Product information

Information about other products is available at: www.demeditec.com

Rheumatoid Factor IgG ELISA

CE IVD

REF DE7640

Σ 96

Demeditec Diagnostics GmbH
Lise-Meitner-Strasse 2
24145 Kiel – Germany
www.demeditec.com

CONTENTS

1. INTENDED PURPOSE 3
2. PRINCIPLE OF THE TEST 3
3. WARNINGS AND PRECAUTIONS 3
4. CONTENTS OF THE KIT 4
5. MATERIALS REQUIRED 4
6. SPECIMEN COLLECTION, STORAGE AND HANDLING 4
7. STORAGE AND STABILITY 4
8. PROCEDURAL NOTES 5
9. PREPARATION OF REAGENTS 5
10. TEST PROCEDURE 5
11. VALIDATION 6
12. CALCULATION OF RESULTS 6
13. PERFORMANCE CHARACTERISTICS 6
14. LIMITATIONS OF THE PROCEDURE 7
15. REFERENCES 8
SYMBOLS USED WITH DEMEDITEC ASSAYS 12

1. INTENDED PURPOSE

Rheumatoid Factor IgG is an ELISA test system for the quantitative measurement of IgG class rheumatoid factor in human serum or plasma samples. This product is intended for professional in vitro diagnostic use only. The test is used as an aid in the differential diagnosis of rheumatoid arthritis (RA), and presence of rheumatoid factors (RF) is an integral part of the current ACR criteria for classification of RA. In established RA, high titers of serum IgG and especially IgM RF indicate poor prognosis. The presence of either IgG or IgA RF in patients with long-standing RA may be a prognostic indicator of systemic manifestations. Evaluation of a test result should always take into account all clinical and laboratory findings.

2. PRINCIPLE OF THE TEST

Fc fragments of highly purified human Immunoglobulin G are coated on to microwells.
The determination is based on an indirect enzyme linked immune reaction with the following steps: Specific antibodies in the patient sample bind to the antigen coated on the surface of the reaction wells. After incubation, a washing step removes unbound and unspecifically bound serum or plasma components. Subesquently added enzyme conjugate binds to the immobilized antibody-antigen-complexes. After incubation, a second washing step removes unbound enzyme conjugate. After addition of substrate solution the bound enzymeconjugate hydrolyses the substrate forming a blue coloured product. Addition of an acid stopps the reaction generating a yellow end-product. The intensity of the yellow color correlates with the concentration of the antibody-antigen-complex and can be measured photometrically at 450 nm.

3. WARNINGS AND PRECAUTIONS

- All reagents of this kit are intended for professional in vitro diagnostic use only.
- Components containing human serum were tested and found negative for HBsAg, HCV, HIV1 and HIV2 by FDA approved methods. No test can guarantee the absence of HBsAg, HCV, HIV1 or HIV2, and so all human serum based reagents in this kit must be handled as though capable of transmitting infection.
- Bovine serum albumin (BSA) used in components has been tested for BSE and found negative.
- Avoid contact with the substrate TMB (3,3´,5,5´-Tetramethyl-benzidine).
- Stop solution contains acid, classification is non-hazardous. Avoid contact with skin.
- Control, calibrator, sample buffer and wash buffer contain sodium azide (NaN_3) 0.09% as preservative. This concentration is classified as non-hazardous.
- Enzyme conjugate contains ProClin 300 0.05% as preservative. This concentration is classified as non-hazardous.

During handling of all reagents, controls and serum samples observe the existing regulations for laboratory safety regulations and good laboratory practice:

- First aid measures: In case of skin contact, immediately wash thoroughly with water and soap. Remove contaminated clothing and shoes and wash before reuse. If system fluid comes into contact with skin, wash thoroughly with water. After contact with the eyes carefully rinse the opened eye with running water for at least 10 minutes. Get medical attention if necessary.
- Personal precautions, protective equipment and emergency procedures:

Observe laboratory safety regulations. Avoid contact with skin and eyes. Do not swallow. Do not pipette by mouth. Do not eat, drink, smoke or apply makeup in areas where specimens or kit reagents are handled. When spilled, absorb with an inert material and put the spilled material in an appropriate waste disposal.

- Exposure controls / personal protection: Wear protective gloves of nitrile rubber or natural latex. Wear protective glasses. Used according to intended use no dangerous reactions known.
- Conditions to avoid: Since substrate solution is light-sensitive. Store in the dark.
- For disposal of laboratory waste the national or regional legislation has to be observed.

