



Instructions For Use

Valid as of 28.09.2022

DotDiver Quantrix ANA

REF 5020

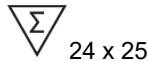
Dot immunoassay for the determination of IgG antibodies against nuclear and cytoplasmic antigens in human serum



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1 Intended Purpose

The DotDiver Quantrix ANA is a quantitative dot immunoassay for the determination of IgG antibodies against nuclear and cytoplasmic antigens (nucleosomes, dsDNA, histones, Sm, RNP, Sm/RNP, SS-A/Ro60, SS-A/Ro52, SS-B, Scl-70, Ku, PM/Scl-100, Mi-2, Jo-1, PL-7, PL-12, SRP, ribosomes, CENP-A/B, PCNA, sp100, gp210, M2 recombinant, M2/nPDC and f-actin) in human serum.

The DotDiver Quantrix ANA is intended as an aid in the diagnosis of systemic autoimmune diseases in conjunction with other clinical and laboratory findings.

The immunoassay is designed for semi-automated use with the DotDiver instrument.

The immunoassay is designed for professional *in vitro* diagnostic use.

2 Diagnostic Relevance

Systemic autoimmune diseases (such as systemic lupus erythematosus, scleroderma, rheumatoid arthritis, Sjögren syndrome, dermatomyositis, mixed connective tissue disease) are characterized by the production of a variety of autoantibodies directed against components of the cell nucleus or plasma.

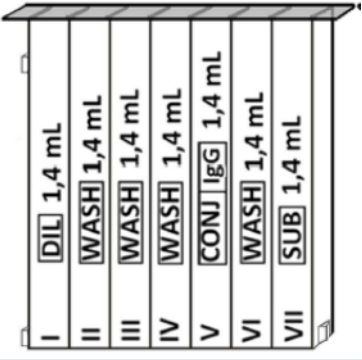
Although significance and pathological relevance of some auto-antibodies have not completely understood yet, the detection of auto-antibodies plays an important role in the diagnosis of systemic autoimmune diseases.

3 Test Principle

Dot immunoassays are frequently used for the determination of specific antibodies directed against multiple antigens. The test strips are coated with various antigens in consistent intervals. If antibodies are present in the patient's sample, they bind to the respective antigens. A secondary antibody conjugated with the enzyme alkaline phosphatase detects the generated immune complexes. A colorless substrate is converted into a colored, insoluble product. The signal intensity of the precipitated reaction product is proportional to the antibody activity in the sample.

4 Test Components

| Component | Description |
|---|---|
| Test strips STRIP , 24 (3 x 8) pieces | 24 (3 x 8) breakable test strips on plastic supports (ready-to-use), each strip coated with dots of highly purified <ul style="list-style-type: none"> - Nucleosomes - dsDNA - Histones - Sm - RNP - Sm/RNP - SS-A/Ro60 - SS-A/Ro52 - SS-B - Scl-70 - Ku - PM/Scl-100 - Mi-2 - Jo-1 - PL-7 - PL-12 - SRP - Ribosomes - CENP-A/B - PCNA - sp100 - gp210 - M2 recombinant - M2/nPDC and - f-Actin as well as calibrator dots with 0 (blank), 6, 12, 25, 50 and 100 AU/mL, substrate, conjugate and serum controls |
| Cartridges CART , 24 pieces with 7 compartments | 24 cartridges (ready-to-use) sealed with aluminum foil, each compartment contains reagents |

| | |
|--|--|
|  | |
| Sample diluent DIL , 1 x 1.4 mL | Colored solution (contains ProClin 300) |
| Wash buffer WASH , 4 x 1.4 mL | Colorless solution (contains ProClin 300) |
| Conjugate IgG CONJ , 1 x 1.4 mL | Colored solution of polyclonal anti-human IgG antibody conjugated to alkaline phosphatase (contains ProClin 300) |
| Substrate BCIP / NBT SUB , 1 x 1.4 mL | Substrate solution of bromo-chloro-indolyl-phosphate and nitroblue tetrazolium (ready-to-use; contains sodium azide) |
| QC Certificate 1 piece | - |
| Instructions for Use 1 piece | - |

5 Materials required but not provided

- Common laboratory equipment
- Precision pipette (10 µL) and disposable pipette tips
- DotDiver2.0 instrument or, alternatively, DotDiver1.0 instrument with additional scanner and Blot GALaxy evaluation software or equivalents
- Adsorbent paper or paper towel

6 Storage and Stability

Upon receipt, all test components must be stored at 2 °C to 8 °C, preferably in the original kit box. If stored properly in their original containers, all components are stable until their expiry date.

