研究用試薬

# EUROLINE Anti-SARS-CoV-2 Profile (IgG)

# Instructions for use

**For in vitro diagnostic use** IVD

| ORDER NO. | ANTIBODIES AGAINST | IG CLASS | SUBSTRATE | FORMAT |
|---|---|---|---|---|
| DN 2606-1601-1 G<br>DN 2606-6401-1 G<br>DN 2606-5001-1 G | SARS-CoV-2 S1,<br>SARS-CoV-2 S2,<br>SARS-CoV-2 NP,<br>HCoV-HKU1 NP, HCoV-OC43 NP,<br>HCoV-NL63 NP and HCoV-229E NP | IgG | Ag-coated test strips | 16 x 01 (16)<br>64 x 01 (64)<br>50 x 01 (50) |

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## Intended use

The EUROLINE Anti-SARS-CoV-2 Profile IgG is an immunoblot for qualitative in vitro determination of human antibodies of immunoglobulin class IgG against the SARS-CoV-2 antigens S1, S2 and NP in serum, EDTA, heparin or citrate plasma. The test is designed to support the diagnosis of infections with SARS-CoV-2. It can also be used for the determination of antibodies following vaccination with vaccines based on the spike protein. The product is only intended for use by qualified laboratory personnel and can be performed and evaluated automatically or manually. The test results should always be interpreted together with those from other examinations as well as the clinical picture.

The determination of antibodies of class IgG against the other HCoV antigens (HCoV-HKU1-NP, HCoV-OC43-NP, HCoV-NL63-NP and HCoV-229E-NP) is only for information purposes.

## Clinical significance

Severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2, previously called 2019-nCoV) belongs to the family of coronaviruses and, like SARS-CoV, is classified in the genus *Betacoronavirus* [1]. At the end of 2019, SARS-CoV-2 was identified as the causative agent of clustered cases of pneumonia of unclear origin. The virus caused an infection wave that has spread rapidly worldwide and was declared a pandemic by the WHO at the beginning of 2020 [2-5].

SARS-CoV-2 is predominantly transmitted by droplet infection via coughing or sneezing and through close contact with infected persons [3, 4, 6]. Healthcare personnel and family members are especially at risk of infection [6]. The zoonotic reservoir of the virus appears to be bats [3, 4, 6].

The incubation time of SARS-CoV-2 is three to seven, maximally 14 days [2]. The symptoms of SARS-CoV-2 infection are fever, coughing, breathing difficulties, fatigue and loss of the olfactory and taste sense [2-4, 6, 7]. In most patients the infection manifests with symptoms of a mild febrile illness with irregular lung infiltrates. Some patients, especially elderly or chronically ill patients, develop acute respiratory distress syndrome (ARDS) [2, 3, 5, 6]. In February 2020, the disease caused by SARS-CoV-2 was named COVID-19 by the WHO.

Suitable methods for the diagnosis of SARS-CoV-2 infections are detection of viral RNA by reverse transcriptase polymerase chain reaction (RT-PCR) or of viral protein by ELISA or rapid test primarily in sample material from the upper (nasopharyngeal or oropharyngeal swabs) or lower respiratory tract (bronchoalveolar lavage fluid, tracheal secretion, sputum, etc.) [4, 5]. The detection of viral antigens is less sensitive than RT-PCR testing.

**Updates with respect to the previous version are marked in grey.**

The determination of antibodies enables confirmation of SARS-CoV-2 infection in patients with typical symptoms and in suspected cases. It also contributes to monitoring and outbreak control [4, 5]. The spike (S) and nucleocapsid (N) proteins of SARS-CoV-2 are highly immunogenic. More than 90% of the neutralising antibodies in COVID-19 patients are directed against the receptor-binding domain (RBD) of the spike protein. The spike protein is the target protein of almost all vaccines against COVID-19 [8].

Around 90% of SARS-CoV-2-infected persons develop specific antibodies until day 10 following symptom onset. IgG, IgA and IgM against the spike protein often occur simultaneously [8]. For significant serological results, two patient samples should be investigated, one from the acute phase (week 1 of the illness) and one from the convalescent phase (3 to 4 weeks later) [4, 6, 9]. SARS-CoV-2-specific T cells appear a few days after onset of symptoms. A specific T cell response is associated with a milder COVID-19 course [8].

Neutralising antibodies are associated with protective immunity against reinfection with SARS-CoV-2 or SARS-CoV. Neutralising antibodies against SARS-CoV could be detected 17 years after infection. SARS-CoV-2-reactive T-cells are part of the T-cell repertoire from persons who had a SARS-CoV infection in 2003. These cells proliferate following contact with SARS-CoV-2. Cross-reacting T-cells were detected in some of the investigated persons without history of SARS-CoV-2 infection and are supposedly due to prior infections with coronaviruses causing common colds. This may indicate a long-lasting immunity following infection with betacoronaviruses [8, 10, 11].

