AESKULISA **APS Profil-GM**

REF 3234

Instruction manual

Contents

1. Intended Use

***AESKULISA* APS-Profile-GM** is a solid phase enzyme immunoassay for the separate qualitative detection of IgG and/or IgM antibodies against phospholipids in human serum. The assay employs highly purified human Prothrombin (Factor II), Thrombin , Cardiolipin, Phosphatidyl-choline, -ethanolamine, -inositol, -serine and Sphingomyelin.
The assay is an aid in the diagnosis and risk estimation of thrombosis in patients with systemic lupus erythematosus.

2. Clinical Application and Principle of the Assay

Antibodies against phospholipids, components of the biological membranes, are specific for phospholipids such as Cardiolipin, Phosphatidyl -inositol, -ethanolamine, -choline and Sphingomyelin.

Anti-phospholipid antibodies are frequently found in sera of patients with systemic lupus erythematosus (SLE) and related diseases. The occurrence of anti-phospholipid antibodies in patients with SLE and related diseases is typical for a secondary anti-phospholipid syndrome (APS). In contrast, anti-phospholipid antibodies in patients with no other autoimmune diseases characterize the primary APS.

Many studies have shown a correlation beTween 20 these autoantibodies and an enhanced incidence of thrombosis, thrombocytopenia and habitual abortions (as a consequence of placental infarct). The exact mechanisms by which pathogenic anti-phospholipid antibodies induce thrombosis is not yet revealed fully.

Antibodies targeting prothrombin alone have recently been described being highly associated with fetal loss in APS patients. Prothrombin antibodies are the the first marker for this serious complication as all other known antiphospholipid antibodies failed to correlate with fetal loss.

The presence of anti-thrombin antibodies has been associated with the clinical features of the antiphospholipid syndrome (APS). Anti-Thrombin antibodies seem to correlate with deep venous thrombosis.

Principle of the test
Serum samples diluted 1:101 are incubated in the microplates coated with the specific antigen. Patient‘s antibodies, if present in the specimen, bind to the antigen. The unbound fraction is washed off in the following step. Afterwards anti-human immunoglobulins conjugated to horseradish peroxidase (conjugate) are incubated and react with the antigen-antibody complex of the samples in the microplates. Unbound conjugate is washed off in the following step. Addition of TMB-substrate generates an enzymatic colorimetric (blue) reaction, which is stopped by diluted acid (color changes to yellow). The rate of color formation from the chromogen is a function of the amount of conjugate bound to the antigen-antibody complex and this is proportional to the initial concentration of the respective antibodies in the patient sample.

3. Kit Contents

To be reconstituted:

5x Sample Buffer	1 vial, 20 ml - 5x concentrated (capped white: yellow solution) Containing: Tris, NaCl, BSA, sodium azide < 0.1% (preservative)
50x Wash Buffer	1 vial, 20 ml - 50x concentrated (capped white: green solution) Containing: Tris, NaCl, Tween 20, sodium azide < 0.1% (preservative)

Ready to use:

Negative Control	2 vials, 1.8 ml (capped green: colorless solution) Containing: Human serum (diluted), sodium azide < 0.1% (preservative)
Cut-off Calibrator	8 vials antigen specific (A-H), 1.5 ml (capped white: yellow solution) Containing: Human serum (diluted), sodium azide < 0.1% (preservative)
Conjugates	1 vial,15 ml IgG (capped blue: blue solution) 1 vial,15 ml IgM (capped green: green solution) Containing: Anti-human immunoglobulins conjugated to horseradish peroxidase
TMB Substrate	1 vial, 15 ml (capped black) Containing: Stabilized TMB/H_2O_2
Stop Solution	1 vial, 15 ml (capped white: colorless solution) Containing: 1M Hydrochloric Acid
Microtiterplate	12x 8 well strips with breakaway microwells Coating see paragraph 1

Material required but not provided:

Microtiter plate reader 450 nm reading filter and optional 620 nm reference filter (600-690 nm). Glass ware(cylinder 100-1000ml), test tubes for dilutions. Vortex mixer, precision pipettes (10, 100, 200, 500, 1000 µl) or adjustable multipipette (100-1000ml). Microplate washing device (300 µl repeating or multi-channel pipette or automated system), adsorbent paper.

