COVID-19 Antigen Rapid Test (Swab)
Package Insert

REF ICOV-502	English

COVID-19 Antigen Rapid Test is a rapid chromatographic immunoassay for the qualitative detection of SARS-CoV-2 Nucleocapsid Protein antigens in swab specimen. For professional in vitro diagnostic use only.

【INTENDED USE】

The COVID-19 Antigen Rapid Test (Swab) is a rapid chromatographic immunoassay for the qualitative detection of SARS-CoV-2 Nucleocapsid Protein antigens in swab specimens from individuals with suspected SARS-CoV-2 infection in conjunction with clinical presentation and the results of other laboratory tests.

Results are for the detection of SARS-CoV-2 Antigens. An antigen is generally detectable in upper respiratory specimens during the acute phase of infection. Positive results indicate the presence of viral antigens, but clinical correlation with patient history and other diagnostic information is necessary to determine infection status. Positive results do not rule out bacterial infection or co-infection with other viruses. The agent detected may not be the definite cause of disease.

Negative results do not preclude SARS-CoV-2 infection and should not be used as the sole basis for treatment or patient management decisions. Negative results should be treated as presumptive and confirmed with a molecular assay, if necessary for patient management. Negative results should be considered in the context of a patient's recent exposures, history and the presence of clinical signs and symptoms consistent with COVID-19.

【SUMMARY】

The novel coronaviruses belong to the β genus. COVID-19 is an acute respiratory infectious disease. People are generally susceptible. Currently, the patients infected by the novel coronavirus are the main source of infection; asymptomatic infected people can also be an infectious source. Based on the current epidemiological investigation, the incubation period is 1 to 14 days, mostly 3 to 7 days. The main manifestations include fever, fatigue and dry cough. Nasal congestion, runny nose, sore throat, myalgia and diarrhea are found in a few cases.

【PRINCIPLE】

The COVID-19 Antigen Rapid Test (Swab) is a qualitative membrane-based immunoassay for the detection of SARS-CoV-2 Antigens in human swab specimen. SARS-CoV-2 antibody is coated in the test line region. During testing, the specimen reacts with SARS-CoV-2 antibody-coated particles in the test. The mixture then migrates upward on the membrane by capillary action and reacts with the SARS-CoV-2 antibody in test line region. If the specimen contains SARS-CoV-2 Antigens, a colored line will appear in test line region as a result of this. If the specimen does not contain antigens to SARS-CoV-2, no colored line will appear in the test line region, indicating a negative result. To serve as a procedural control, a colored line will always appear in the control line region, indicating that the proper volume of specimen has been added and membrane wicking has occurred.

【REAGENTS】

The test contains anti-SARS-CoV-2 antibody as the capture reagent and anti-SARS-CoV-2 antibody as the detection reagent.

【PRECAUTIONS】

1. This package insert must be read completely before performing the test. Failure to follow directions in package insert may yield inaccurate test results.
2. For professional *in vitro* diagnostic use only. Do not use after expiration date.
3. Do not eat, drink or smoke in the area where the specimens or kits are handled.
4. Do not use test if pouch is damaged.
5. Handle all specimens as if they contain infectious agents. Observe established precautions against microbiological hazards throughout in the collection, handling, storage, and disposal of patient samples and used kit contents.
6. Wear protective clothing such as laboratory coats, disposable gloves and eye protection when specimens are assayed.
7. Wash hands thoroughly after handling.
8. Please ensure that an appropriate amount of samples are used for testing. Too much or too little sample size may lead to deviation of results.
9. Viral Transport Media (VTM) may affect the test result; extracted specimens for PCR tests cannot be used for the test.
10. Sterile Swabs for the collection of Nasopharyngeal specimen and Nasal specimen are different, Do not mix the using of the two types of sampling swabs.
11. The used test should be discarded according to local regulations.
12. Humidity and temperature can adversely affect results.

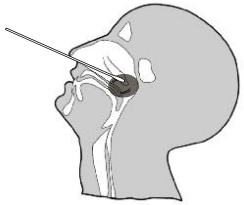
【STORAGE AND STABILITY】

Store as packaged in the sealed pouch at room temperature or refrigerated (2-30°C). The test is stable through the expiration date printed on the sealed pouch. The test must remain in the sealed pouch until use. **DO NOT FREEZE.** Do not use beyond the expiration date.