Observe the guidelines for performing quality control in medical laboratories by assaying control sera.

4. CONTENTS OF THE KIT

Sufficient for 96 determinations

1. **SORB MT 1 divisible microplate** consisting of 12 modules of 8 wells each. Ready to use.
2. **CAL A-E 5x 1.5 ml Calibrator A-E** (0, 15, 50, 150, 500 U/ml), containing rheumatoid factor in a serum/buffer matrix (PBS, BSA, detergent, NaN_3 0.09%), yellow. Ready to use.
3. **CONTROL 1 & 2 2x 1.5 ml Control positive (1) and negative (2),** containing rheumatoid factor in a serum/buffer matrix (PBS, BSA, detergent, NaN_3 0.09%), yellow. Ready to use. The concentration is specified on the certificate of analysis.
4. **SAM DIL 5x 20 ml Sample Buffer**, containing PBS, BSA, detergent, preservative NaN_3 0.09%, yellow, 5x conc.
5. **ENZ CONJ 15 ml Enzyme Conjugate** containing anti-human IgG antibodies, HRP labelled; PBS, BSA, detergent, preservative ProClin 300 0.05%, light red. Ready to use.
6. **SUB TMB 15 ml TMB Substrate**; containing 3,3', 5,5'- Tetramethylbenzidin, colorless. Ready to use.
7. **STOP SOLN 15 ml Stop Solution**; contains acid. Ready to use.
8. **WASH SOLN 50x 20 ml Wash Buffer**, containing Tris, detergent, preservative NaN_3 0.09%; 50 x conc.
9. **1 Instruction for Use**
10. **1 Certificate of Analysis**

5. MATERIALS REQUIRED

- Microplate reader capable of endpoint measurements at 450 nm;
- optional: reference filter at 620 nm
- Data reduction software
- Multi-channel dispenser or repeatable pipette for 100 µl
- Vortex mixer
- Pipettes for 10 µl, 100 µl and 1000 µl
- Laboratory timing device
- Distilled or deionised water
- Measuring cylinder for 1000 ml and 100 ml
- Plastic container for storage of the wash solution

This ELISA assay is suitable for use on open automated ELISA processors. Each assay has to be validated on the respective automated system. Detailed information is provided upon request.

6. SPECIMEN COLLECTION, STORAGE AND HANDLING

- Collect whole blood specimens using acceptable medical techniques to avoid hemolysis.
- Allow blood to clot and separate the serum or plasma by centrifugation.
- Test serum should be clear and non-hemolyzed. Contamination by hemolysis or lipemia should be avoided, but does not interfere with this assay.
- Specimens may be refrigerated at 2-8°C for up to five days or stored at -20°C up to six months.
- Avoid repetitive freezing and thawing of serum or plasma samples. This may result in variable loss of antibody activity.
- Testing of heat-inactivated sera is not recommended.

7. STORAGE AND STABILITY

- Store test kit at 2-8°C in the dark.
- Do not expose reagents to heat, sun, or strong light during storage and usage.
- Store microplate sealed and dessicated in the clip bag provided.
- Unopened reagents are stable until expiration of the kit. See labels for individual batch.
- Diluted Wash solution and Sample Buffer are stable for at least 30 days when stored at 2-8°C. We recommend consumption on the same day.

8. PROCEDURAL NOTES

- Do not use kit components beyond their expiration dates.
- Do not interchange kit components from different lots and products.
- All materials must be at room temperature (20-28°C) prior to use.
- Prepare all reagents and samples. Once started, perform the test without interruption.
- Double determinations may be done. By this means pipetting errors may become obvious.
- Perform the assay steps only in the order indicated.
- Always use fresh sample dilutions.
- Pipette all reagents and samples into the bottom of the wells.
- To avoid carryover or contamination, change the pipette tip between samples and different kit controls.
- Wash microwells thoroughly and remove the last droplets of wash solution.
- All incubation steps must be accurately timed.
- Do not re-use microplate wells.

9. PREPARATION OF REAGENTS

Wash Buffer
Dilute the contents of one vial of the buffered wash solution concentrate (50x) with distilled or deionised water to a final volume of 1000 ml prior to use.

Sample Buffer
Prior to use dilute the contents (20 ml) of one vial of sample buffer 5x concentrate with distilled or deionised water to a final volume of 100 ml.

Preparation of samples
Dilute patient samples 1:100 before the assay: Put 990 µl of prediluted sample buffer in a polystyrene tube and add 10 µl of sample. Mix well.
Note: Calibrators / Controls are ready to use and need not be diluted.