Our tests are designed to be used with purified water according to the definition of the United States Pharmacopeia (USP 26 - NF 21) and the European Pharmacopeia (Eur.Ph. 4th ed.).

4. Storage and Shelf Life

Store all reagents and the microplate at 2-8°C/35-46°F, in their original containers. Once prepared, reconstituted solutions are stable for 1 month at 4°C/39°F, at least. ***Reagents and the microplate shall be used within the expiry date indicated on each component, only. Avoid intense exposure of TMB solution to light. Store microplates in designated foil, including the desiccant, and seal tightly.***

5. Precautions of Use

5.1 Health hazard data

THIS PRODUCT IS FOR IN VITRO DIAGNOSTIC USE ONLY. Thus, only staff trained and specially advised in methods of in vitro diagnostics may perform the kit. Although this product is not considered particularly toxic or dangerous in conditions of normal use, refer to the following for maximum safety :

Recommendations and precautions

This kit contains potentially hazardous components. Though kit reagents are not classified being irritant to eyes and skin we recommend to avoid contact with eyes and skin and wear disposable gloves.
WARNING ! Calibrators, Controls and Buffers contain sodium azide (NaN_3) as a preservative. NaN_3 may be toxic if ingested or adsorbed by skin or eyes. NaN_3 may react with lead and copper plumbing to form highly explosive metal azides. On disposal, flush with a large volume of water to prevent azide build-up. Please refer to decontamination procedures as outlined by CDC or other local/national guidelines.
Do not smoke, eat or drink when manipulating the kit.
Do not pipette by mouth.
All human source material used for some reagents of this kit (controls, standards e.g.) has been tested by approved methods and found negative for HbsAg, Hepatitis C and HIV 1. However, no test can guarantee the absence of viral agents in such material completely. Thus handle kit controls, standards and patient samples as if capable of transmitting infectious diseases and according to national requirements.

5.2 General directions for use

Do not mix or substitute reagents or microplates from different lot numbers. This may lead to variations in the results.

Allow all components to reach room temperature (20-32°C/68-89.6°F) before use, mix well and follow the recommended incubation scheme for an optimum performance of the test.

Incubation: We recommend test performance at 30°C/86°F for automated systems.

Never expose components to higher temperature than 37°C/ 98.6 °F.

Always pipette substrate solution with brand new tips only. Protect this reagent from light. Never pipette conjugate with tips used with other reagents prior.

A definite clinical diagnosis should not be based on the results of the performed test only, but should be made by the physician after all clinical and laboratory findings have been evaluated. The diagnosis is to be verified using different diagnostic methods.

6. Sample Collection, Handling and Storage

Use preferentially freshly collected serum samples. Blood withdrawal must follow national requirements.

Do not use icteric, lipemic, hemolysed or bacterially contaminated samples. Sera with particles should be cleared by low speed centrifugation (<1000 x g). Blood samples should be collected in clean, dry and empty tubes. After separation, the serum samples should be used immediately, respectively stored tightly closed at 2-8°C/35-46°F up to three days, or frozen at -20°C/-4°F for longer periods.

7. Assay Procedure

7.1 Preparations prior to pipetting

Dilute concentrated reagents:

Dilute the concentrated sample buffer 1:5 with distilled water (e.g. 20 ml plus 80 ml).
Dilute the concentrated wash buffer 1:50 with distilled water (e.g. 20 ml plus 980 ml).

Samples:

Dilute serum samples 1:101 with sample buffer (1x)
e.g. 1000 µl sample buffer (1x) + 10 µl serum. Mix well !