【SPECIMEN COLLECTION, TRANSPORT AND STORAGE】

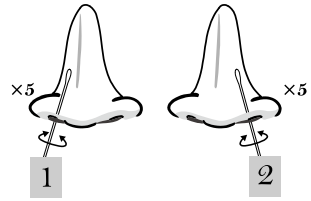
Nasopharyngeal Swab Specimen Collection

1. Insert a sterile swab into the nostril of the patient, reaching the surface of the posterior nasopharynx.
2. Swab over the surface of the posterior nasopharynx.
3. Withdraw the sterile swab from the nasal cavity.



Nasal Swab Specimen Collection

1. Insert a sterile swab less than one inch (about 2 cm) into a nostril (until resistance is met at the turbinates).
2. Rotate the swab 5-10 times against the nasal wall. Using the same swab repeat the collection procedure with the second nostril.
3. Withdraw the sterile swab, avoid excess volume and high-viscous nasal discharge.



Caution:

If the swab stick breaks during specimen collection, repeat specimen collection with a new swab.

Specimen transport and storage

Specimens should be tested as soon as possible after collection. If swabs are not been processed immediately, it is highly recommended the swab sample is placed into a dry, sterile, and tightly sealed plastic tube for storage. The swab specimen in dry and sterile condition is stable for up to 24 hours at 2-8°C.

【SPECIMEN PREPARATION】

Only the extraction buffer and tubes provided in the kit is to be used for swab specimen preparation.

Please refer to the Procedure card for detailed information of Specimen Extraction.

1. Place the swab specimen in the Extraction tube with Extraction Buffer. Rotate the swab for approximately 10 seconds while pressing the head against the inside of the tube to release the antigen in the swab.
2. Remove the swab while squeezing the swab head against the inside of the Extraction tube as you remove it to expel as much liquid as possible from the swab. Discard the swab in accordance with your biohazard waste disposal protocol.

***NOTE**: The storage of the specimen after extraction is stable for 2 hours at room temperature or 24 hours at 2-8°C.

【MATERIALS】

Material Provided

- Test cassettes
- Extraction Buffer
- Procedure card
- Sterile swabs
- Extraction tubes and tips (Optional)
- Package insert
- Workstation

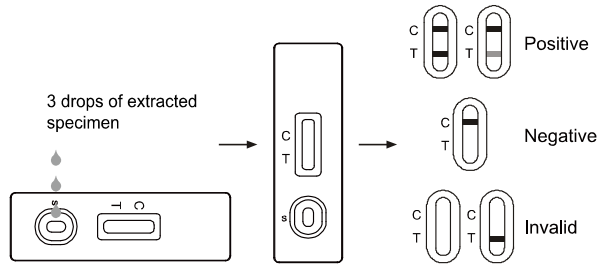
Materials required but not provided

- Timer

【DIRECTIONS FOR USE】

Allow the test, extracted specimen and/or controls to equilibrate to room temperature (15-30°C) prior to testing.

1. Remove the test cassette from the sealed foil pouch and use it within one hour. Best results will be obtained if the test is performed immediately after opening the foil pouch.
2. Invert the specimen extraction tube and add **3 drops of extracted specimen** (approx.75-100μL) to the specimen well(S) and then start the timer.
3. Wait for the colored line(s) to appear. Read the result at **15 minutes**. Do not interpret the result after 20 minutes.



【INTERPRETATION OF RESULTS】

(Please refer to the illustration above)

POSITIVE:* Two colored lines appear. One colored line should be in the control region (C) and another colored line should be in the Test region (T). Positive result in the Test region indicates detection of SARS-CoV-2 antigens in the sample.

***NOTE**: The intensity of the color in the test line region (T) will vary based on the amount of SARS-CoV-2 antigen present in the sample. So any shade of color in the test region (T) should be considered positive.

NEGATIVE: One colored line appears in the control region (C). No apparent colored line appears in the test line region (T).

