

SARS-CoV-2 Rapid Antigen Test

REF	$\overline{\mathbb{V}}$	SYSTEM
9901-NCOV-01G	25	visual reading

Intended use The SARS-CoV-2 Rapid Antigen Test is a rapid chromatographic immunoassay for the qualitative detection of specific antigens of SARS-CoV-2 present in nasopharyngeal or combined nasopharyngeal/oropharyngeal samples. This test is intended to detect antigen from the SARS-CoV-2 virus in individuals suspected of COVID-19. This product is strictly intended for professional use in laboratory and Point of Care environments.

Summary Coronaviruses can cause a variety of acute and chronic diseases. Common signs of a person Coronaviruses can cause a vanety of acute and chronic diseases. Common signs of a person infected with a coronavirus include respiratory symptoms, fever, cough, shortness of breath, and dyspnea. In more severe cases, infection can cause pneumonia, severe acute respiratory syndrome, kidney failure, and even death. The 2019 new coronavirus, or SARS-CoV-2, was discovered due to Wuhan virial pneumonia cases in 2019 and a pandemic was declared by the World Health Organization on March 11, 2020¹. WHO confirmed that COVID-19 can cause colds and more serious diseases such as severe acute respiratory syndrome (SARS).

Test principle The SARS-CoV-2 Rapid Antigen Test has two pre-coated lines: A "C" Control line and a "T" Test line on the surface of the nitrocellulose membrane. Both the control line and test line in the result tine on the surface of the nitrocellulose membrane. Both the control line and test line in the result window are not visible before applying any samples. Mouse monoclonal anti-SARS-CoV-2 antibody is coated on the test line region and mouse monoclonal anti-Chicken IgY antibody is coated on the control line region. Mouse monoclonal anti-SARS-CoV-2 antibody conjugated with color particles are used as detectors for the SARS-CoV-2 antibody wice. During the test, the SARS-CoV-2 antibide in the sample interacts with monoclonal anti-SARS-CoV-2 antibody antibide the sample interacts with monoclonal anti-SARS-CoV-2 antibody and the sample interacts with monoclonal anti-SARS-CoV-2 antibody and the sample interacts with monoclonal anti-SARS-CoV-2 antibody and the sample interacts with monoclonal anti-SARS-CoV-2 antibody antibody sample interacts with monoclonal anti-SARS-CoV-2 antibody and the sample interacts with monoclonal anti-SARS-CoV-2 antibody antibody sample interacts with monoclonal anti-SARS-CoV-2 antibody and the sample interacts with monoclonal anti-SARS-CoV-2 antibody antibody sample interacts with monoclonal anti-SARS-CoV-2 antibody antibody sample antibody sample and the sample antibody antibody sample and the sample antibody antibody sample antibody sample and antibody sample antibody antibody sample antibody sample antibody conjugated with color particles making an antigen-antibody color particle complex. This complex migrates on the membrane via capillary action to the test line, where it is captured by the mouse monoclonal anti-SARS-CoV-2 antibody. A colored test line becomes visible in the result window

If SARS-CoV-2 antigens are present in the sample. The intensity of the colored test line varies depending upon the amount of SARS-CoV-2 antigen present in the sample. Note: Even if the test line is very faint or not uniform the test result should be interpreted as a positive result. If SARS-CoV-2 antigens are not present in the sample, no color appears in the est line. The control line is used for procedural control, and always appears if the test result is valid. If no control line is visible the test result should be considered as invalid.

Reagents

- mAb anti-COVID-19 antibody
- mAb anti-Chicken IgY
- mAb anti-COVID-19 antibody-gold conjugate Purified chicken IgY-gold conjugat

Precautions and warnings This kit contains components classified as follows in accordance with the Regulation (EC) No. 1272/2008: Warning:

- H317 May cause an allergic skin reaction.
- H319 Causes serious eve irritation
- H412 Harmful to aquatic life with long lasting effects

Prevention

- P261 Avoid breathing dust/fume/gas/mist/vapours/spray. P273 Avoid release to the environment.
- P280 Wear protective gloves/eye protection/face protection Response
- P333 + P313 If skin irritation or rash occurs: Get medical advice/attention.
- P337 + P313 If eve irritation persists: Get medical advice/attention
- P362 + P364 Take off contaminated clothing and wash it before reuse.
- For customers in the European Economic Area: Contains SVHC: octyl/nonylphenol ethoxylates. For use as part of an IVD method and under controlled conditions only - acc. to Art. 56.3 and 3.23 REACH Regulation

Do not re-use the test kit.