Washing:

Prepare 20 ml of diluted wash buffer (1x) per 8 wells or 200 ml for 96 wells
e.g. 4 ml concentrate plus 196 ml distilled water.

Automated washing:

Consider excess volumes required for setting up the instrument and dead volume of robot pipette.

Manual washing:

Discard liquid from wells by inverting the plate. Knock the microwell frame with wells downside vigorously on clean adsorbent paper. Pipette 300 µl of diluted wash buffer into each well, wait for 20 seconds. Repeat the whole procedure twice again.

Microplates:

Calculate the number of wells required for the test. Remove unused wells from the frame, replace and store in the provided plastic bag, together with desiccant, seal tightly (2-8°C/35-46°F).

7.2 Work flow

For pipetting scheme see Annex A, for the test procedure see Annex B
We recommend pipetting samples and calibrators in duplicate.

NOTE: If IgG and IgM are determined in parallel, controls and samples have to be done twice, for each subclass separately.

- Pipette 100 µl of each patient‘s diluted serum into the designated microwells.
- Pipette 100 µl cut-off calibrator (A-H) and negative control into the designated wells.
- Incubate for 30 minutes at 20-32°C/68-89.6°F.
- Wash 3x with 300 µl washing buffer (diluted 1:50).
- Pipette 100 µl conjugate into each well.
- Incubate for 30 minutes at 20-32°C/68-89.6°F.
- Wash 3x with 300 µl washing buffer (diluted 1:50).
- Pipette 100 µl TMB substrate into each well.
- Incubate for 30 minutes at 20-32°C/68-89.6°F, protected from intense light.
- Pipette 100 µl stop solution into each well, using the same order as pipetting the substrate.
- Incubate 5 minutes minimum.
- Agitate plate carefully for 5 sec.
- Read absorbance at 450 nm (optionally 450/620 nm) within 30 minutes.

8. Qualitative Interpretation

Read the optical density of the specific calibrator (A-H) and the patient samples. Multiply the OD of the calibrator by the parameterspecific factor, provided with the lot specific QC certificate. For qualitative interpretation we recommend to consider sera within a range of 20% around the cut-off value as equivocal. All samples with higher ODs are considered positive, samples with lower ODs are considered negative.

APS-Profile	O.D. 450/620 nm
Negative Control	0.033
Cut-off Calibrator	0.5225

Example of interpretation

We recommend pipetting cut-off calibrator for each run.

Measured: $OD_{\text{Cut-off Calibrator}}$ (Cardiolipin): **0.5225**

Negative: $OD_{\text{Patient}} < 0.8 \times \mathbf{OD_{\text{Cut-off Parameter}}} = 0.8 \times \mathbf{0.5225} =$ **0.418**

Positive: $OD_{\text{Patient}} > 1.2 \times \mathbf{OD_{\text{Cut-off Parameter}}} = 1.2 \times \mathbf{0.5225} =$ **0.627**

Equivocal: **0.418** ≤ OD_{Patient} ≤ **0.627**

ID Nr.	Sample OD Cardiolipin	OD - Calculation	Interpretation
1	0.99	> **0.627**	→ Positive
2	0.49	≥ **0.418** and ≤ **0.627**	→ Equivocal
3	0.27	< **0.418**	→ Negative

Do not use this example for interpreting patients results!

For lot specific data, see enclosed quality control leaflet. Medical laboratories might perform an in-house Quality Control by using own controls and/or internal pooled sera, as foreseen by EU regulations.