With regard to COVID-19, the immunological memory is heterogeneous: virus-specific antibodies and memory B and T cells are present in different quantities and their levels change with different dynamics. Current findings indicate that the T and B cell memory and antibodies in most cases persist over years after SARS-CoV-2 [8].

## Antigen

The test strips are coated with the following antigens: SARS-CoV-2 S1 (isolate Wuhan-Hu-1), SARS-CoV-2 S2, SARS-CoV-2 NP, HCoV-HKU1 NP, HCoV-OC43 NP, HCoV-NL63 NP and HCoV-229E NP.

## Test principle

The test kit contains test strips coated with purified antigens. In the first reaction step, the test strips are incubated with diluted patient serum or plasma. In the case of positive samples, the specific IgG antibodies will bind to the corresponding antigenic site. To detect the bound antibodies, a second incubation is carried out using an enzyme-labelled anti-human IgG (enzyme conjugate) catalysing a colour reaction.
The format DN 2606-5001-1 G belongs to the Immunoblot-PreQ system, in which the incubation trays are pre-fitted with test strips (EUROTrays).

## Contents of the test kit

| Component | 1601 | 6401 | 5001 | Symbol |
|---|---|---|---|---|
| **1. Test strips coated with the antigens** SARS-CoV-2 S1, SARS-CoV-2 S2, SARS-CoV-2 NP, HCoV-HKU1 NP, HCoV-OC43 NP, HCoV-NL63 NP and HCoV-229E NP | 1 x 16 strips | 4 x 16 strips | 5 x 10 strips in EUROTrays | STRIPS |
| **2. Positive control** (IgG, human) 50x concentrate | 1 x 0.04 ml | 4 x 0.04 ml | 3 x 0.1 ml | POS CONTROL 50x |
| **3. Enzyme conjugate** Alkaline phosphatase-labelled anti-human IgG (goat), 10x concentrate | 1 x 3 ml | 4 x 3 ml | - | CONJUGATE 10x |
| **4. Enzyme conjugate** Alkaline phosphatase-labelled anti-human IgG (goat), ready for use | - | - | 3 x 30 ml | CONJUGATE |
| **5. Sample buffer** ready for use | 1 x 100 ml | 3 x 100 ml | 2 x 100 ml | SAMPLE BUFFER |
| **6. Universal buffer** 10x concentrate | 1 x 50 ml | 1 x 100 ml | 1 x 100 ml | BUFFER 10x |
| **7. Substrate solution** Nitroblue tetrazolium chloride/5-Bromo-4-chloro-3-indolylphosphate (NBT/BCIP), ready for use | 1 x 30 ml | 4 x 30 ml | 4 x 30 ml | SUBSTRATE |
| **8. Incubation tray** | 2 x 8 channels | - | - | TRAY |
| **9. Instructions for use** | 1 booklet | 1 booklet | 1 booklet | - |

## Additional materials and equipment (not supplied in the test kit)

- Calibrated pipettes
- Pipette tips
- Stop watch
- Rocking shaker (only with manual processing)

Depending on the automated processing, further components which are not included in the test kit can be ordered from EUROIMMUN under the order numbers below:

- Incubation tray with 30 channels (200 trays) (EUROIMMUN order no. ZD 9895-20030-1)
- Incubation tray with 44 channels (black, for the EUROBlotOne and EUROBlotCamera system, 30 trays) (EUROIMMUN order no. ZD 9898-3044-1)

**If using Immunoblot-PreQ (DN 2606-5001-1 G), no additional incubation tray is needed.**

For evaluation of the incubated test strips, the current version of the EUROLineScan software provided by EUROIMMUN is recommended.

For the creation of work protocols and the evaluation of incubated test strips using **EUROLineScan** green paper and adhesive foil are required:

- Green paper (1 sheet) (EUROIMMUN order no. ZD 9880-0101)
- Adhesive foil for approx. 16 test strips (EUROIMMUN order no. ZD 9885-0116)
- Adhesive foil for approx. 30 test strips (EUROIMMUN order no. ZD 9885-0130)

If a **visual evaluation** is to be performed in individual cases, the required evaluation protocol can be ordered:

- Visual evaluation protocol EUROLINE Anti-SARS-CoV-2 Profile (IgG) (EUROIMMUN order no. ZD 2606-0101-1 G)

The Immunoblot-PreQ (DN 2606-5001-1 G) is evaluated directly in the channels of the EUROTray using a EUROIMMUN camera system together with the EUROLineScan software. The test strips must be dry

before starting the evaluation.