- Do not use the test kit if the pouch is damaged or the seal is broken Do not use the buffer of different lot
- Do not smoke, drink or eat while handling sample.
- · Wear personal protective equipment, such as gloves and lab coats when handling kit reagents. Wash hands thoroughly after the tests are done.
- · Clean up spills thoroughly using an appropriate disinfectant
- Handle all samples as if they contain infectious agents.
- Observe established precautions against microbiological hazards throughout testing
- procedures Dispose of all samples and materials used to perform the test as biohazard waste. Laboratory chemical and biohazard wastes must be handled and discarded in accordance with all local,
- state, and national regulations. Desiccant in foil pouch is to absorb moisture and keep humidity from affecting products. If the
- moisture indicating desiccant beads change from yellow to green, the test device in the pouch should be discarded. Product safety labeling follows EU GHS guidance.
- Contact phone: all countries: +49-621-759

- For in vitro diagnostic use. Exercise the normal precautions required for handling all laboratory reagents. Disposal of all waste material should be in accordance with local guidelines. Safety data sheet available for professional user on request.

Storage and stability Store the kit at 2-30 °C / 36-86 °F out of direct sunlight. Kit materials are stable until the expiry date printed on the outer box. Do not freeze the ki

- Materials provided
- Test device (individually in a foil pouch with desiccant) Extraction buffer tube
- Nozzle cap
- Sterile swah
- Film (can be attached to the test device when performing outdoor testing)
- Instructions for use

Quick Reference Guide

- Materials required (but not provided)
- Timer
- Micropipette (for preparing VTM sample) Personal protective equipment per local recommendations or requirements
- Biohazard container

Test preparation and sample collection Carefully read the instructions for using the SARS-CoV-2 Rapid Antigen Test. Please also see the enclosed Quick Reference Guide (QRG, with illustrations) before performing a test.

Preparing for a test Prior to starting the procedure, test devices and reagents must be equilibrated to operating temperature (15-30 °C / 59-86 °F).

1. Check the expiry date on the back of the foil pouch. Do not use the test, if the expiry date ha 2. Open the foil pouch and remove the test device and the desiccant package. Use the test

immediately after opening the pouch.

3. Ensure that the test device is undamaged and that the desiccant status indicator shows valid (yellow).

patients for whom days post symptom onset was known, and was 0-5 days, the sensitivity was 91.1 % (95 % CI: 85.7 % - 94.9 %).

Switzerland

191 (36.1 %)

338 (63.9 %

(Cl, 83.7 % - 93.1 %),

(Cl, 92.5 % - 99.2 %),

(CI, 91.1 % - 98.2 %),

94.3 % (Cl, 89.7 % - 97.2 %),

(Cl, 86.8 % - 95.3 %),

99.7 % (Cl, 98.4 % - 100 %),

More clinical evaluations under different settings conducted by independent investigators can be found under www.diagnostics.roche.com, SARS-CoV-2 Rapid Antigen Test. Test performance was better in samples with lower Ct values (indicating a higher viral load), which are more likely to be correlated with virus culture positivity than samples with higher Ct values.^{2,3,4}

Limit of detection (LoU): The SARS-CoV-2 positive specimen was prepared by spiking inactivated SARS-CoV-2 (2019-nCOV) NCCP 43326/2020/Korea strain to SARS-CoV-2 negative nasopharyngeal swab confirmed with PCR. LoD is determined as 3.12 X 10⁻² TCID₅₀/mL for direct Nasopharyngeal swab, 5 x 10⁻² TCID₅₀/mL for Nasopharyngeal swab stored in VTM⁰ by testing serially diluted

2019-nCoV Strain Tested: NCCP 43326/2020 / Korea

Stock 2019-nCoV Titer: 1 X 1062 TCID m/mL

800

103.2

NA

Lowest concentration with uniform positivity per parameter: 3.12 X 10^{2.2} TCID₅₀/mL

Limit of Detection (LoD) per virus strain: 3.12 X 10^{2.2} TCID₅₀/mL

ere was no cross-reaction and interference with the potential cross-reacting microorganis ed below except SARS-CoV.