INVALID: Control line fails to appear. Insufficient specimen volume or incorrect procedural techniques are the most likely reasons for control line failure. Review the procedure and repeat the test with a new test. If the problem persists, discontinue using the test kit immediately and contact your local distributor.

【QUALITY CONTROL】

Internal Quality Control

A procedural control is included in the test. A colored line appearing in the control region (C) is the internal procedural control. It confirms sufficient specimen volume and correct procedural technique. Control standards are not supplied with this kit; however, it is recommended that a positive control and a negative control be tested as a good laboratory practice to confirm the test procedure and to verify proper test performance.

External Quality Control

Positive/negative controls are not included in this kit. However, in compliance with Good Laboratory Practice (GLP), these controls are recommended.[1]

【LIMITATIONS】

1. The test Procedure and the Interpretation of test Result must be followed closely when testing for the presence of SARS-CoV-2 antigens in the human swab specimens from suspected individuals. For optimal test performance, proper sample collection is critical. Failure to follow the procedure may give inaccurate results.
2. The performance of the COVID-19 Antigen Rapid Test (Swab) was evaluated using the procedures provided in this product insert only. Modifications to these procedures may alter the performance of the test. Viral Transport Media (VTM) may affect the test result; extracted specimens for PCR tests cannot be used for the test.
3. The COVID-19 Antigen Rapid Test (Swab) is for *in vitro* diagnostic use only. This test should be used for detection of SARS-CoV-2 Antigens in human swab specimens as an aid in the diagnosis of patients with suspected SARS-CoV-2 infection in conjunction with clinical presentation and the results of other laboratory tests. Neither the quantitative value nor the rate of increase in the concentration of SARS-CoV-2 antigens can be determined by this qualitative test.
4. The COVID-19 Antigen Rapid Test (Swab) will only indicate the presence of SARS-CoV-2 Antigens in the specimen and should not be used as the sole criteria for the diagnosis of SARS-CoV-2 infections.
5. The results obtained with the test should be considered with other clinical findings from other laboratory tests and evaluations.
6. If the test result is negative or non-reactive and clinical symptoms persist. It is recommended to re-sample the patient a few days later and test again or test with a

molecular diagnostic device to rule out infection in these individuals.

7. The test will show negative results under the following conditions:
   a. The concentration of the novel coronavirus antigens in the sample is lower than the minimum detection limit of the test.
   b. The optimal sampling time (peak virus concentration) after infection has not been verified, so collecting samples at different times for the same patient may avoid false negatives.
   c. Incorrect specimen collection and storage.
8. Negative results do not rule out SARS-CoV-2 infection, particularly in those who have been in contact with the virus. Follow-up testing with a molecular diagnostic should be considered to rule out infection in these individuals.
9. Positive results of COVID-19 may be due to infection with non-SARS-CoV-2 coronavirus strains or other interference factors.

【PERFORMANCE CHARACTERISTICS】

Detection limitation

The COVID-19 Antigen Rapid Test (Swab) can detect out SARS-CoV-2 as low as 100$TCID_{50}$/mL.

Sensitivity, Specificity and Accuracy

The COVID-19 Antigen Rapid Test (Swab) has been evaluated with specimens obtained from the patients. RT-PCR is used as the reference method for the COVID-19 Antigen Rapid Test (Swab). Specimens were considered positive if RT-PCR indicated a positive result. Specimens were considered negative if RT-PCR indicated a negative result.

Nasopharyngeal Swab Specimen

COVID-19 Antigen Rapid Test		RT-PCR		Total
		Positive	Negative	
COVID-19 Antigen	Positive	80	2	82
	Negative	3	189	192
Total		83	191	274
Relative Sensitivity		96.4% (95%CI*: 89.8%~99.2%)		
Relative Specificity		99.0% (95%CI*: 96.3%~99.9%)		
Accuracy		98.2% (95%CI*: 95.8%~99.4%)		

Nasal Swab Specimen

COVID-19 Antigen Rapid Test		RT-PCR		Total
		Positive	Negative	
COVID-19 Antigen	Positive	274	311	585
	Negative	11	0	11
Total		285	311	596
Relative Sensitivity		96.1% (95%CI*: 93.2%~98.1%)		
Relative Specificity		＞99.9% (95%CI*: 98.8%~100%)		
Accuracy		98.2% (95%CI*: 96.7%~99.1%)		