## Storage and stability

The test kit has to be stored at +2 °C to +8 °C, do not freeze. Unopened, all test kit components are stable until the indicated expiry date.

## In-use stability

After initial opening, the reagents are stable for 12 months, if this does not exceed the expiry date and unless stated otherwise below. Opened reagents must likewise be stored at +2 °C to +8 °C and protected from contamination.

## Warnings and precautions

- The product must only be used by healthcare professionals in an adequate laboratory environment.
- Test strips and incubation trays are intended for single use.
- Do not use the test kit if the packaging of the reagents is damaged.
- Before using the product, read the instructions for use carefully. Only use the valid version provided with the product.
- EUROIMMUN reagents must not be mixed with or replaced by reagents from other manufacturers.
- Observe Good Laboratory Practice (GLP) and safety guidelines. Some of the reagents contain preservatives in non-declarable concentrations. Avoid eye and skin contact with samples and reagents. In case of eye or skin contact, rinse thoroughly with water. Remove and wash contaminated clothing. In case of ingestion, obtain medical advice.
- The controls of human origin have tested negative for HBsAg, anti-HCV, anti-HIV-1 and anti-HIV-2. Nonetheless, all test kit components should be treated as potentially infectious and handled with care.

## Preparation and stability of the samples

- **Samples:** Human serum or EDTA, heparin or citrate plasma.
- **Sample preparation:** The **patient samples** for analysis are diluted **1:51** with sample buffer using a clean pipette tip.

  For example: add 30 µl of sample to 1.5 ml sample buffer and mix well by vortexing. Sample pipettes are not suitable for mixing.
- **Stability of the patient samples: Patient samples** to be investigated can generally be stored at +2 °C to +8 °C for up to 14 days. Diluted samples should be incubated within one working day.

## Preparation and stability of the reagents

**Note:** All reagents must be brought to room temperature (+18 °C to +25 °C) approx. 30 minutes before use.

- **Coated test strips:** Ready for use. Open the package with the test strips only when the strips have reached room temperature (+18 °C to +25 °C) to prevent condensation on the strips. After removal of the test strips/Immunoblot-PreQ, the package should be sealed tightly and stored at +2 °C to +8 °C.
- **Positive control:** The control is a 50x concentrate. For the preparation of the working-strength control the amount required should be removed from the bottle using a clean pipette tip and diluted 1:51 with sample buffer.

  For example: add 30 µl of control to 1.5 ml of sample buffer and mix thoroughly. The working-strength diluted control should be used on the same working day.
- **Enzyme conjugate:** The enzyme conjugate is supplied as a 10x concentrate. For the preparation of the working-strength enzyme conjugate the amount required should be removed from the bottle using a clean pipette tip and diluted 1:10 with the working-strength diluted universal buffer. Example: For 1 test strip dilute 0.15 ml anti-human IgG concentrate with 1.35 ml working-strength diluted universal buffer. The working-strength diluted enzyme conjugate should be used on the same working day. To ensure optimal enzymatic activity, a working temperature of +18 °C to +25 °C should be maintained.
- **Enzyme conjugate:** ready for use.
  Note: only for DN 2606-5001-1 G
- **Sample buffer:** Ready for use.
- **Universal buffer:** The universal buffer is supplied as a 10x concentrate. For the preparation of the working-strength universal buffer the amount required should be removed from the bottle using a clean pipette tip and diluted 1:10 with deionised or distilled water. Example: for 1 test strip add 2 ml universal buffer (10x concentrate) to 18 ml deionised or distilled water. The working-strength diluted universal buffer should be used on the same working day.
- **Substrate solution:** Ready for use. Close the bottle immediately after use, as the contents are sensitive to light.

## Waste disposal

Patient samples, controls and incubated test strips should be handled as infectious waste. All reagents must be disposed of in accordance with local disposal regulations.

## Quality control

On every test strip, there is a conjugate control membrane chip (IgA, IgG and IgM) and a membrane chip with a serum/plasma control band (control).
Optionally, a positive control (EUROIMMUN order no. CL 2606-0108 G and CL 2606-0107 G) and a negative control (EUROIMMUN order no. CW 2000 ZG) can be included in each test run.