1600

6.25 X 10^{2.2}

100% 100% 100% 100% 100% 100% 0% 0% 0% 0% (5/5)

100%

(20/2-0)

3200

3.12 1.56

10^{2.2}

100% 0% (20/2- (0/2-0) 0)

Combined

249 (25.5 %)

727 (74.5 %)

(CI, 86.9 % - 94.4 %),

(Cl, 93.9 % - 99.3 %),

(Cl, 92.9 % - 98.6 %),

95.5 % (Cl, 91.8 % - 97.8 %)

93.3 % (Cl, 89.3 % - 96.1 %)

(Cl, 98.2 % - 99.7 %),

6400 128-00

Concentration of poten

tially cross reacting

4 X 104 TCID₅₀/mL

1 X 104.5 TCID₅₀/mL

1 X 105 TCID₅₀/mL

1 X 104 TCID₅₀/mL

3 X 105 TCID₅₀/mL

2.5 X 104 TCID₅₀/mL

3 X 105 TCID₅₀/mL

3 X 105 TCID₅₀/mL

3 X 105 TCID₅₀/mL

1 X 105 TCID₅₀/mL

1 X 105 TCID₅₀/mL

substance

3.5 µg/ml

X 10^{1.2} X 10^{2.2}

NA NA

00

976

N/A

Summary of sample characteristics and performances

Thailand

combined NP/O

58 (13.0 %)

389 (87.0 %)

(Cl, 90.8 % - 100 %),

(CI, 88.8 % - 100 %),

(CI, 91.2 % - 100 %),

(CI, 92.3 % - 100 %),

(Cl. 90.3 % - 100 %).

(Cl, 97.0 % - 99.6 %),

b) Data from the two studies combined and analyzed

100 200 400

100%

NA

2. Cross-reactivity & microbial interference:

NA NA

Urban

229E

OC43

NL63

Florida/USA-2 Saud

Arabia_2014

H1N1 Denve

H1N1 WS/33

H1N1 Pdm-09

H1N1 New Caledonia

hMPV 3 Type B1 / Peru2-2002

hMPV 16 Type A1 / IA10-2003

H1N1 New Jersey

Nevada/03/2011

B/Lee/40

Type A

Type B

B/Taiwan/2/62

Sample type

PCR positive,

PCR negative,

agreement, % (95 % CI), I

agreement, % (95% CI), N

agreement, % (95% CI). N

agreement, % (95% CI), N

agreement, % (95% CI), N

N (%)

N (%)

Positive

Ct ≤ 24,

Ct ≤ 27, Positive

Ct ≤ 30,

Ct ≤ 33,

Positive

Negative

agreement

6 (95% CI). N

Analytical performance

the mock not

Dilution

Concer

ration

Call rate (5)^{d)}

Call rate

d) of 5 replicates

substance

Influenza A

Influenza B

Respiratory syncytial virus

Human Metapneumovirus (hMPV)

SARS Coronavirus

MERS Coronavirus

Juman Coronavirus

1. Limit of detection (LoD):

100%

(5/5)

NA

c) in dilution tested TCID₅₀/mL

e) of 20 replicates near cut-off

Potential cross reacting

ositive

Potential cross reacting

Parainfluenza virus

Rhinovirus

Enterovirus

Mycobacterium tuberculos

Human immunodeficiency

Haemophilus influenzae

Mycoplasma pneumoniae

Streptococcus pneumonia

Streptococcus pyrogens

Legionella pneumophila

Candida albicans

Bordetella pertussis

Moraxella catarrhalis

Pseudomonas aeruginosa

Staphylococcus epidermidis

Streptococcus salivarius

Chlamvdia pneumoniae

Pooled human nasal wash

a) Exogenous factor:

Exogenous factor

Relevant medicines

Anti-inflammatory

medication

Antibiotic

virus lysate

Strain

Type 1

Type 2

Type 3

Type 4A

Type B42

Type 68

Frdman

HN878

CDC1551

H37Bv

Type 1

Type 3

Type 5

Type 7

Type 8

Type 11

Type 18

Type 23

Type 55

NCTC 456

Mutant 22

M129-B7

[NCTC 10119]

178 [Poland 23F-16]

Slovakia 14-10 [2905]

Typing strain T1 [NCIB 11841, SF 1301

262 [CIP 104340]

Bloomington-2

Los Angeles

NCCP 1367

R. Hugh 813

N/A

3. Exogenous / endogenous interference substances studies:

There was no interference for potential interfering substances listed below

FDA strain PCI 120

TWAR strain TW-183

Note: Human coronavirus HKU1 and Pneumocystis jirovecii (PJP) have not been tested. There

can be cross-reaction with Human coronavirus HKU1 and Pneumocystis iirovecii (PJP), even to be closer relation with runnan contravings in or and in running site protecting in , even in the nucleocapsid protein sequence of HKU1 and PJP with the nucleocapsid protein sequence of SARS-CoV-2 was 35.22 % and 16.2 % which is considered as low homology.

Interfering substances

Zanamivir (Influenza)

Oseltamivir (Influenza)

Artemether-lumefantrine

Quinine (Malaria

Ribavirin (HCV

Daclatasvir (HCV

Acetylsalicylic acid

Erythromycin (antibiotic)

Ciprofloxacin (antibiotic

Acetaminopher

lbuprofen

Mupirocir

Tobramycin

Lamivudine (Retrovira medication)

Doxycycline hyclate (Malaria)

S21B [IFO 13956]

82A3105

H strain of Eaton Agen

4752-98 [Maryland (D1)6B-17] 5 X 10⁴ cells/mL

BaL

(09/2014 isolate 4)

Concentration of potentially cross reacting

1 X 105 TCID 50/mL

1 X 105 TCID₅₀/mL

1 X 105 TCID₅₀/mL

1 X 105 TCID₅₀/mL

1 X 105 TCID₅₀/mL

1 X 104 TCIDro/ml

1 X 104 TCID₅₀/mL

1 X 104 TCID₅₀/mL

5 X 10⁴ cells/mL

3 X 105 TCID₅₀/mL

1.5 X 106 TCID₅₀/mL

4 X 105 TCID₅₀/mL

1.5 X 106 TCID₅₀/mL

4 X 105 TCID₅₀/mL

5 X 10⁴ cells/mL

1 X 105 cells/mL

Test concentration

5 mg/mL

10 mg/ml

50 uM

70 uM

50 uN

mg/mL

1 mg/mL

1 mg/mL

200 µM

37 mM

2.5 mM

0 ma/ml

5 µg/mL

81.6 uN

31 µM

10 µg/mL

- 4. Perform a QC as required according to the Instructions for Use of the QC material. Collecting a sample (Nasopharyngeal swab)
- 1 To collect a pasopharyngeal swab sample insert a sterile swab into the postril of the patient reaching the surface of the posterior nasopharynx.
- 2. Using gentle rotation, push the swab until resistance is met at the level of the turbinate. 3. Rotate the swab 3-4 times against the nasopharyngeal surface
- Bemove the swab from the nostril carefully.
- 5. Insert the swab into the provided extraction buffer tube. While squeezing the buffer tube, stir
- the swab more than 5 times.
- 6. Remove the swab while squeezing the sides of the tube to extract the liquid from the swab 7. Press the nozzle cap tightly onto the tube. The sample should be tested as soon as possible
- after collection. . Samples may be stored at room temperature for up to 1 hour or at 2-8 °C/ 36-46 °F for up to
- 4 hours prior to testing. 9. Do not use the sample if it has been frozen and thawed more than once or if the sample in
- VTM has been frozen and thawed more than 3 times.