For semi-quantification of the results, each patient-OD value can be expressed by the Index-Value. The Index-Value is calculated by dividing the patient-OD by the cut-off parameter:

$$\text{Index Value} = \frac{\text{OD (patient sample)}}{\text{OD (cut-off parameter)}}$$

Negative: Index Value < 0.8
Equvocal: 0.8 ≤ Index Value ≤ 1.2
Positive: Index Value > 1.2

9. Technical Data

Sample material: serum

Sample volume: 10 µl of sample diluted 1:101 with 1x sample buffer

Total incubation time: 90 minutes at 20-32°C/68-89.6°F

Storage: at 2-8°C/35-46°F use original vials, only

Number of determinations: 96 tests

10. Performance Data

10.1 Specificity and sensitivity

The microplate is coated with Prothrombin, Thrombin, Cardiolipin, Phophatidylcholine, -ethanolamine, -inostol, -serine and Sphingomyelin. No crossreactivities to other autoantigens have been found.Up to 50 % of pregnant women with APS suffer from fetal loss. Prothrombin identifies 84 % of those. Since *AESKULISA* APS-Profile consists of various antigens, the known values for IgG sensitivity and specificity are listed in the table below.

	Sensitivity	Specificity
Cardiolipin	67%	73%
Phosphatidylserine	62%	83%
Phosphatidyl-Inositol	69%	75%
Ethanolamine	62%	78%
Choline	62%	79%

10.2 Linearity

Chosen sera have been tested with this kit and found to dilute linearly. However, due to the heterogeneous nature of human autoantibodies there might be samples that do not follow this rule.

Sample No. Cardiolipin	Dilution Factor	measured concentration (OD-Ratio)	expected concentration (OD-Ratio)	Recovery (%)
1	1 / 100	7.40	7.50	98.7
	1 / 200	3.50	3.75	93.3
	1 / 400	1.75	1.88	93.1
	1 / 800	0.88	0.94	93.6
2	1 / 100	3.60	3.50	102.9
	1 / 200	1.71	1.75	97.7
	1 / 400	0.85	0.88	96.6
	1 / 800	0.43	0.44	97.7

10.3 Precision

To determine the precision of the assay, the variability (intra and inter-assay) was assessed by examining its reproducibility on three serum samples selected to represent a range over the standard curve.

Intra-Assay		
APS Profile	**Mean OD Ratio**	**CV (%)**
Prothrombin	2.4	3.1
Thrombin	1.8	2.8
Cardiolipin	1.5	1.5
Phosphatidyl-Choline	3.2	1.6
Phosphatidyl-Ethanolamine	3.5	1.9
Phosphatidyl-Inositol	3.1	2.2
Phosphatidyl-Serine	2.6	2.9
Sphingomyelin	2.1	3.1

Inter-Assay		
APS Profile	**Mean OD Ratio**	**CV (%)**
Prothrombin	2.8	2.8
Thrombin	1.5	3.1
Cardiolipin	1.3	3.6
Phosphatidyl-Choline	2.6	2.1
Phosphatidyl-Ethanolamine	2.9	3.5
Phosphatidyl-Inositol	4.1	2.6
Phosphatidyl-Serine	3.8	1.5
Sphingomyelin	3.6	2.4

11. Literature

1. **Boey, M.L., Colaco, C.B., Gharavi, A.E., et al. (1983):**
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2. **Gastineau, D.A., Kazmier, F.J., Nichols, W.L., Bowie, E.J. (1985):**
   Lupus anticoagulant: an analysis of the clinical and laboratory features of 219 cases.
   Am. J. Hematol. 19: 265-267.
3. **P. von Landenberg, T. Matthias, J. Zaech, M. Schultz, M. Lorber, M. Blank, Y. Shoenfeld (2003).**
   Antiprothrombin antibodies are associated with pregnancy loss in patients with the antiphospholipid syndrome.
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4. **Wöhrle R, Matthias T, von Landenberg P, Oppermann M, Helmke K, Förger F (2000):**
   Clinical relevance of antibodies against different phospholipids.
   Journal of Autoimmunity 15: A60.
5. **Wöhrle R, Matthias T, von Landenberg P, Oppermann M, Förger F, Helmke K (2000):**
   A new anti.phospholipid-antibody ELISA - sensitivity and specificity for cerebrovascular insults in autoimmune diseases.
   Journal of Autoimmunity Vol 15: A 60.