## Assay procedure

If using Immunoblot-PreQ (DN 2606-5001-1 G), manual incubation is not possible. Please see options below.

| | |
|---|---|
| **Pretreat:** | Fill the channels of the incubation tray according to the number of serum samples to be tested with **1.5 ml sample buffer** each. Remove the required amount of test strips from the packaging using a pair of tweezers and place them one by one in the channels containing the buffer (Make sure that the surface of the test strips is not damaged!). The number on the test strip must be visible.<br>Use of Immunoblot-PreQ: Set up the required incubation trays according to the work protocol and insert into the incubation device.<br>Incubate for **15 minutes** at room temperature (+18 °C to +25 °C) on a rocking shaker. Afterwards aspirate off all the liquid. |
| **Sample incubation:** (1st step) | Fill each channel with **1.5 ml** of the **diluted samples** using a clean pipette tip.<br>Incubate at room temperature (+18 °C to +25 °C) for **30 minutes** on a rocking shaker. |
| **Wash:** | Aspirate off the liquid from each channel and wash **3 x 5 minutes** each with **1.5 ml working-strength universal buffer** on a rocking shaker. |
| **Conjugate incubation:** (2nd step) | Pipette **1.5 ml diluted enzyme conjugate** (alkaline phosphatase-labelled anti-human IgG) into each channel and incubate for **30 minutes** at room temperature (+18 °C to +25 °C) on a rocking shaker. |
| **Wash:** | Aspirate off the liquid from each channel. Wash as described above. |
| **Substrate incubation:** (3rd step) | Pipette **1.5 ml substrate solution** into the channels of the incubation tray.<br>Incubate for **10 minutes** at room temperature (+18 °C to +25 °C) on a rocking shaker. |
| **Stop:** | Aspirate off the liquid from each channel and wash each test strip **3 x 1 minute** with distilled water. |
| **Evaluate:** | Place test strip on the evaluation protocol, press with filter paper, air dry and evaluate.<br>Immunoblot-PreQ: The evaluation of the test strips is performed exclusively via the EUROIMMUN camera systems. |

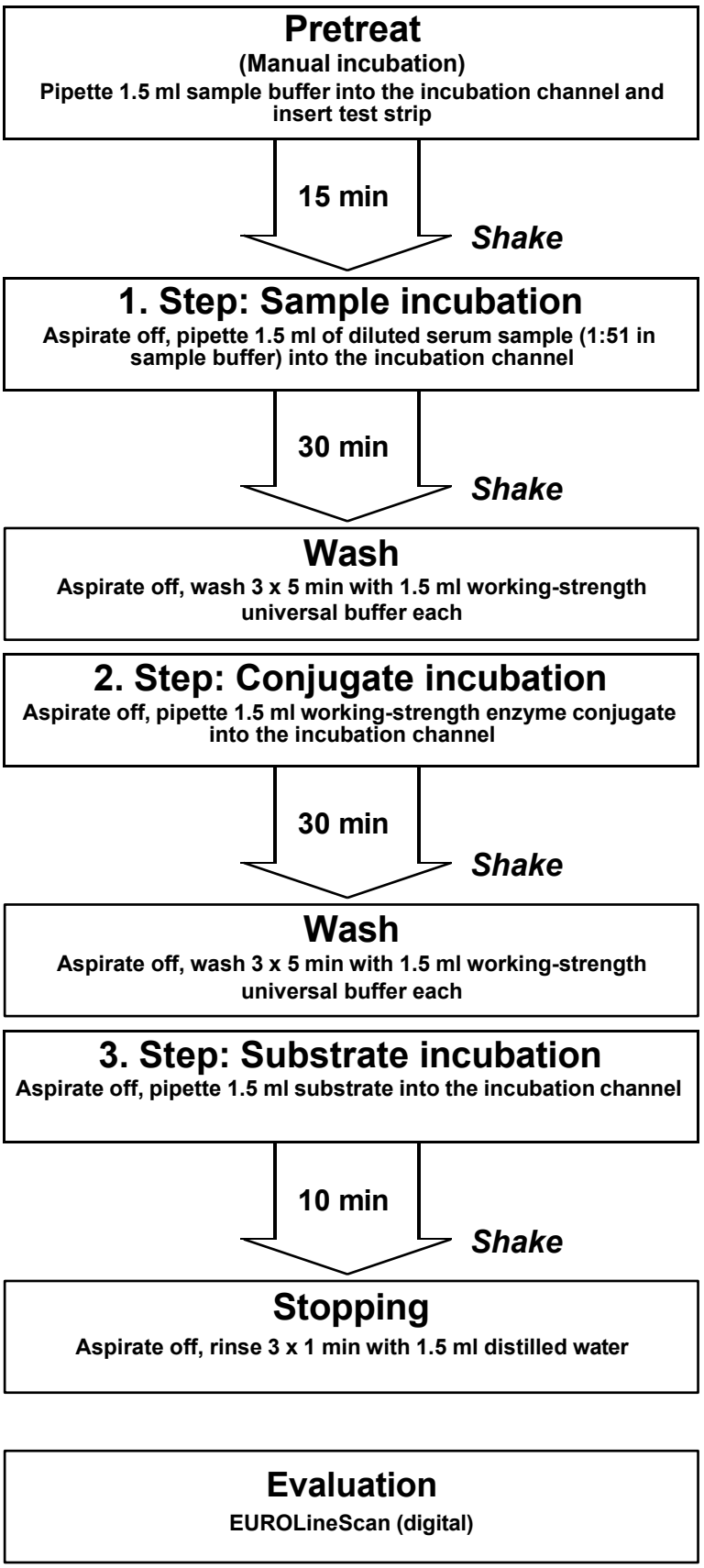
For automated incubation with the **EUROBlotMaster** select the program **Euro20**.