7 General Information

This product is for *in vitro* diagnostic use only. The instructions for use of the immunoassay as well as of the DotDiver device must be read carefully. They are valid only for the present product with the given composition and must be strictly followed to ensure reliable test results. Deviations can lead to erroneous test results. Components must not be exchanged by test reagents of different lots or of other manufacturers. Exposure of reagents to strong light must be avoided throughout the entire test procedure and storage.

8 Preparation

8.1 Preparation of Reagents

All components including the test strips must be brought to room temperature (RT: 18 °C to 25 °C) before use for at least 30 min. All liquid components must be mixed gently to ensure homogeneity.

8.1.1 Test Strips

The breakable test strips are provided on plastic supports within sealed aluminium pouches. Unused test strips should always be stored refrigerated and protected from moisture.

8.1.2 Cartridges

The cartridges are ready-to-use. They contain ready-to-use reagents in sufficient amounts for the analysis of one sample. Unused cartridges should always be stored refrigerated.

8.2 Preparation of Samples

8.2.1 Sample Material

The use of freshly collected serum from blood taken by venipuncture is recommended. The use of icteric, lipemic, hemolytic or bacterially contaminated samples should be avoided. Insoluble substances must be removed from the sample by centrifugation. Samples must not be thermally inactivated.

8.2.2 Sample Storage

Samples may be kept at 2 °C to 8 °C up to three days. Long-term storage requires -20 °C. Repeated freezing and thawing should be avoided. For multiple use, samples should be aliquoted and kept at -20 °C.

9 Test Performance

9.1 Procedure

Start the DotDiver device. Place the test strips into the clamp and the cartridges into the corresponding positions of the cartridge holder and insert both into the instrument. Close the cover and follow the indications on the DotDiver screen.

Processing, analysis and evaluation of the immunoassay performed by the DotDiver2.0 are described below (Protocol 02):

| Step | Description |
|--------------------------|--|
| 1. Piercing | Piercing of well 1 of the cartridges by the instrument |
| 2. Open cover | Open the cover of the instrument |
| 3. Addition of samples | Add 10 µL of undiluted samples into well 1 of the cartridges and application of sample information |
| 4. Close cover | Close the cover of the instrument |
| 5. Piercing | Piercing of all other wells of the cartridges by the instrument |
| 6. Pre-wash | Incubation of strips for 1 min. in well 2 (wash buffer) of the cartridge. |
| 7. Sample Incubation | Incubation of strips for 30 min. in well 1 (dilution buffer) of the cartridge. |
| 8. Wash | Incubation of strips for 2 min. in well 2 (wash buffer) of the cartridge. |
| 9. Wash | Incubation of strips for 2 min. in well 3 (wash buffer) of the cartridge. |
| 10. Wash | Incubation of strips for 2 min. in well 6 (wash buffer) of the cartridge. |
| 11. Conjugate Incubation | Incubation of strips for 10 min. in well 5 (conjugate) of the cartridge. |
| 12. Wash | Incubation of strips for 2 min. in well 4 (wash buffer) of the cartridge. |
| 13. Wash | Incubation of strips for 2 min. in well 3 (wash buffer) of the cartridge. |
| 14. Wash | Incubation of strips for 2 min. in well 2 (wash buffer) of the cartridge. |
| 15. Substrate Incubation | Incubation of strips for 10 min. in well 7 (substrate) of the cartridge. |
| 16. Wash | Incubation of strips for 2 min. in well 6 (wash buffer) of the cartridge. |

| | |
|----------------|--|
| 17. Drying | Automated drying of test strips for about 25 min. by integrated fan. |
| 18. Analysis | Automated imaging of the test strips by integrated camera |
| 19. Evaluation | Automated evaluation of the test strips by integrated software |

9.2 Automation

Processing, analysis and evaluation of the immunoassay is performed completely by the DotDiver2.0 device. For semi-automated use of the immunoassay with the DotDiver1.0 device, prepare test strips and cartridges according to the instructions for use of the instrument and follow the indications on the DotDiver screen. Processing of the immunoassay must be performed analogous to the described procedure. Processed strips must be dried for approximately 30 min. prior scanning and evaluation of images by use of the Blot GALaxy evaluation software or equivalents.

