

Instructions for use
Read the instructions for use completely before performing the test.
The instructions must be followed carefully

INTENDED USE

COVID-VIRO ALL IN TRIPLEX® is a rapid test, specially designed and secured for use in children or in adults, for the detection of the N protein of SARS-CoV-2, Influenza A, Influenza B and RSV in nasal secretions.

COVID-VIRO ALL IN TRIPLEX® is a rapid test that assists in the diagnosis of SARS-CoV-2, Influenza A, Influenza B and RSV infections.

COVID-VIRO ALL IN TRIPLEX® is a test for professional use only.

COVID-VIRO ALL IN TRIPLEX® detects SARS-CoV-2 and new variants in which the synthesis of nucleoprotein N is not affected (alpha, beta, gamma, delta and omicron variants).

INTRODUCTION

SARS-CoV-2 was identified in 2019, it belongs to the β -coronavirus family. It is the pathogen causing an emerging atypical pneumonia, coronavirus disease 2019 (Covid-19).

Several SARS-CoV-2 variants, called alpha, beta, gamma, delta and omicron have been identified by viral genome sequencing. Their RNAs have multiple mutations and deletions resulting in deletions or amino acid changes in the S (Spike) protein.

Currently, patients infected with SARS-CoV-2 are the main source of transmission: infected persons, who are asymptomatic, can also be a source of infection. Based on the current epidemiological survey, the incubation period can range from 1 to 14 days but is usually 3 to 7 days.

The main symptoms are fever or the feeling of fever and cough. Sudden loss of smell, without nasal obstruction, and total loss of taste are also symptoms that have been observed in patients. In people with more severe forms, breathing difficulties are present, which can lead to hospitalisation in intensive care and death.

Influenza is an acute, highly contagious viral infection of the respiratory tract. The agents responsible for the infection are immunologically divergent single-stranded RNA viruses, called influenza viruses. There are three types of influenza virus: A, B and C. Type A viruses are the most common and are associated with the most severe epidemics, while type B infection is generally milder. Type C viruses have never been associated with a major epidemic of human disease. Type A and B viruses can circulate simultaneously, but usually one type is dominant in a given season and in a particular epidemic area. The disease is easily transmitted by coughing and sneezing droplets containing virus. Influenza epidemics normally occur each year during the autumn and winter seasons.

Respiratory syncytial virus (RSV) is a major cause of respiratory disease in all ages. It is the most common cause of severe respiratory tract infections in paediatrics, especially in children under 4 years of age. It also causes severe problems for the elderly and immunocompromised, resulting in high mortality rates. Bronchiolitis is one of the most severe conditions in children aged 2-6 months. The condition is less severe in older children and adults, being limited to nasal secretions and a cold-like discharge.

COVID-VIRO ALL IN TRIPLEX® has been designed to detect the SARS-CoV-2 Nucleocapsid Protein as well as specific target antigens of Influenza A, Influenza B and RSV.

COVID-VIRO ALL IN TRIPLEX® detects alpha, beta, gamma, delta and omicron variants with the same performance as other known strains of SARS-CoV-2. Mutations in Spike protein synthesis do not affect test performance. The nucleocapsid (N) protein of SARS-CoV-2 is usually detectable in upper respiratory tract specimens during the acute phase of infection.

PRINCIPE DU TEST

COVID-VIRO ALL IN TRIPLEX® is a triple lateral flow immunochromatographic test that uses highly sensitive monoclonal antibodies to detect specific target antigens for each virus (SARS-CoV-2, Influenza A, Influenza B and RSV) in a nasal sample. The test uses monoclonal antibodies directed against target antigens for each virus and fixed at the test site (T) on a nitrocellulose strip. A monoclonal antibody directed against target antigens for each virus and labelled with colloidal gold is used as a lyophilised conjugate.

In the test, antigens in the sample interact with the antigen-specific monoclonal antibodies conjugated to the colour particles to form a coloured antibody-antigen complex. This complex migrates by capillary action across the membrane to the test line (T) where it is captured by the antigen-specific monoclonal antibodies bound to the membrane.

A coloured test line will appear in the results window (T) if antigens for any of the viruses are present in the sample. The intensity of the coloured test line will vary according to the amount of antigen present in the sample. If no antigen is present in the sample, no colour will appear on the test line (T). The control line is used as a procedural control and should always appear in the control area (C) if the test procedure is performed correctly.