For automated incubation with the **EUROBlotOne** select the program **Euro20**.

For automated incubation of Immunoblot-PreQ with the **EUROBlotOne** please refer to the EUROBlotOne user manual (YG_0153_A_UK_CXX).

## EUROLINE Anti-SARS-CoV-2 Profile (IgG)

### Incubation protocol

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## Test evaluation

**Handling:** For the evaluation of incubated test strips we generally recommend using the **EUROLineScan** software. After stopping the reaction using deionised or distilled water, place the incubated test strips onto the adhesive foil of the green work protocol using a pair of tweezers. The position of the test strips can be corrected while they are wet. As soon as all test strips have been placed onto the protocol, they should be pressed hard using filter paper and left to air-dry. After they have dried, the test strips will be stuck to the adhesive foil. The dry test strips are then scanned using a flatbed scanner (EUROIMMUN) and evaluated with **EUROLineScan**. Alternatively, imaging and evaluation are possible directly from the incubation trays (EUROBlotCamera and EUROBlotOne). For general information about the EUROLineScan program please refer to the EUROLineScan user manual (EUROIMMUN document no. YG_0006_A_UK_CXX). The code for entering the **test** into EUROLineScan is **SARS2_Profile_IgG**. For evaluation of the incubated test strips, the current version of the EUROLineScan software provided by EUROIMMUN is recommended.

If a visual evaluation must be performed, place the incubated test strips onto the respective work protocol for visual evaluation. This protocol is available at EUROIMMUN under the order no. ZD 2606-0101-1 G. The test strips must be completely dry for evaluation. If insufficiently dried test strips are evaluated, an increased background staining of the membrane may lead to an incorrect test result.

The Immunoblot-PreQ (EUROIMMUN order no. DN 2606-5001-1 G) is evaluated directly in the channels of the EUROTray using a EUROIMMUN camera system together with the EUROLineScan software. The test strips must be completely dry for evaluation. If insufficiently dried test strips are evaluated, an increased background staining of the membrane may lead to an incorrect test result.

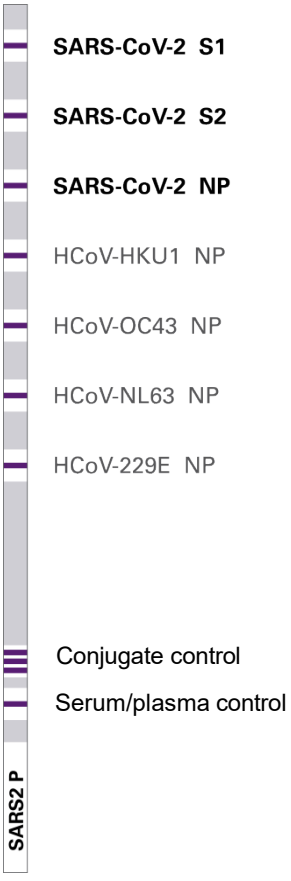
**Note:** A correctly performed incubation is indicated by a positive reaction of the control band and a positive reaction of the IgG band on the conjugate control chip.

**Antigens and their arrangement on the strips:**

| Name | Source |
|---|---|
| **SARS-CoV-2 S1** | Recombinant SARS-CoV-2 spike protein domain 1 |
| **SARS-CoV-2 S2** | Recombinant SARS-CoV-2 spike protein domain 2 |
| **SARS-CoV-2 NP** | Recombinant SARS-CoV-2 nucleocapsid protein |
| HCoV-HKU1 NP | Recombinant HCoV-HKU1 nucleocapsid protein |
| HCoV-OC43 NP | Recombinant HCoV-OC43 nucleocapsid protein |
| HCoV-NL63 NP | Recombinant HCoV-NL63 nucleocapsid protein |
| HCoV-229E NP | Recombinant HCoV-229E nucleocapsid protein |

**Conjugate control:**
Control indicating a correctly used conjugate.

**Serum/plasma control:** Control indicating a correctly performed incubation.



EUROIMMUN recommends interpreting results based on the signal intensity:

| **Signal** | **Signal intensity EUROLineScan Flatbed scanner** | **Result** | |
|---|---|---|---|
| No signal | 0 – 11 | o | Negative |
| Very weak band | 12 –18 | (+) | Borderline |
| Medium to strong band | >18 | + | Positive |

The table above contains **values** for the evaluation using a flatbed scanner. The values for other instruments supported by EUROLineScan can be found in the EUROLineScan program. To access them, mark the corresponding assay in the test list (main menu: “Help” → “Test”) and click on details and select **the corresponding instrument** in **“image source”**.