ANNEX A: Pipetting scheme

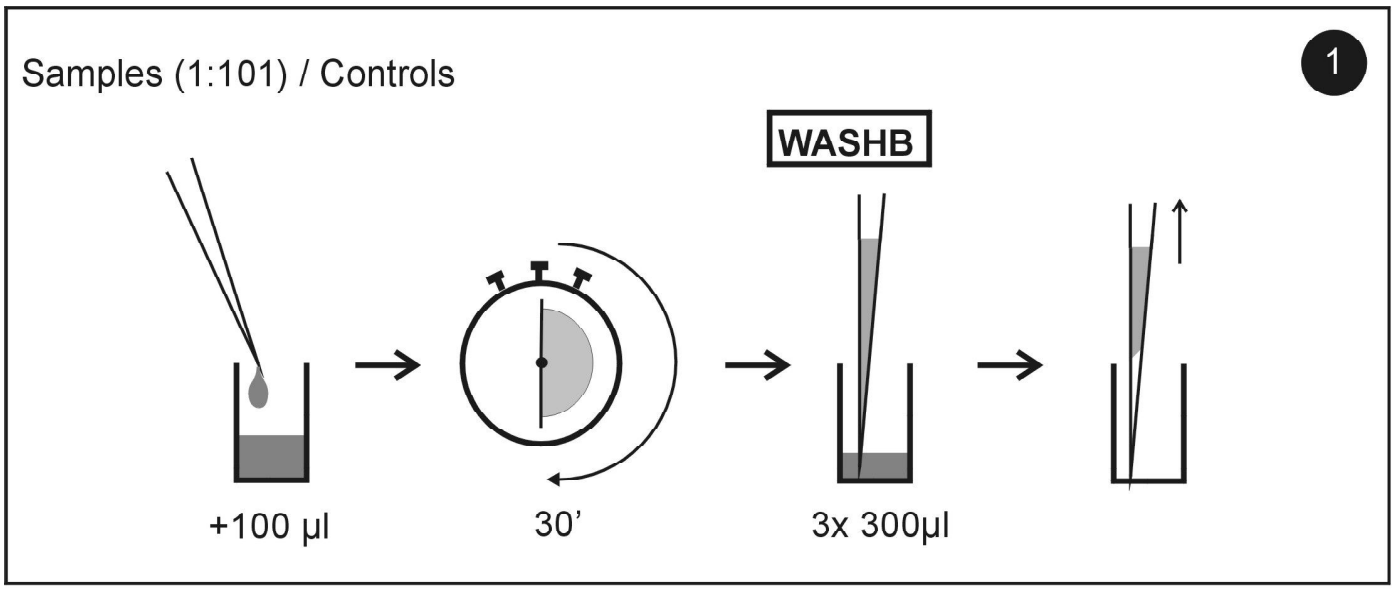
We suggest pipetting calibrators, controls and samples as follows:
For **quantitative interpretation** use calibrators to establish a standard curve.
For **qualitative interpretation** use cut-off calibrator.