10 Test Evaluation

10.1 Metrological Traceability

The immunoassay is calibrated using internal reference samples.

10.2 Evaluation

For generation of a standard curve, the mean optical signals of the six calibrator triplicates incl. blank are plotted against their antibody activities and correlated by a mathematical fitting function. Antibody activities of unknown samples can be derived directly from their optical signals by use of the generated standard curve.

10.3 Criteria of Validity

Test runs are only valid if the following criteria of validity are fulfilled:

- The calibrators (6 triplicates including blank control) must present test results of increasing intensity according to their predefined activity (CAL 0 < CAL 1 < CAL 2 < CAL 3 < CAL 4 < CAL 5)
- The calibration curve must fit a specific, pre-determined curve equation.
- The sample controls (2 triplicates located at the beginning and the end of the test strip) must present a minimum pre-determined intensity.
- The conjugate controls (triplicates for each IgG, IgM and IgA) must present a minimum pre-determined intensity for the respective conjugate specificity only.
- The substrate controls (3 triplicates) must present test results of increasing intensity according to their predefined activity

The coloration of these controls ensures that the test has been performed correctly. If these criteria are not met, the test is not valid and must be repeated.

10.4 Troubleshooting

In case of an invalid test run, the expiry dates and storage conditions, incubation times and temperatures, and precise calibration of all instruments used should be verified. If no reason for an invalid test run could be identified, please contact the supplier or manufacturer of the product.

10.5 Reference Ranges

The reference ranges are indicated below:

| | Interpretation |
|-------------------------------|----------------|
| Antibody activity < 6 U/mL | negative |
| Antibody activity 6 – 12 U/mL | borderline |
| Antibody activity > 12 U/mL | positive |

As a result of different seroprevalences in individual regions, each laboratory should verify the reference ranges by own analysis and adapt, if necessary.

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10.6 Interpretation of Test Results

A positive test result indicates the presence of specific antibodies. A negative result indicates the absence of specific antibodies, but does not exclude the possibility of an autoimmune reaction. In case of a borderline test result, a reliable evaluation is not possible.

10.7 Limitations of the Method

The interpretation of test results must always be considered in combination with the clinical picture of the patient. The diagnosis should not be based on the results of a sole diagnostic method. All clinical and laboratory findings should be evaluated to state a diagnosis. For confirmation, further investigations should be carried out.

11 Performance Characteristics

11.1 Analytical Performance Characteristics

11.1.1 Analytical Sensitivity and Specificity

The Limit of Blank (LoB) was determined by multiple analysis of sample diluent. The Limit of Detection (LoD) was assessed by multiple analysis of negative samples.

| | Analytical Sensitivity |
|--------------------------|------------------------|
| Limit of Blank (LoB) | < cut off |
| Limit of Detection (LoD) | cut off |

11.1.2 Precision

The precision of test results was assessed by the determination of the intra- and interassay variation by the analysis of multiple samples with different antibody activities. No differences in the qualitative evaluation have been observed.

