For Use Under an FDA Emergency Use Authorization (EUA) Only

INSTRUCTIONS FOR USE

REF: COV-ST01S (1 Test/Box)

INTENDED USE

The COVISTIX™ COVID-19 VIRUS Rapid Antigen Detection Test is a lateral flow immunoassay for the qualitative detection of nucleocapsid protein from SARS-CoV-2 on a nasal swab. It is intended to be used by professionals for point of care and home use and provides a preliminary test result to aid in the diagnosis of infection with SARS-CoV-2 virus.

Any interpretation or use of this preliminary test result should be based on comprehensive clinical and other laboratory information as well as on the professional judgment ofhealth care providers. Alternative test method(s) should be considered to confirm the test result obtained by this test.

SUMMARY AND EXPLANATION OF THE TEST

Coronaviruses (CoV) are a large family of viruses that cause illness ranging from the common cold to more severe diseases such as Middle East Respiratory Syndrome (MERS-CoV) and Severe Acute Respiratory Syndrome (SARS-CoV). The SARS-CoV-2 virus is a new strain that causes COVID-19 in humans. The clinical manifestations of COVID-19 are systemic symptoms such as fever and fatigue, accompanied by dry cough, dyspnea, etc., which can rapidly develop into severe pneumonia, respiratory failure, Acute Respiratory Distress Syndrome (ARDS), septic shock, multiple organ failure, and severe acid-base metabolism disorder, all of which may lead to death.

Nasopharyngeal and nasal swabbing are common sampling methods for the diagnosis of respiratory infections, such as common cold, influenza, respiratory syncytial virus (RSV), etc.

The COVISTIX™ COVID-19 VIRUS Rapid Antigen Detection Test detects the nucleocapsid protein of SARS-CoV-2 virus in human nasal swab samples. It can be performed within 15–20 minutes by minimally skilled personnel withoutthe use of laboratory equipment.

TEST PRINCIPLE

The COVISTIX™ COVID-19 VIRUS Rapid Antigen Detection Test is a lateral flow chromatographic immunoassay. The test strip in the cassette consists of 1) a conjugate pad containing mouse anti-nucleocapsid protein of SARS-CoV-2 monoclonal antibodies conjugated with colloidal platinum core nanoparticles and 2) a nitrocellulose membrane strip containing one test line (T line) and a control line (C line). The T line is pre-coated with mouse monoclonal antibodies specific for SARS-CoV-2 nucleocapsid protein, and the C line is pre-coated with Protein G SPG as an internal control of the test strip.

When an adequate volume of test specimen is dispensed into the sample well of the test cassette, the specimen migrates by capillary action along the test strip. The nucleocapsid protein of SARS-CoV-2 virus, if present in the specimen, will bind to the mouse anti-nucleocapsid protein antibody-platinum conjugates. The immunocomplex is then captured by the pre-coated mouse anti-nucleocapsid proteinmonoclonal antibody, forming a black-colored T line, indicating a SARS-CoV-2 virus positive test result, and suggesting the presence of the virus.

Absence of T lines suggests a negative result. Each test contains an internal control (C line) which should exhibit a black-colored line of the control antibodies regardless of color development on any of the test lines. If the C line does not develop, the test result is invalid, and the specimen must be retested with another cassette.

REAGENTS AND MATERIALS PROVIDED

1. (1) Individually sealed foil pouch containing a cassette and a desiccant pouch
2. (1) Sampling tube and cap
3. (1) Sterile individually wrapped swab
4. (1) Lysis buffer bottle (1 mL/each)
5. (1) Paper rack, 4-well
6. (1) Quick Reference Guide

MATERIALS REQUIRED BUT NOT PROVIDED

1. Clock or timer

WARNINGS AND PRECAUTIONS

For In Vitro Diagnostic Use:

1. To obtain accurate results, the Instructions for Use must be followed.
2. Do not open the sealed pouch until ready to conduct the assay.
3. Do not use the kit contents beyond the expiration date printed on the outside of the box.
4. Do not use the components of any other type of test kit as a substitute for the components in this kit.
5. Discard and do not use any damaged test cassette or materials.
6. Use of Nitrile, Latex (or equivalent) gloves is recommended when handling patient samples. Wash handsthoroughly after performing the test.
7. Do not smoke, drink, or eat in areas where specimens or kit reagents are being handled.

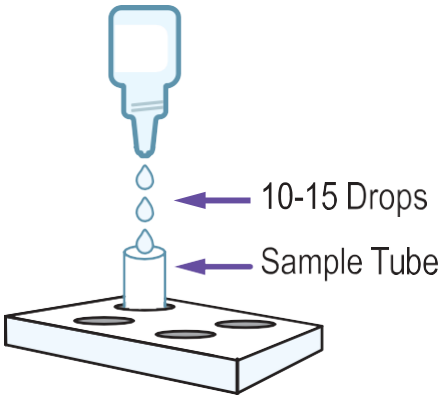
8. Inadequate or inappropriate sample collection, storage, and transport may yield false test results.
9. Dispose of all specimens and materials used to perform the test as bio-hazardous waste.
10. Use appropriate precautions in the collection, handling, storage, and disposal of patient samples and used kit contents.
11. The testing results should be read 15–20 minutes after a specimen is applied to the sample well of the cassette. Any results interpreted outside of the 20-minute windowshould be considered invalid and must be repeated.
12. Do not reuse the used test cassette, reagent tubes, solutions, or control swabs.

TRANSPORTATION AND STORAGE

All reagents are ready to use as supplied. Store unused test cassettes unopened at 2–30°C. If stored at 2–8°C, ensure that the test cassette is brought to room temperature before opening. The test cassette is stable until the expiration date printed on the sealed pouch. Do not freeze the kit or expose the kit to temperatures above 30°C for long periods of time. This product should be shipped at room temperature.

