower temperatures may result in values not meeting the quality control ranges.
 - The washing procedure is absolutely important. Improper washing will cause erroneous results. It is recommended to use a multichannel pipette and an automated washer.
 - To avoid cross-contamination and false-positive results it is recommended to perform all pipetting steps properly. Use only clean pipette tips, dispensers and lab ware.
 - Test components based on human serum were tested using a CE marked method for the presence of antibodies against HIV 1 / HIV 2, Anti-HBc, and Anti-HCV as well as for hepatitis antigen HBsAg and were found to be negative.
- Nevertheless, material based on human serum should be handled as potentially infectious (BIOHAZARD).
- Some kit components may contain bovine serum albumin, of which according to the manufacturer no infectious potential is known. Due to the eventual occurrence of undetectable infectious agents we recommend to handle any product of animal origin as potentially infectious.
 - The following safety rules should be followed with all reagents:
 - Do not get in eyes, on skin, or on clothing (P262). Do not breathe spray (P260). Pipetting should never be done by mouth, but with suitable pipetting devices.
 - IF SWALLOWED: rinse mouth. Do NOT induce vomiting (P301/330/331)
 - IF ON SKIN (or hair): Remove/Take off immediately all contaminated clothing. Rinse skin with water/shower (P303/361/353).
 - IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing (P303/340).
 - IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. (P305/351/338)
 - Don't eat, drink or smoke while performing the test. Keep away from food, feed and beverage.
 - Wear protective gloves/protective clothing/eye protection (P280). Wash hands thoroughly after handling (P264) and care for your skin.
 - Material safety data sheet is available on request.
 - Stop Solution causes severe skin burns and eye damage (H314).
 - TMB in high concentrations may be potentially mutagenic. Due to the low concentration of TMB in this substrate solution a mutagenic effect can be ruled out, if it is properly used.
 - The preservatives (Bronidox, Thimerosal, Azid) are toxic to aquatic life, but their concentration is not hazardous to environment anymore. On disposal, flush large volumes of reagents with plenty of water. Thimerosal (WashBuf B) may cause damage to organs through prolonged or repeated exposure(H373)
 - Waste containing serum must be collected in separate containers containing an appropriate disinfectant in sufficient concentration. This material has to be treated according to national biohazard and safety guidelines or regulations.
 - We refer to the national regulations of medical devices regarding *in-vitro* diagnostic test kits.



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Lot- Number	European conformity	For <i>in-vitro</i> diagnostic use	Temperature Limit	Use before	Catalogue Number	Consult instructions for use	Refer accompanying documents	Do not use when package is damaged	Do not Re-use	Sufficient for <n> tests	Manufactured by	Bio-hazard