11.2 Diagnostic Performance Characteristics

11.2.1 Diagnostic Sensitivity and Specificity

The sensitivity and specificity were assessed by the analysis of characterized samples (confirmed positive or negative for specific antibodies by reference laboratories and/or methodologies).

| | Sensitivity | Specificity |
|-------------|-------------|-------------|
| Nucleosomes | 67 % | 98 % |
| dsDNA | > 99 % | > 99 % |
| Histones | > 99 % | > 99 % |
| Sm | > 99 % | 98 % |
| RNP | > 99 % | 98 % |
| Sm/RNP | > 99 % | > 99 % |
| SS-A/Ro60 | 99 % | > 99 % |
| SS-A/Ro52 | n.d. | n.d. |
| SS-B | > 99 % | 99 % |
| Scl-70 | > 99 % | > 99 % |
| Ku | > 99 % | > 99 % |
| PM/Scl-100 | > 99 % | > 99 % |
| Mi-2 | > 99 % | > 99 % |
| Jo-1 | > 99 % | > 99 % |
| PL-7 | > 99 % | > 99 % |

| | | |
|----------------|--------|--------|
| PL-12 | > 99 % | > 99 % |
| SRP | > 99 % | > 99 % |
| Ribosomes | > 99 % | > 99 % |
| CENP-A/B | > 99 % | 99 % |
| PCNA | > 99 % | > 99 % |
| sp100 | > 99 % | > 99 % |
| gp210 | > 99 % | > 99 % |
| M2 recombinant | > 99 % | 98 % |
| M2/nPDC | 94 % | 94 % |
| f-Actin | 97 % | 98 % |

12 Warnings and Precautions

The product is designed exclusively for *in vitro* diagnostic use by qualified, authorized and trained personnel. All test components and human samples should be handled with care as potentially hazardous. Good laboratory practices (GLP) and all relevant regulations should be adhered to.

In case the product is damaged or product information including labelling is wrong or incorrect, please contact the manufacturer or supplier.

This product contains preparations of human and / or animal origin. Any material derived from human body fluids or organs used for the preparation of components were tested and found negative for HBsAg (Hepatitis B-Virus-surface Antigen) and anti-HIV as well as anti-HCV antibodies. However, all components and all patient samples should be handled as potentially hazardous in accordance with national laws and appropriate guidelines on biological safety.

As the product contains potentially hazardous materials, the following precautions should be followed: Do not smoke, eat or drink while handling kit material or samples. Avoid direct contact to kit material or samples by wearing protective gloves laboratory coat and safety glasses. Never pipette material by mouth. Wipe up spills promptly and wash the affected surface thoroughly with a decontaminant. Wash hands thoroughly after use.

Some of the reagents contain ProClin (< 0.0015 %) as a preservative, and must not be swallowed or allowed to come into contact with skin or mucosa.

Some of the reagents contain sodium azide (< 0.1 %) as a preservative and must not be swallowed or allowed to come into contact with skin or mucosa. The possible formation of heavy metal azides in the drainage has to be prevented by sufficient rinsing with water.

The information in the safety data sheet on possible hazards, first aid measures, measures in the event of the unintentional release of large quantities, handling and storage, personal protective equipment, information on disposal as well as information on toxicology must be observed.

Any serious incident that has occurred in relation to the device shall be reported to the manufacturer and the competent authority of the member state in which the user and/or the patient is established.





















13 Disposal

For decontamination and disposal the recommendations of the CDC as well as the relevant local and national environmental guidelines and regulations should be adhered to. Samples, potentially contaminated materials and infectious waste must be decontaminated, e.g. by autoclaving for 20 min. at 121 °C.

14 References

- Tan EM: Antinuclear antibodies: diagnostic markers for autoimmune diseases and probes for cell biology. *Adv Immunol* 1989, 44, 93-151.

15 Symbols

| | |
|---|---|
|  | Manufacturer |
|  | CE marking of conformity |
|  | <i>In vitro</i> diagnostic medical device |
|  | Catalogue number |
|  | Unique device identifier |
|  | Batch code |
|  | Temperature limit |
|  | Use-by date |
|  | Consult instructions for use |
|  | Contains sufficient for <n> tests |
|  | Do not re-use |
|  | Caution |
|  | Biological risk |
|  | Keep away from sunlight |
|  | Test strip |
|  | Cartridge |
|  | Sample diluent |
|  | Conjugate |
|  | Wash buffer |
|  | Substrate |

16 Changes

Changes in current Instructions for Use

| | |
|--------------------|------------------------------------|
| Current Version | 006/09.2022 |
| Summary of Changes | Editorial changes in all sections. |