**Antibodies of IgG class against SARS-CoV-2**

Result interpretation:

| | |
|---|---|
| **Negative** | - None of the antigen bands for the specific antigens SARS-CoV-2 S1, S2 and NP shows a positive intensity value.<br>- One or more antigen bands for the specific antigens SARS-CoV-2 S1, S2 and NP show a borderline intensity value.<br>- Only one antigen band for the specific antigens SARS-CoV-2 S1, S2 and NP shows a positive intensity value.<br>- The antigen band for SARS-CoV-2 S2 shows a positive intensity value and at least one band for the specific antigens SARS-CoV-2 S1 and/or SARS-CoV-2 NP shows a borderline intensity value |
| **Borderline** | One antigen band for SARS-CoV-2 S1 or SARS-CoV-2 NP shows a positive intensity value and at least one further antigen band for SARS-CoV-2 S1, SARS-CoV-2 S2 or SARS-CoV-2 NP shows a borderline intensity value |
| **Positive** | At least two antigen bands for the specific antigens SARS-CoV-2 S1, SARS-CoV-2 S2 or SARS-CoV-2 NP show a positive intensity value. |

The determination of antibodies of class IgG against further HCoV antigens is for information purposes only. Evaluation (positive, borderline, negative result) of the bands HCoV-HKU1 NP, HCoV-OC43 NP, HCoV-NL63 NP and HCoV-229E NP is possible based on the signal intensity (see table above).

## Analytical performance

***Measurement range:*** The EUROLINE is a qualitative method. No measurement range is provided.

***Prevalence:*** The prevalence was determined by investigating 369 samples from blood donors, children and persons between 70 and 91 years taken before the occurrence of SARS-CoV-2 (sample collection before 2020). The prevalence of anti-SARS-CoV-2 IgG antibodies amounted to 0.3%.

| Panel (sample collection before 2020) | n | EUROLINE Anti-SARS-CoV-2 Profile (IgG): anti-SARS-CoV-2 antibody result (IgG) | EUROLINE Anti-SARS-CoV-2 Profile (IgG): anti-HCoV antibody result* (IgG) |
|---|---|---|---|
| | | Prevalence | Prevalence |
| Blood donors | 220 | 0.0% | 84.1% |
| Children (0-10 years) | 100 | 0.0% | 56.0% |
| Persons aged 70 to 91 years | 49 | 2.0% | 71.4% |
| **Total** | **369** | **0.3%** | **74.8%** |

Furthermore, 93 patient samples precharacterised as positive by SARS-CoV-2 RT-PCR were investigated for antibodies against the other HCoV antigens. The prevalence of IgG antibodies amounted to 82.8%. This result is comparable with the prevalence of 84.1% obtained in healthy blood donors (sample collection before 2020).

| Panel | n | EUROLINE Anti-SARS-CoV-2 Profile (IgG): anti-HCoV antibody result* (IgG) |
|---|---|---|
| | | Prevalence |
| Patients with confirmed SARS-CoV-2 infection (PCR) | 93 | **82.8%** |

* For determination of the prevalence, the result obtained for antibodies against the other HCoV antigens was evaluated as positive if at least one of the four HCoV bands (HCoV-HKU1 NP, HCoV-OC43 NP, HCoV-NL63 NP or HCoV-229E NP) was evaluated as positive.

The antibodies following vaccination with vaccines based on the spike protein were determined by analysing samples from donors vaccinated with the vaccines by BioNTech/Pfizer (n=14), Moderna (n=1) and AstraZeneca (n=8). Donors for whom antibodies against SARS-CoV-2 were detected prior to the first vaccination or for whom antibodies against the SARS-CoV-2 NP antigen indicated an infection between the two doses were excluded. Two to three weeks after their second vaccination dose all 23 donors received a positive result in the EUROLINE Anti-SARS-CoV-2 Profile (IgG).

| n = 23 vaccinated donors | | Measurement time | |
|---|---|---|---|
| | | **First vaccination (-1 to +6 days)** | **+13 to +22 days after second vaccination** |
| **Result EUROLINE Anti-SARS-CoV-2 Profile (IgG)** | positive | 0 | 23 |
| | borderline | 0 | 0 |
| | negative | 23 | 0 |

***Cross-reactions (analytical specificity):*** Due to the use of a modified nucleocapsid protein, in which significant homologous regions were eliminated and the diagnostically relevant epitopes combined, and owing to low homologies of the S1 protein in the coronavirus family, cross reactions with most of the human pathogenic members of the virus family are unlikely. However, cross reactions between SARS-CoV(-1) and SARS-CoV-2 are likely since these two viruses are closely related.