MATERIALS

Materials Provided

- 10 Individually packed tests
- Package insert

Materials Required but Not provided

- Clock, timer or stopwatch

PRECAUTIONS

- The test device should remain in the sealed pouch until use.
- Do not use the kit after the expiry date, do not use the kit with a hole or damage in the bag.
- Incorrect results may be obtained if the kit is stored incorrectly.
- The kit is for single use only. It should not be removed from the bag until just before testing (to avoid cross-contamination).
- Avoid skin or eye contact with the pad in the dosette before, during or after the test.
- If the solution comes into contact with the skin or eyes, rinse thoroughly with water.
- For accurate results, do not use samples that contain blood or are too viscous.
- Wear appropriate protective clothing, gloves and eye/face protection when handling the contents of this kit. The used kit should be disposed of in accordance with local regulations.

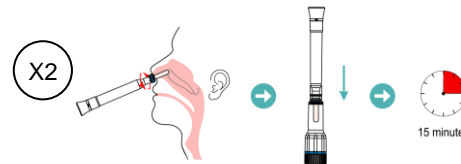
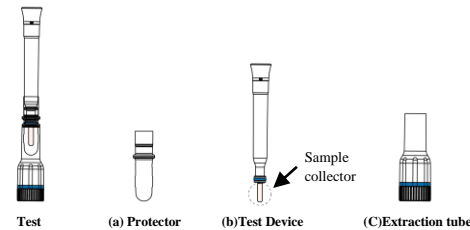
STORAGE AND STABILITY

- Store The **COVID-VIRO ALL IN TRIPLEX®** Antigen Nasal Test Kit at 2~30°C when not in use.
- **DO NOT FREEZE.**
- Kit contents are stable until the expiration dates marked on their outer packaging and containers.

TEST PROCEDURE

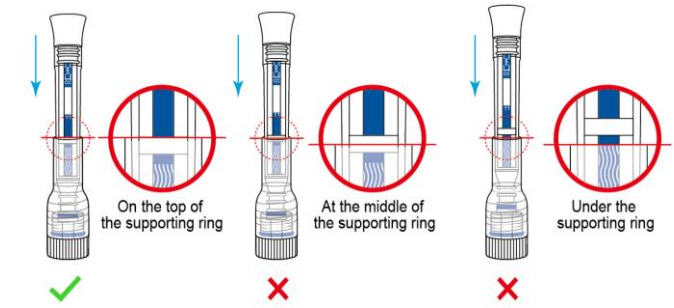
Bring devices, reagents and specimens and/or controls to room temperature (15~30°C) before use.

1. Remove the test from its packing. Label the device with the patient's identification. For best results, the assay should be performed within one hour.
 2. 1) Take the test device out of the extraction tube.
2) Remove the protector.
 3. Gently insert the sample collector until resistance is met (about 1-2 cm into the nostril).
 4. Rotate the collector five times against the nasal wall and remove from the nostril.
 5. Repeat the sample collection procedure for the other nostril to ensure that sufficient specimen be collected from both nasal cavities.
- Note: 1. It is important to obtain as much secretion as possible.**
2. Do not insert the collector any deeper if you feel strong resistance.
6. Place the test device vertically into the extraction tube until the top edge of the extraction tube reach the top of the supporting ring.
 7. Read the results at 15 minutes.



Note:

When placing the test device vertically in the extraction tube, the edge of the extraction tube must reach the top of the support ring. Failure to do so may result in migration failure, resulting in an incorrect or invalid result.



RESULT INTERPRETATION

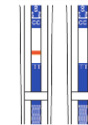
For COVID-19 test:



POSITIVE: Two colored bands appear on the membrane. One band appears in the control region (C) and another band appears in the test region (T).

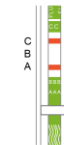


NEGATIVE: Only one colored band appears, in the control region (C). No apparent colored band appears in the test region (T).

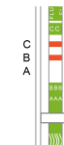


INVALID: Control band fails to appear. Results from any test which has not produced a control band at the specified read time must be discarded. Please review the procedure and repeat with a new test. If the problem persists, discontinue using the kit immediately and contact your local distributor.

For Influenza A/B test:



INFLUENZA A POSITIVE: One colored band appears in the control region (C), and another colored band in the A region (A).



INFLUENZA B POSITIVE: One colored band appears in the control region (C), and another colored band in the B region (B).



INFLUENZA A+B POSITIVE: One colored band appears in the control region (C), and two other colored bands appear in both A region (A) and B region (B).

NOTE: Co-infection with influenza A and B is rare. A clinical specimen that generates positive results for both A and B should be considered an invalid result, and another test should be performed. If the test is again positive for both influenza A and B, the specimen should be re-tested by another method prior to reporting of results.