Note: When collecting a combined NP/OP sample, follow steps 1-4 for collecting a NP sample Note: which collecting a combined version scale, follow steps 1-4 bit collecting a version of the poster with the first swab. Use a second swab to collect a OP sample. Insert the swab into the poster pharynx and tonsillar areas. Rub the swab over both tonsillar pillars and posterior oropharynx and avoid touching the tongue, teeth, and gums. Insert both swabs into the extraction buffer tube and follow the steps 5-7 as described above.

ing a sample from viral transport media

Prepare a sample from a viral transport medium as shown in the QRG illustration.					
Viral transport medium (VTM)	Recommended storage condition				
	2 °C to 8 °C	25 °C	– 70 °C		
Recommended VTMs ^{a)}	12 hours	8 hours	3 months		

a) Only use the following VTMs: Copan UTM[™] Universal Transport Media 3 mL (REF 305C). BD™ Universal Viral Transport 3 mL (REF 220531), STANDARD™ Transport Medium 2 mL (REE 90-VTM-01)

① When using viral transport medium (VTM), it is important to ensure that the VTM containing Or micro using virial using virial using virial using out in the VI M (2014) will be sample is warmed to room temperature. Cold samples will not flow correctly and can lead to erroneous or invalid results. Several minutes will be required to bring a cold sample to room temperature.

Preparing a sample from supplemented HBSS

HBSS 1 X 100 mL (GIBCO, REF 14170112) supplemented with FBS 0.4 mL, 5% NaHCO3 1 mL. 1M HEPES 1 mL, Penicillin (40000 U/mL) 0.5 mL icin (4 mg/mL) 0.5 mL, Amphotericin B (1 mg/mL) 0.1 mL

When using supplemented HBSS, the following workflow should be applied: 1. Insert the swab into 2 mL of supplemented HBSS.

- 2. Add 5 to 10 glass beads and vortex
- Transfer 200 µL into the extraction buffer using a micropipette.

4. Press the nozzle cap tightly onto the tube. Continue with step 3 as described in QRG.

- Test procedure
- 1. Place the test device on a flat surface and apply 3 drops of extracted sample in a 90° angle to the specimen well of the test device.
- 2. Read the test result at 15-30 minutes / Do not read test results after 30 minutes. It may give false results

Reading and interpreting results:

· A colored line appears in the top section of the result window to show that the test is working properly. This line is the control line (C). Even if the control line is faint or not uniform, the test should be considered to be performed properly. If no control line is visible the test result should be considered as invalid In case of a positive result, a colored line appears in the lower section of the result window.

This line is the test line of the SARS-CoV-2 antigen (T). Even if the test line is very faint or not uniform the test result should be interpreted as a positive result.

QC A control kit including positive and negative quality control is available separately from Roche (SARS-CoV-2 Antigen Control, SD Biosensor).

Limitations

- The test procedure, precautions and interpretation of results for this test must be followed strictly when testing. The test should be used for the detection of SARS-CoV-2 antigen in human nasopharyngeal
- swab samples and combined nasopharyngeal/oropharyngeal samples. This is a qualitative test, therefore quantitative values of SARS-CoV-2 antigen concentration
- cannot be determined. The immune response cannot be assessed with this test and needs other testing methods
- The test result should not be used as a sole basis for treatment or patient management. decisions, and should be considered in the context of the patient's recent exposures, history and the presence of clinical signs and symptoms consistent with COVID-19.
- A negative result may occur if the concentration of antigen in a sample is below the detection limit of the test or if the sample was collected or transported improperly. Therefore a negative test result does not eliminate the possibility of SARS-CoV-2 infection, and should be confirmed by viral culture or a molecular assay or ELISA, if necessary for patient

Clinical evaluation Clinical performance of the SARS-CoV-2 Rapid Antigen Test was evaluated using 976 upper

Conical periodinatics of the SAR-SCVV2 hep/of Antigen First was evaluated using 3r0 upper respiratory samples in two prospective studies at two clinical centers, in Thailand and Switzerland. The patient cohors in both countries included patients suspected of COVID-19 according to the local testing criteria. Sites specific, FDA EUA-authorized RT-PCR tests (cobas® SARS-CoV-2 in Switzerland and Allplex[™] 2019-nCoV Assay in Thailand) were used as the comparator method in these studies. Particularly, the RT-PCR and antigen tests were performed from the same sample in the Thai study.