The cross reactivity of the SARS-CoV-2 antigens was evaluated by analysing 219 patient samples positive for antibodies against other human pathogenic coronaviruses or other pathogens. The prevalence of IgG antibodies against SARS-CoV-2 in the cross-reaction panel amounted to 0.0%.

| Panel | n | EUROLINE Anti-SARS-CoV-2 Profile (IgG): anti-SARS-CoV-2 antibody result (IgG) |
|---|---|---|
| | | Prevalence |
| Influenza/parainfluenza | 21 | 0.0% |
| Acute EBV infections | 39 | 0.0% |
| *Chlamydia pneumoniae* | 79 | 0.0% |
| HCoV | 60 | 0.0% |
| Dengue-Virus | 20 | 0.0 % |
| **Total** | **219** | **0.0%** |

***Method comparison***

**IgG antibodies against SARS-CoV-2:**

The correlation was determined by investigating 103 characterised patient samples using the EUROLINE Anti-SARS-CoV-2 Profile (IgG) and two CE-marked reference tests based on the SARS-CoV-2 antigens NP and S1. Borderline results were not included in the calculation.

| n = 103 | | CE-marked reference tests: Anti-SARS-CoV-2 NP (IgG) and Anti-SARS-CoV-2 S1 (IgG) | | |
|---|---|---|---|---|
| | | positive | borderline | negative |
| **EUROLINE Anti-SARS-CoV-2 Profile (IgG): anti-SARS-CoV-2 antibody result (IgG)** | positive | 85 | 2 | 0 |
| | borderline | 2 | 0 | 0 |
| | negative | 0 | 1 | 13 |

| | |
|---|---|
| Positive agreement | **100.0%** |
| Negative agreement | **100.0%** |
| Confidence | **100.0%** |

**For IgG antibodies against further human coronaviruses**

The correlation was determined by investigating 101 samples from healthy blood donors (sample collection before January 2020) using the EUROLINE Anti-SARS-CoV-2 Profile (IgG) and a CE-marked serological comparative test. Borderline results were not included in the calculation.

| n = 101 | | Serological comparative test: anti-HKU1 antibody result (IgG) | | |
|---|---|---|---|---|
| | | positive | borderline | negative |
| **EUROLINE Anti-SARS-CoV-2 Profile (IgG): anti-HKU1 antibody result (IgG)** | positive | 24 | 1 | 0 |
| | borderline | 8 | 9 | 1 |
| | negative | 3 | 34 | 21 |

| | |
|---|---|
| Positive agreement | **88.9%** |
| Negative agreement | **100.0%** |
| Confidence | **93.8%** |

| n = 101 | | Serological comparative test: anti-OC43 antibody result (IgG) | | |
|---|---|---|---|---|
| | | positive | borderline | negative |
| **EUROLINE Anti-SARS-CoV-2 Profile (IgG): anti-OC43 antibody result (IgG)** | positive | 31 | 13 | 4 |
| | borderline | 0 | 6 | 8 |
| | negative | 3 | 20 | 16 |

| | |
|---|---|
| Positive agreement | **91.2%** |
| Negative agreement | **80.0%** |
| Confidence | **87.0%** |

| n = 101 | | Serological comparative test: anti-NL63 antibody result (IgG) | | |
|---|---|---|---|---|
| | | positive | borderline | negative |
| **EUROLINE Anti-SARS-CoV-2 Profile (IgG): anti-NL63 antibody result (IgG)** | positive | 29 | 15 | 1 |
| | borderline | 3 | 17 | 4 |
| | negative | 4 | 15 | 13 |

| | |
|---|---|
| Positive agreement | **87.9%** |
| Negative agreement | **92.9%** |
| Confidence | **89.4%** |

| n = 101 | | Serological comparative test: anti-229E antibody result (IgG) | | |
|---|---|---|---|---|
| | | positive | borderline | negative |
| **EUROLINE Anti-SARS-CoV-2 Profile (IgG): anti-229E antibody result (IgG)** | positive | 29 | 21 | 0 |
| | borderline | 0 | 18 | 2 |
| | negative | 0 | 11 | 20 |

| | |
|---|---|
| Positive agreement | **100.0%** |
| Negative agreement | **100.0%** |
| Confidence | **100.0%** |

***Interference:*** Haemolytic, lipaemic and icteric sera up to concentrations of 5 mg/ml haemoglobin, 20 mg/ml triglycerides and 0.4 mg/ml bilirubin showed no effect on the analytical results of the present EUROLINE.