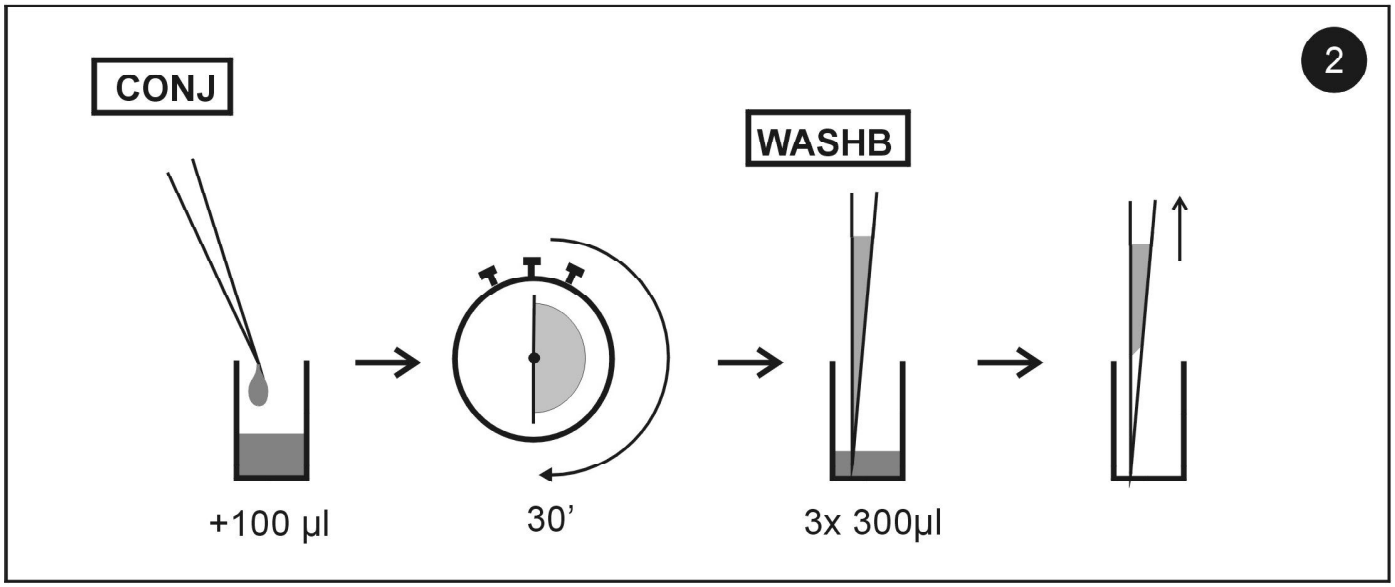
Antigen		1	2	3	4	5	6	7	8	9	10	11	12
Prothrombin	**A**	CCA	NC	P1	P2	P3	...						
Thrombin	**B**	CCB	NC	P1	P2	P3	...						
Cardiolipin	**C**	CCC	NC	P1	P2	P3	...						
P.-cholin	**D**	CCD	NC	P1	P2	P3	...						
P.-ethanolamin	**E**	CCE	NC	P1	P2	P3	...						
P.-inositol	**F**	CCF	NC	P1	P2	P3	...						
P.-serine	**G**	CCG	NC	P1	P2	P3	...						
Sphingomyelin	**H**	CCH	NC	P1	P2	P3	...						