The solensitivity & specificity The following table correlates the performance of the SARS-CoV-2 Rapid Antigen Test in all RT-PCP-positive samples to the respective PCR comparator Ct values. The resulting overall relative sensitivity in both cohorts was 95.5 % (Ct value < 30; 95 % CI: 91.8 % - 97.8 %). The overall relative specificity was 99.2 % (95 % CI: 98.2 % - 99.7 %). In the Swiss cohord, for

- management.
- Positive test results do not rule out co-infections with other pathogen

Specific performance data

Test sensitivity & specificity

Positive test results do not differentiate between SARS-CoV-2 and SARS-CoV Negative test results are not intended to rule in or rule out other coronavirus infection.

Exogenous factor	Interfering substances	Test concentration
	Neo-Synephrine (Phenylephrine)	10 % (v/v)
Nasal sprays or drops	Afrin Nasal Spray (Oxymetazoline)	10 % (v/v)
	Saline Nasal Spray	10 % (v/v)
	Rhinocort (Nasal corticosteroids - Budesonide)	10 % (v/v)
Homeopathic allergy relief medicine	Homeopathic Zicam Allergy Relief Nasal Gel	5 % (v/v)
	Sodium Cromoglycate	20 mg/mL
	Olopatadine Hydrochloride	10 mg/mL
Oral anaesthetic	Anbesol (Benzocaine 20 %)	5 % (v/v)
Threat lazangea	Strepsils (flurbiprofen 8.75 mg)	5 % (w/v, 50 mg/mL)
Throat lozenges	Throat candy (mint)	5 % (w/v, 50 mg/mL)
Others	Mucin: bovine submaxillary gland, type I-S	100 µg/mL
	Biotin	100 µg/mL

b) Endogenous factor:

Endogenous factor	Interfering substances	Test value
Autoimmune disease		802 ng/mL
		375 ng/mL
	Human anti-mouse antibody	317 ng/mL
		69 ng/mL
		727.5 ng/mL
	Rheumatoid factor	3480 IU/mL
Serum protein	Whole blood (human), EDTA anticoagulated	10 % (w/w)
	Human serum albumin	60 mg/mL

 High-dose hook effect: SARS-CoV-2 cultured virus was spiked into specimen. SARS-CoV-2 cultured virus did not show nook-effect at 1 X 10^{6.2} TCID₅₀

f) For VTM's described in section a). Preparing a sample from viral transport media.

A point (period/stop) is always used in this Method Sheet as the decimal separator to mark the porder between the integral and the fractional parts of a decimal numeral. Separators fo thousands are not used

- World Health Organization (WHO), https://www.who.int/emergencies/diseases/novelcoronavirus-2019
- Lavezzo E, Franchin E, Ciavarella C et al. Suppression of a SARS-CoV-2 outbreak in the Italian municipality of Vo. Nature 2020584(7821):425-429. PMID: 32604404.
- Van Beek J, Zsofa I, Boelsums T et al. From more testing to smart testing: data-guided SARS-CoV-2 testing choices, https://doi.org/10.1101/2020.10.13.20211524.
- Jaafar R, Aherfi S, Wurtz N et al. Correlation between 3790 dPCR positives samples and positive cell cultures including 1941 SARS-CoV-2 isolates. Clin Infect Dis. 2020:1491 PMID: 32986798.

Symbols

he manufacturer uses the following symbols and signs in addition to those listed in the ISO 15223-1 stand



Global Trade Item Number Unique Device Identifie

UDI

SYSTEM

Systems on which reagents can be used

Additions, deletions or changes are indicated by a change bar in the margin

CE

Head office: C-4th&5th, 16, Deogyeong-daero 1556beon-gil, Yeongtong-gu, Suwon-si, Gyeonggi-do, 16690 REPUBLIC OF KOREA Manufacturing site: 74, Osongsaengmyeong 4-ro, Osong-eup, Heungdeok-gu, Cheongju-si, Chungcheongbuk-do, 28161 REPUBLIC OF KOREA www.sdbiosensor.com

Distribution by:

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www.roche.com Roche order number: 09327592

EC REP Authorized Representative

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