PERFORMANCE CHARACTERISTICS

Analytical Sensitivity:

The limit of detection (LOD) of COVID-VIRO ALL IN TRIPLEX® Antigen Nasal Test Kit, defined as the concentration of influenza virus and SARS-CoV-2 virus that produces positive COVID-VIRO ALL IN TRIPLEX® Antigen Nasal Test Kit results approximately 95% of the time, was identified by evaluating different concentrations of inactivated Flu A (H3N2, H1N1), inactivated Flu B (Victoria, Yamagata), inactivated respiratory syncytial virus (type B) and inactivated SARS-CoV-2 in The COVID-VIRO ALL IN TRIPLEX® Antigen Nasal Test Kit. 20 tests were run at each concentration. The results identify a concentration of 1.0×10^4 TCID₅₀/ml as the LOD for Flu A (H3N2), 4.3×10^4 TCID₅₀ as the LOD for Flu A (H1N1), 2.2×10^5 TCID₅₀ for Flu B (Victoria), 2.5×10^5 TCID₅₀ for Flu B (Yamagata), 1.35×10^3 TCID₅₀/mL for inactivated respiratory syncytial virus (type B) and $1 \times 10^{2.4}$ TCID₅₀/mL as the LOD for SARS-CoV-2.

Clinical Evaluation:

For COVID-19 Test:

A total of 612 clinical specimens were collected to verify the performance of COVID-19 Antigen Test. Individuals who are suspected of COVID-19 were enrolled in this study. 107 positive specimens and 505 negative specimens were confirmed by RT-PCR.

Table 1: Clinical Summary of COVID-19 Antigen

COVID-19-Antigen-Test	RT-PCR		Total
	Positive	Negative	
	Positive	101	0
Negative	6	505	511
Total	107	505	612

Relative Sensitivity: 94,39 % (88,3 - 97,4%)*

Relative Specificity: 100 % (99,2 - 100%)*

Overall Agreement: 99,9 %

*95% Confidence Interval

For FLU A/B Test:

For Influenza A Test:

A total of 151 clinical specimens were collected, to verify the performance of Influenza A/B Antigen Test. 25 were found to be positive by RT-PCR and 126 were found to be negative by RT-PCR.

For Influenza B Test:

A total of 151 clinical specimens were collected, to verify the performance of Influenza A/B Antigen Test. 26 were found to be positive by RT-PCR and 125 were found to be negative by RT-PCR.

Table 2: Clinical Summary of Influenza A

Influenza A Test	RT-PCR		Total
	Positive	Negative	
	Positive	25	0
Negative	0	126	126
Total	25	126	151

Relative Sensitivity: 99,9% (86,7%~100,0%)*

Relative Specificity: 99,9% (97,0%~100,0%)*

Overall Agreement: 99,9 % (97,5%~100,0%)*

* 95% Confidence Interval

Table 3: Clinical Summary of Influenza B

Influenza B Test	RT-PCR		Total
	Positive	Negative	
	Positive	25	0
Negative	1	125	126
Total	26	125	151

Relative Sensitivity: 96,2% (81,1%~99,3%)*

Relative Specificity: 99,9% (97,0%~100,0%)*

Overall Agreement: 99,3 % (96,3%~99,9%)*

*95% Confidence Interval

For Respiratory Syncytial Virus(RSV) test:

A total of 151 clinical specimens were collected, to verify the performance of Respiratory Syncytial Virus Antigen Test. 18 were found to be positive by RT-PCR and 133 were found to be negative by RT-PCR.

Table 4: Clinical Summary of RSV

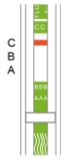
Respiratory Syncytial Virus Test	RT-PCR		Total
	Positive	Negative	
	Positive	18	1
Negative	0	132	132
Total	18	133	151

Relative Sensitivity: 99,9% (82,4%~100,0%)*

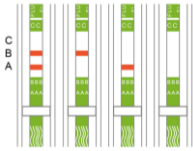
Relative Specificity: 99,2% (95,9%~99,9%)*

Overall Agreement: 99,3% (96,3%~99,9%)*

*95% Confidence Interval

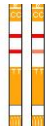


NEGATIVE: Only one colored band appears in the control region (C), and band appears neither in the A region (A) nor B region (B).



INVALID: No colored band appears in the control region (C), whether a test band(s) is present or not. Repeat invalid tests with a new sample, new test device and reagent. Insufficient sample volume, inaccurate operating procedure or expired tests may yield an invalid result. Contact your local distributor if the problem continues.

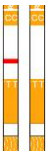
For RSV test:



POSITIVE: Two colored bands appear on the membrane. One band appears in the control region (C) and another band appears in the test region (T).



NEGATIVE: Only one colored band appears, in the control region (C). No apparent colored band appears in the test region (T).



INVALID: Control band fails to appear. Results from any test which has not produced a control band at the specified read time must be discarded. Please review the procedure and repeat with a new test. If the problem persists, discontinue using the kit immediately and contact your local distributor.