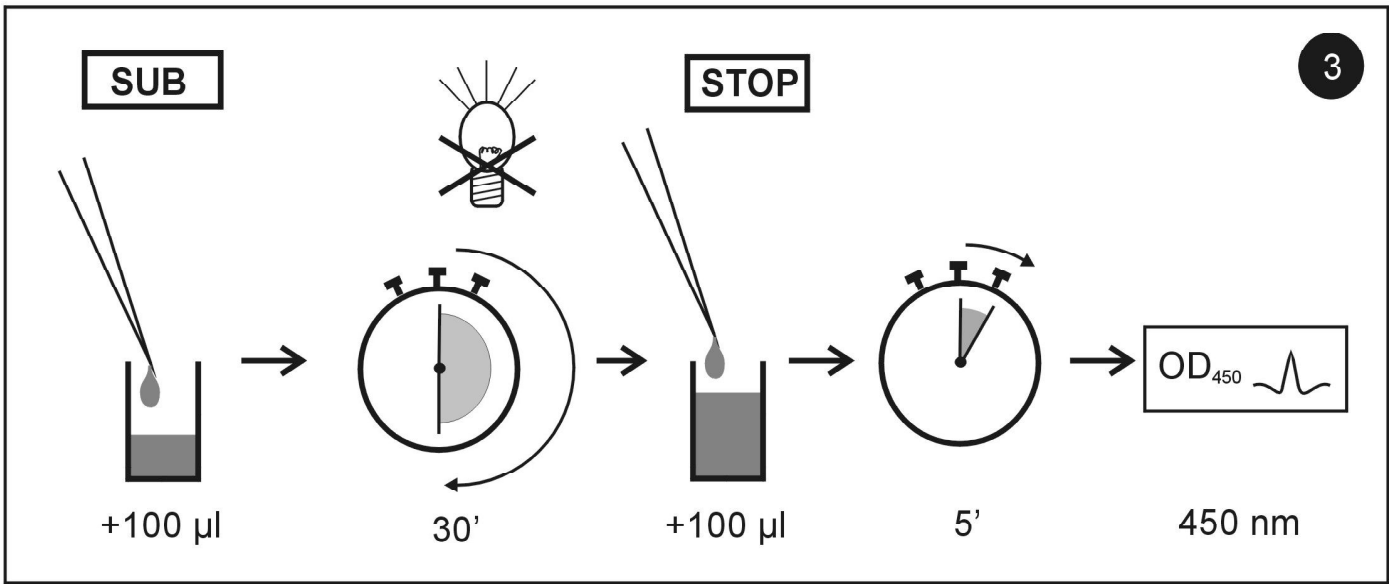
CCA: cut-off calibrator A; CCB: cut-off calibrator B; CCC: cut-off calibrator C; CCD: cut-off calibrator D; CCE: cut-off calibrator E; CCF: cut-off calibrator F; CCG: cut-off calibrator G; CCH: cut-off calibrator H.
NC: negative control
P.-serine: Phosphatidyl-serine
P.-inositol: Phosphatidyl-inositol

P1: patient 1
P2: patient 2
P3: patient 3

Annex B: Test Procedure







Assay/Test: _____ Incubation / Inkub. : 1._____min Date/ Datum:_____

Temperature/Temperatur:_____ °F _____ °C 2._____min

Signature/Unterschrift:._____

Name:_____ 3._____min

	1	2	3	4	5	6	7	8	9	10	11	12
Pro-thrombin	CCA	NC	P 1	P 2								
Thrombin	CCB	NC	P 1	P 2								
Cardio-lipin	CCC	NC	P 1	P 2								
P.-cholin	CCD	NC	P 1	P 2								
P.-Ethanol-amin	CCE	NC	P 1	P 2								
P.-Inositol	CCF	NC	P 1	P 2								
P.-Serine	CCG	NC	P 1	P 2								
Sphingo-myelin	CCH	NC	P 1	P 2								