10. TEST PROCEDURE

Prepare enough microplate modules for all calibrators / controls and patient samples.
1. Pipette **100 µl** of calibrators, controls and prediluted patient samples into the wells.
2. Incubate for **30 minutes** at room temperature (20-28 °C).
3. Discard the contents of the microwells and **wash 3 times with 300 µl** of wash solution.
4. Dispense **100 µl** of enzyme conjugate into each well.
5. Incubate for **15 minutes** at room temperature.
6. Discard the contents of the microwells and **wash 3 times with 300 µl** of wash solution.
7. Dispense **100 µl** of TMB substrate solution into each well.
8. Incubate for **15 minutes** at room temperature
9. Add **100 µl** of stop solution to each well of the modules
10. Incubate for **5 minutes** at room temperature.
11. Read the optical density at 450 nm (reference 600-690nm) and calculate the results. The developed colour is stable for at least 30 minutes. Read during this time.

Example for a pipetting scheme:

	1	2	3	4	5	6	7	8	9	10	11	12
A	A	P2										
B	B	P3										
C	C											
D	D											
E	E											
F	C+											
G	C-											
H	P1											

P1, ... patient sample A-E calibrators C+, C- controls

11. VALIDATION

Test results are valid if the optical densities at 450 nm for calibrators / controls and the results for controls comply with the reference ranges indicated on the Certificate of Analysis enclosed in each test kit. If these quality control criteria are not met the assay run is invalid and should be repeated.

12. CALCULATION OF RESULTS

For quantitative results plot the optical density of each calibrator versus the calibrator concentration to create a calibration curve. The concentration of patient samples may then be estimated from the calibration curve by interpolation. Using data reduction software a 4-Parameter-Fit with lin-log coordinates for optical density and concentration is the data reduction method of choice.

13. PERFORMANCE CHARACTERISTICS

Calibration
This assay system is calibrated in relative arbitrary units. Calibration is related to 1st British Standard Preparation 64/2 for Rheumatoid Factor.

Measuring range
The calculation range of this ELISA assay is 0 - 500 U/ml

Expected values
In a normal range study with samples from healthy blood donors the following ranges have been established with this ELISA assay: Cut-off 20 U/ml

Interpretation of results
Negative: < 20 U/ml
Positive: ≥ 20 U/ml

Linearity
Patient samples containing high levels of specific antibody were serially diluted in sample buffer to demonstrate the dynamic range of the assay and the upper / lower end of linearity. Activity for each dilution was calculated from the calibration curve using a 4-Parameter-Fit with lin-log coordinates.

Sample	Dilution	Observed U/ml	Expected U/ml	O/E %
1	1:100	652.3	560.3	116
	1:200	293.9	280.2	105
	1:400	142.7	140.1	102
	1:800	64.4	70.0	92
	1:1600	36.3	35.0	104
	1:3200	15.7	17.5	90
2	1:100	490.2	452.7	108
	1:200	214.5	226.4	95
	1:400	108.9	113.2	96
	1:800	53.3	56.6	94
	1:1600	26.1	28.3	92
	1:3200	14.2	14.1	101
3	1:100	269.0	260.5	103
	1:200	123.4	130.3	95
	1:400	58.9	65.1	90
	1:800	27.4	32.6	84
	1:1600	15.7	16.3	96
	1:3200	7.1	8.1	88

Limit of detection
Functional sensitivity was determined to be: 1 U/ml

Reproducibility
Intra-assay precision: Coefficient of variation (CV) was calculated for each of three samples from the results of 24 determinations in a single run. Results for precision-within-assay are shown in the table below.
Inter-assay precision: Coefficient of variation (CV) was calculated for each of three samples from the results of 6 determinations in 5 different runs. Results for run-to-run precision are shown in the table below.

Intra-Assay		
Sample	**Mean U/ml**	**CV %**
1	22.8	5.5
2	65.3	7.4
3	160.7	6.9

Inter-Assay		
Sample	**Mean U/ml**	**CV %**
1	27.1	6.5
2	54.0	7.2
3	136.8	7.8

Interfering substances
No interference has been observed with haemolytic (up to 1000 mg/dl) or lipemic (up to 3 g/dl triglycerides) sera or plasma, or bilirubin (up to 40 mg/dl) containing sera or plasma. Nor have any interfering effects been observed with the use of anticoagulants (Citrate, EDTA, Heparin). However for practical reasons it is recommended that grossly hemolyzed or lipemic samples should be avoided.