*Confidence Intervals

Specificity Testing with Various Viral Strains

The COVID-19 Antigen Rapid Test was tested with the following viral strains. No discernible line at either of the test-line regions was observed at these concentrations:

Description	Test Level
Adenovirus type 3	3.16 x 10^4 $TCID_{50}$/mL
Adenovirus type 7	1.58 x 10^5 $TCID_{50}$/mL
Human coronavirus OC43	1 x 10^6 $TCID_{50}$/mL
Human coronavirus 229E	5 x 10^5 $TCID_{50}$/mL
Human coronavirus NL63	1 x 10^6 $TCID_{50}$/mL
Human coronavirus HKU1	1 x 10^6 $TCID_{50}$/mL
MERS COV Florida	1.17 x$10^4$$TCID_{50}$/mL
Influenza A H1N1	3.16 x 10^5 $TCID_{50}$/mL
Influenza A H3N2	1 x 10^5 $TCID_{50}$/mL
Influenza B	3.16 x 10^6 $TCID_{50}$/mL
Human Rhinovirus 2	2.81 x 10^4 $TCID_{50}$/mL
Human Rhinovirus 14	1.58 x 10^6 $TCID_{50}$/mL
Human Rhinovirus 16	8.89 x 10^6 $TCID_{50}$/mL
Measles	1.58 x 10^4 $TCID_{50}$/mL
Mumps	1.58 x 10^4 $TCID_{50}$/mL
Parainfluenza virus 2	1.58 x 10^7 $TCID_{50}$/mL
Parainfluenza virus 3	1.58 x 10^8 $TCID_{50}$/mL
Respiratory syncytial virus	8.89 x 10^4 $TCID_{50}$/mL

$TCID_{50}$ = Tissue Culture Infectious Dose is the dilution of virus that under the conditions of the assay can be expected to infect 50% of the culture vessels inoculated.

Precision

Intra-Assay＆Inter-Assay

Within-run and Between-run precision has been determined by using three specimens of COVID-19 standard control. Three different lots of COVID-19 Antigen Rapid Test (Swab) have been tested using negative specimen, SARS-CoV-2 Antigen weak and Strong positive specimens. Ten replicates of each level were tested each day for 3 consecutive days. The specimens were correctly identified>99% of the time.

Cross-reactivity

The following organisms were tested at 1.0x10^8 org/mL and all found to be negative when tested with the COVID-19 Antigen Rapid Test (Swab):

Arcanobacterium	*Pseudomonas aeruginosa*
Candida albicans	*Staphylococcus aureus subspaureus*
Corynebacterium	*Staphylococcus epidermidis*
Escherichia coli	*Streptococcus pneumoniae*
Moraxella catarrhalis	*Streptococcus pyogenes*
Neisseria lactamica	*Streptococcus salivarius*
Neisseria subflava	*Streptococcus sp group F*

Interfering Substances

The interfering substances below were spiked with negative, SARS-CoV-2 Antigen weak positive. No substances showed any interference with the COVID-19 Antigen Rapid Test (Swab).

Substance	Concentration
Whole Blood	20μL/mL
Mucin	50μg/mL
Budesonide Nasal Spray	200μL/mL
Dexamethasone	0.8mg/mL
Flunisolide	6.8ng/mL
Mupirocin	12mg/mL
Oxymetazoline	0.6mg/mL
Phenylephrine	12mg/mL
Rebetol	4.5μg/mL
Relenza	282ng/mL
Tamiflu	1.1μg/mL
Tobramycin	2.43mg/mL

【BIBLIOGRAPHY】

1. Westgard JO, Barry PL,Hunt MR, Groth T. A multi-rule Shewhart for quality control in clinical chemistry, Clinical Chemistry 1981;27:493-501

Index of Symbols

IVD	For *in vitro* diagnostic use only	Σ	Tests per kit	EC REP	Authorized Representative
2°C 30°C	Store between 2-30°C		Use by		Do not reuse
	Do not use if package is damaged	LOT	Lot Number	REF	Catalog #
	Manufacturer		Consult Instructions For Use		

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EC REP

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CE

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