NOTE:

- The color intensity in the test region(s) may vary depending on the concentration of analytes present in the specimen. Note that this is a qualitative test only, and cannot determine the concentration of analytes in the specimen.

QUALITY CONTROL

Internal Procedural Controls

The COVID-VIRO ALL IN TRIPLEX® Antigen Nasal Test Kit has built-in (procedural) controls. Each test has an internal standard zone to ensure proper sample flow. The user should confirm that the colored band located at the "C" region is present before reading the result.

LIMITATIONS OF THE TEST

- The COVID-VIRO ALL IN TRIPLEX® Antigen Nasal Test Kit is for professional *in vitro* diagnostic use, and should only be used for the qualitative detection of viral antigens specific for SARS-CoV-2, Influenza A virus, Influenza B virus and respiratory syncytial virus. The intensity of color in a positive band should not be evaluated as "quantitative or semi-quantitative".
- Both viable and nonviable viruses are detectable with the kit.
- As with all diagnostic tests, a definitive clinical diagnosis should not be based on the results of a single test, but should only be made by the physician after all clinical and laboratory findings have been evaluated.
- Failure to follow the TEST PROCEDURE and RESULT INTERPRETATION may adversely affect test performance and/or invalidate the test result.
- Results obtained with this assay, particularly in the case of weak test lines that are difficult to interpret, should be used in conjunction with other clinical information available to the physician.
- Negative results do not preclude viral infections and should be confirmed via molecular assay.

Cross Reactivity:

Cross reactivity with the following organisms has been studied. Samples positive for the following organisms were found negative when tested with The COVID-VIRO ALL IN TRIPLEX® Antigen Nasal Test Kit.

HCov-229E	Adenovirus 4	<i>Candida albicans</i>
HCov-OC43	Adenovirus 5	<i>Chlamydia pneumoniae</i>
HCov-NL63	Adenovirus 7	<i>Group C Streptococcus</i>
Norovirus	Adenovirus 55	<i>Haemophilus influenzae</i>
Parainfluenza virus 1	Epstein-Barr virus	<i>Legionella pneumophila</i>
Parainfluenza virus 2	Enterovirus EV70	<i>Mycoplasma pneumoniae</i>
Parainfluenza virus 3	Enterovirus EV71	<i>Mycobacterium tuberculosis</i>
Parainfluenza virus 4	Enterovirus A16	<i>Staphylococcus aureus</i>
Rhinovirus A30	Enterovirus A24	<i>Staphylococcus epidermidis</i>
Rhinovirus B52	Enterovirus B1	<i>Streptococcus agalactiae</i>
Adenovirus 1	Echovirus 6	<i>Streptococcus pneumoniae</i>
Adenovirus 2	<i>Bordetellapara pertussis</i>	<i>Streptococcus pyogenes</i>
Adenovirus 3	<i>Bordetella pertussis</i>	

NOTE:

- For COVID-19 test:** COVID-19 detection has no cross reactivity with influenza A, influenza B, respiratory syncytial virus, adenovirus.
- For FLU A/B test:** FLUA detection has no cross reactivity with influenza B, respiratory syncytial virus, SARS-CoV-2. FLUB detection has no cross reactivity with influenza A, respiratory syncytial virus, SARS-CoV-2.
- For RSV test:** RSV detection has no cross reactivity with influenza A, influenza B and SARS-CoV-2.

Interfering Substances

The following substances, naturally present in respiratory specimens or that may be artificially introduced into the respiratory tract, were evaluated at the concentrations listed below. None of them were found to affect test performance of the kit.

Substance	Concentration	Substance	Concentration
3 OTC nasal sprays	10%	Guaiacol glyceryl ether	20mg/mL
3 OTC mouth washes	10%	Mucin	1%
3 OTC throat drops	10%	Whole blood	4%
4-acetamidophenol	10 mg/mL	Mupirocin	250µg/mL
Acetylsalicylic acid	10 mg/mL	Oxymetazoline	25µg/mL
Albuterol	10 mg/mL	Phenylephrine	10 mg/mL
Chlorpheniramine	5 mg/mL	Phenylpropanolamine	1mg/mL
Dexamethasone	50µg/mL	Zanamivir	10mg/mL
Dextromethorphan	10µg/mL	Adamantanamine	500 ng/mL
Diphenhydramine	5 mg/mL	Oseltamivir phosphate	10mg/mL
Doxylamine succinate	1 mg/mL	Tobramycin	10mg/mL
Flunisolide	25µg/mL	Triamcinolone	14mg/mL

GLOSSARY OF SYMBOLS

	Read the instructions for use		Expiry date
	For <i>in vitro</i> diagnostic use only		Batch number
	Store between 2 and 30°C		Number of tests per kit
	Manufacturer		Reference
	Do not reuse		CE marking

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