Study results

Study population	**n**	**n Pos**	**%**
Rheumatoid Arthritis	302	252	83.4
Normal human sera	169	16	9.5

Clinical Diagnosis

	Pos	**Neg**	
Pos	252	16	
Neg	50	153	
	302	169	471

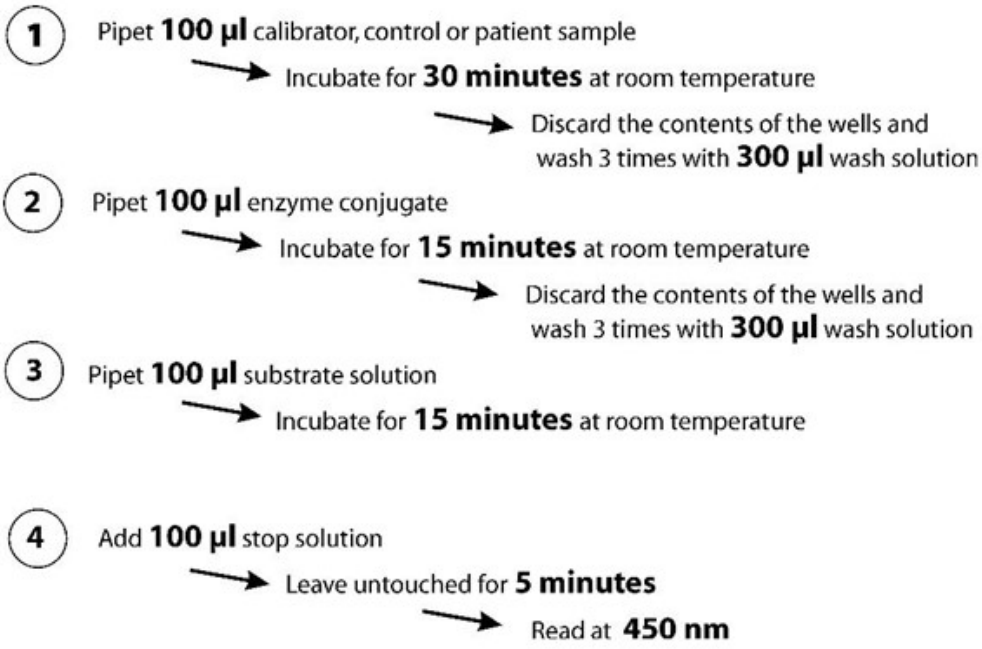
Sensitivity: 83.4 %
Specificity: 90.5 %
Overall agreement: 86.0 %

14. LIMITATIONS OF THE PROCEDURE

This assay is a diagnostic aid. A definite clinical diagnosis should not be based on the results of a single test, but should be made by the physician after all clinical and laboratory findings have been evaluated concerning the entire clinical picture of the patient. Also every decision for therapy should be taken individually. The above pathological and normal reference ranges for antibodies in patient samples should be regarded as recommendations only. Each laboratory should establish its own ranges according to ISO 15189 or other applicable laboratory guidelines.