***Inter- and intra-assay variation:*** The inter-assay and intra-assay variations were determined by multiple analyses of characteristic samples performed on several days. In every case, the intensity of the bands was within the specified range. This EUROLINE displays excellent inter- and intra-assay reproducibility.

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## Clinical performance

***Diagnostic sensitivity and specificity:*** The sensitivity (prevalence) was determined by investigating 78 samples from 24 European patients using the EUROLINE Anti-SARS-CoV-2 Profile (IgG). These patients had been confirmed to be infected with SARS-CoV-2 by RT-PCR based on a sample taken at the early phase of infection. The serological analysis was performed with samples taken during the further course of the infection. The prevalence in samples collected after day 14 (time point after symptom onset or positive direct detection) and analysed using the EUROLINE Anti-SARS-CoV-2 Profile (IgG) amounted to 96%.

| **n = 78** | | **Days after symptom onset or PCR** | |
|---|---|---|---|
| | | (early) 0 – 14 days | (late) >14 days |
| **EUROLINE Anti-SARS-CoV-2 Profile (IgG): anti-SARS-CoV-2 (IgG) result** | Positive | 0 | 72 |
| | Borderline | 0 | 1 |
| | Negative | 2 | 3 |
| | Prevalence | 0.0% | 96.0% |

The diagnostic sensitivity and specificity of the EUROLINE Anti-SARS-CoV-2 Profile (IgG) were determined based on 25 samples from American patients (COVID-19 Validation Panel with 15 positive and 10 negative samples) precharacterised by SARS-CoV-2 RT-PCR. Both amounted to 100%.

| **n=25** | | **COVID-19 Validation Panel** | |
|---|---|---|---|
| | | PCR positive | PCR negative |
| **EUROLINE Anti-SARS-CoV-2 Profile (IgG): anti-SARS-CoV-2 antibody result (IgG)** | positive | 15 | 0 |
| | borderline | 0 | 0 |
| | negative | 0 | 10 |

| | |
|---|---|
| Sensitivity | **100.0%** |
| Specificity | **100.0%** |
| Confidence | **100.0%** |

## Limitations of the procedure

- The results should always be interpreted together with those of further laboratory diagnostic procedures and based on the clinical picture.
- The specifications in the instructions for use, e.g. pipetting volumes, incubation times, temperatures and preparation steps must be observed to avoid incorrect results.
- Correct sample collection and storage are crucial for the reliability of the results.
- Partial or complete adaptation of the test system for use with automated sample processors or other liquid handling devices may lead to differences between the results obtained with the automated and manual procedure. It is the responsibility of the user to validate the automated instruments used for the analysis to ensure that they yield test results within the permissible range.
- A negative serological result does not exclude an infection. Particularly in the early phase of an infection, antibodies may not yet be present or are only present in such small quantities that they are not detectable.
- The test system is validated for the determination of specific antibodies against SARS-CoV-2 S1, SARS-CoV-2 S2 and SARS-CoV-2 NP in human serum or plasma only.

## Literature


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## Liability

The test kit, including original accessories, must only be used in accordance with the intended use. EUROIMMUN accepts no liability for any other use (e.g. non-compliance with the instructions for use and improper use) or for resulting damages.

## Technical support

In case of technical problems you can obtain assistance via the EUROIMMUN website (https://www.euroimmun.de/en/contact/).

## Additional information

Regulatory information for customers in the European Union: Please observe the obligation to report any serious incidents occurring in connection with this product to the competent authorities and to EUROIMMUN.

**研究用試薬**

## Meaning of the symbols

| Symbol | Meaning | Symbol | Meaning |
|---|---|---|---|
| STRIPS | Antigen-coated test strips |  | Protect from sunlight |
| POS CONTROL 50x | Positive control, 50x concentrate |  | Storage temperature |
| CONJUGATE 10x | Conjugate, 10x concentrate |  | Unopened usable until (YYYY-MM-DD) |
| CONJUGATE | Conjugate, ready for use | CE | CE-labelled |
| SAMPLE BUFFER | Sample buffer |  | Manufacturing date (YYYY-MM-DD) |
| BUFFER 10x | Universal buffer, 10x concentrate |  | Manufacturer |
| SUBSTRATE | Substrate |  | Observe instructions for use |
|  | Biological risks | REF | Order number |
| IVD | In vitro diagnostic medical device |  | Contents suffice for <n> analyses |
| LOT | Lot description | TRAY | Incubation trays |
|  | Not reusable | | |