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Prenatal Profil

IVD	♦ Diagnosi in vitro ♦ Pour diagnostic in vitro ♦ In Vitro Diagnostikum ♦ Para uso Diagnóstico in vitro	♦ For in vitro diagnostic use ♦ Para uso diagnóstico in vitro ♦ In Vitro Διαγνωστικό μέσο
REF	♦ Numero d'ordine ♦ Référence Catalogue ♦ Bestellnummer ♦ Número de catálogo	♦ Cataloge number ♦ Numéro de catálogo ♦ Αριθμός παραγγελίας
LOT	♦ Descrizione lotto ♦ Lot ♦ Chargen Bezeichnung ♦ Lote	♦ Lot ♦ Lote ♦ Χαρακτηρισμός παρτίδας
CE	♦ Conformità europea ♦ Déclaration CE de Conformité ♦ Europäische Konformität ♦ Déclaracão CE de Conformidade	♦ EC Declaration of Conformity ♦ Declaración CE de Conformidad ♦ Ευρωπαϊκή συμφωνία
96	♦ 96 determinazioni ♦ 96 tests ♦ 96 Bestimmungen ♦ 96 Testes	♦ 96 tests ♦ 96 pruebas ♦ 96 προσδιορισμοί
i	♦ Rispettare le istruzioni per l'uso ♦ Voir les instructions d'utilisation ♦ Gebrauchsanweisung beachten ♦ Ver as instrucões de uso	♦ See instructions for use ♦ Ver las instrucciones de uso ♦ Λάβετε υπόψη τις οδηγίες χρήσης
	♦ Da utilizzarsi entro ♦ Utilise avant le ♦ Verwendbar bis ♦ Utilizar antes de	♦ Use by ♦ Utilizar antes de ♦ Χρήση μέχρι
+2°C +8°C	♦ Conservare a 2-8°C ♦ Conserver à 2-8°C ♦ Lagerung bei 2-8°C ♦ Conservar entre 2-8°C	♦ Store at 2-8°C (35-46°F) ♦ Conservar a 2-8°C ♦ Φυλάσσεται στους 2-8°C
	♦ Prodotto da ♦ Fabriqué par ♦ Hergestellt von ♦ Fabricado por	♦ Manufactured by ♦ Fabricado por ♦ Κατασκευάζεται από
CO-CAL	♦ Calibratore cut-off ♦ Etalon Seuil ♦ Grenzwert Kalibrator ♦ Calibrador de cut-off	♦ Cut off Calibrator ♦ Calibrador de cut-off ♦ Οριακός ορός Αντιδραστήριο βαθμονόμησης
CON +	♦ Controllo positivo ♦ Contrôle Positif ♦ Positiv Kontrolle ♦ Controlo positivo	♦ Positive Control ♦ Control Positivo ♦ Θετικός ορός ελέγχου
CON −	♦ Controllo negativo ♦ Contrôle Négatif ♦ Negativ Kontrolle ♦ Controlo negativo	♦ Negative Control ♦ Control Negativo ♦ Αρνητικός ορός ελέγχου
CAL	♦ Calibratore ♦ Etalon ♦ Kalibrator ♦ Calibrador	♦ Calibrator ♦ Calibrador ♦ Αντιδραστήριο βαθμονόμησης
RC	♦ Recupero ♦ Corrélation ♦ Wiederfindung ♦ Recuperacão	♦ Recovery ♦ Recuperado ♦ Ανάκτηση
CONJ	♦ Coniugato ♦ Conjugé ♦ Konjugat ♦ Conjugado	♦ Conjugate ♦ Conjugado ♦ Σύζευγμα
MP	♦ Micropiastra rivestita ♦ Microplaque sensibilisée ♦ Beschichtete Mikrotiterplatte ♦ Microplaca revestida	♦ Coated microtiter plate ♦ Microplaca sensibilizada ♦ Επικαλυμμένη μικροπλάκα
PINP	♦ Piastra ad aghi rivestita ♦ Pinplate sensibilisée ♦ Beschichtete Pinplatte ♦ Pinplate revestida	♦ Coated pinplate ♦ Pinplate sensibilizada ♦ Επικαλυμμένη πλάκα Pin
WASHB 50x	♦ Tampone di lavaggio ♦ Tampon de Lavage ♦ Waschpuffer ♦ Solucão de lavagem	♦ Wash buffer ♦ Solución de lavado ♦ Ρυθμιστικό διάλυμα πλύσης
SUB	♦ Tampone substrato ♦ Substrat ♦ Substratpuffer ♦ Substrato	♦ Substrate buffer ♦ Tampón sustrato ♦ Ρυθμιστικό διάλυμα υποστρώματος
STOP	♦ Reagente bloccante ♦ Solution d'Arrêt ♦ Stopreagenz ♦ Solucão de paragem	♦ Stop solution ♦ Solución de parada ♦ Αντιδραστήριο διακοπής αντίδρασης
SB 5x	♦ Tampone campione ♦ Tampon Echantillons ♦ Probenpuffer ♦ Diluente de amostra	♦ Sample buffer ♦ Tampón Muestras ♦ Ρυθμιστικό διάλυμα δειγμάτων