15. REFERENCES

1. Arinbjarnarson S., Jonsson T., Steinsson K. et al. IgA rheumatoid factor correlates with changes in B and T lymphocyte subsets and disease manifestations in rheumatoid arthritis. J. Rheumatol. 1997; 24: 269-274.
2. Borretzen M., Mellbye O. J., Thompson K. M., Natvig J. B. Rheumatoid Factors. In: Peter J. B., Shoenfeld Y. eds. Autoantibodies. 1 ed. Amsterdam: Elsevier, 1996: 706-715.
3. Brown P. B., Nardella F. A., Mannik M. Human complement activation by self-associated IgG rheumatoid factors. Arthritis Rheum. 1982; 25: 1101-1107.
4. Ernst E., Espersen G. T., Andersen M. V. Grunnet N. RF-classes (IgM, IgG, IgA) in a group of highly active RA-patients in relation to disease activity and treatment. Scand. J. Rheumatol. Suppl. 1988; 75: 250-255.
5. Espersen G. T. Ernst E. Vestergaard M. Grunnet N. ELISA estimations of rheumatoid factor IgM, IgA, and IgG in sera from RA patients with high disease activity. DTT treatment studies. Scand. J. Rheumatol. Suppl. 1988; 75: 40-45.
6. Houssien D. A., Jonsson T., Davies E., Scott D .L. Clinical significance of IgA rheumatoid factor subclasses in rheumatoid arthritis. J. Rheumatol. 1997; 24:2119-2122.
7. Jonsson T., Arinbjarnarson S., Thorsteinsson J. et al. Raised IgA rheumatoid factor (RF) but not IgM RF or IgG RF is associated with extra-articular manifestations in rheumatoid arthritis. Scand. J. Rheumatol. 1995;24: 372-375.
8. Kleveland G, Egeland T, Lea T. Quantitation of rheumatoid factors (RF) of IgM, IgA and IgG isotypes by a simple and sensitive ELISA. Discrimination between false and true IgG-RF. Scand. J. Rheumatol. Suppl. 1988; 75: 15-24.
9. Mogk M., Weise I., Welcker M., Oppermann M., Helmke K. Bedeutung der Rheu-mafaktor-Immunglobulinklassen IgG, IgA und IgM in der Diagnostik rheumatologischer und immunologischer Erkrankungen. Clin. Lab. 1995; 41: 885-891.
10. Paimela L.,Palosuo T., Leirisalo-Repo M., Helve T., Aho K. Prognostic value of quantitative measurement of rheumatoid factor in early rheumatoid arthritis. Br. J. Rheumatol. 1995; 34: 1146-1150.
11. Pope R. M. Rheumatoid arthritis: pathogenesis and early recognition. Am. J. Med. 1996; 100: 3S-9S.
12. Scutellari P. N., Orzincolo C. Rheumatoid arthritis: sequences. Eur. J. Radiol. 1998; 27 Suppl. 1: S31-S38
13. Swedler W., Wallman J., Froelich C. J., Teodorescu M. Routine measurement of IgM, IgG, and IgA rheumatoid factors: high sensitivity, specificity, and predictive value for rheumatoid arthritis. J. Rheumatol. 1997; 24: 1037-1044.
14. Winska W. H., Thompson K., Young A., Corbett M., Shipley M., Hay F. IgA and IgM rheumatoid factors as markers of later erosive changes in rheumatoid arthritis (RA). Scand. J. Rheumatol. Suppl. 1988; 75: 238-243.


1
Pipet 100 µl calibrator, control or patient sample
Incubate for 30 minutes at room temperature
Discard the contents of the wells and wash 3 times with 300 µl wash solution
2
Pipet 100 µl enzyme conjugate
Incubate for 15 minutes at room temperature
Discard the contents of the wells and wash 3 times with 300 µl wash solution
3
Pipet 100 µl substrate solution
Incubate for 15 minutes at room temperature
4
Add 100 µl stop solution
Leave untouched for 5 minutes
Read at 450 nm

SYMBOLS USED WITH DEMEDITEC ASSAYS

Symbol	English	Deutsch	Française	Espanol	Italiano
CE	European Conformity	CE-Konformitäts-kennzeichnung	Conforme aux normes européennes	Conformidad europea	Conformità europea
	Consult instructions for use	Gebrauchsanweisung beachten	Consulter les instructions d'utilisation	Consulte las Instrucciones	Consultare le istruzioni per l'uso
IVD	In vitro diagnostic device	In-vitro-Diagnostikum	utilisation Diagnostic in vitro	Diagnóstico in vitro	Per uso Diagnostica in vitro
RUO	For research use only	Nur für Forschungszwecke	Seulement dans le cadre de recherches	Sólo para uso en investigación	Solo a scopo di ricerca
REF	Catalogue number	Katalog-Nr.	Référence	Número de catálogo	No. di catalogo
LOT	Lot. No. / Batch code	Chargen-Nr.	No. de lot	Número de lote	Lotto no
	Contains sufficient for <n> tests/	Ausreichend für "n" Ansätze	Contenu suffisant pour "n" tests	Contenido suficiente para <n> ensayos	Contenuto sufficiente per "n" saggi
	Note warnings and precautions	Warnhinweise und Vorsichtsmaßnahmen beachten	Avertissements et mesures de précaution font attention	Tiene en cuenta advertencias y precauciones	Annoti avvisi e le precauzioni
	Storage Temperature	Lagerungstemperatur	Température de conservation	Temperatura de conservacion	Temperatura di conservazione
	Expiration Date	Mindesthaltbarkeits-datum	Date limite d'utilisation	Fecha de caducidad	Data di scadenza
	Legal Manufacturer	Hersteller	Fabricant	Fabricante	Fabbricante
Distributed by	Distributed by	Vertrieb durch	Distribution par	Distribución por	Distribuzione da parte di
V<x>	Version	Version	Version	Versión	Versione
	Single-use	Einmalverwendung	À usage unique	Uso único	Uso una volta