SAMPLE PREPARATION PROCEDURE

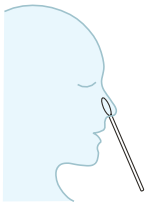
1. Fold the paper rack and insert sample tube.
2. Add 10 drops of lysis buffer to the sample tube.



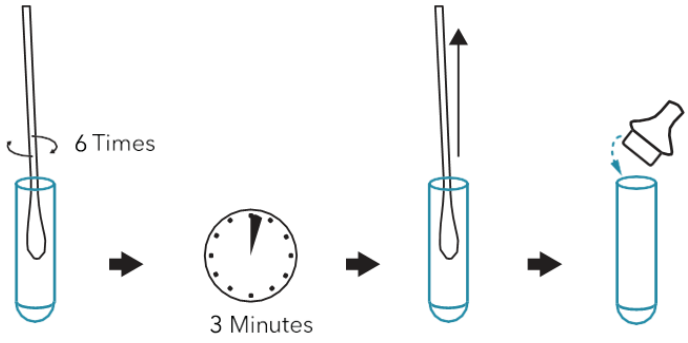
SPECIMEN COLLECTION AND HANDLING

For Nasal Swab

1. Insert the swab to shallow nasal area (not more than ¾ of an inch or 1.5 cm) and slowly rotate at least 6 times against nostril wall.



2. Using the same swab, repeat step 1 in your other nostril.
3. Transfer the swab to sample tube containing diluent solution (lysis buffer).
4. Using the swab, slowly stir the lysis buffer for at least 6 rotations.
5. Leave the swab in the sample tube for 3 minutes.
6. Remove the swab from the tube and dispose of it properly.



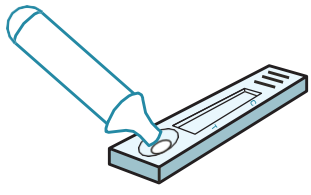
7. Place the cap/dropper on the sampling tube.

SPECIMEN TRANSPORT AND STORAGE

Specimens should be tested as soon as possible after collection.

TESTING

1. Open the pouch, remove the test cassette and place ona clean disinfected flat surface.
2. Set timer for 15 minutes.
3. Apply 4 drops from the sampling tube to the center ofthe sample well (labeled with an “S”) on the cassette.



15 Minutes

Apply the drops slowly so that the liquid gets absorbed and doesn’t overflow.

4. Start the timer.
5. Read results at 15-20 minutes. Do not read after 20 minutes.
6. Properly dispose of the used test cassette, sample tube and nasal swab as medical waste.

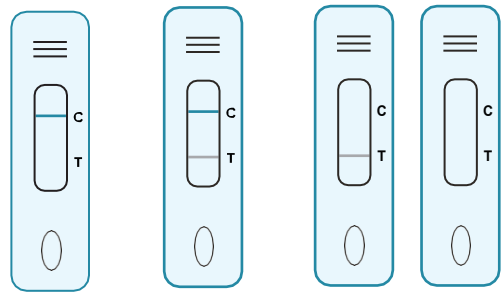
RESULTS

1. This test contains a built-in control feature (C line) that develops after adding the specimen and sample diluent. Depending on the intensity of the line, results maybe visible up to ~24 hours, but results are best at 15 minutes. If no C line or only the T line appears, the test is considered invalid (you will need to retest with a newtest kit).

2. **NEGATIVE RESULT:** If only the C line is present, the absence of black color in test lines (T) indicates that no SARS-CoV-2 virus is detected. The result is negative.
3. **POSITIVE RESULT:** In addition to the presence of the C line, if the T line develops, the test result indicates that SARS-CoV-2 virus is detected. The result is SARS-CoV-2 virus positive.

   Samples with positive results should be confirmed with alternative testing method(s) and clinical findings before a diagnosis is made.

1. **INVALID:** If no C line develops, the assay is invalid regardless of black color in the test lines as indicatedbelow. Repeat the assay with a new cassette



Negative Positive Invalid

PERFORMANCE CHARACTERISTICS

1. **The inspection of enterprise reference products shall meet the following requirements:**
   - **a.** The liquid migration speed should not be less than10 mm/min (n=3).
   - **b.** Minimum detection limit:
     L1, L2 should be positive,
     L3 could be weakly positive,
     L4 should be negative.
   - **c.** The coincidence rate of positive enterprise referenceproducts: (+/+) 5/5
   - **d.** The coincidence rate of negative enterprise referenceproducts: (-/-) 10/10
   - **e.** Repeatability: The test results were all positive withuniform color.
2. **Limitation of Detection (LOD)**
   The limitation of detection with serial dilution of SARS-CoV-2 virus is 625 $TCID_{50}$/mL for per test.
3. **Cross Reactivity**
   No false-positive COVID-19 antigen test results were observed on specimens from the following disease states or specific conditions, respectively.

Interference	The highest concentration	Result
HCoV-OC43 nucleocapsid protein	10 µg/mL	Negative
HCoV-229E nucleocapsid protein	10 pg/mL	Negative
HCoV-NL63 nucleocapsid protein	50 µg/mL	Negative
HCoV-HKU1 nucleocapsid protein	10 µg/mL	Negative
SARS-COV nucleocapsid protein	15.7 pg/mL	Negative
MERS-COV nucleocapsid protein	10 µg/mlL	Negative
Adenovirus	10^5 pfu/mL	Negative
Human Metapneumovirus (hMPV)	10^5 pfu/mL	Negative
Parainfluenza virus 1-4	10^5 pfu/mL	Negative
Influenza A & B	10^5 pfu/mL	Negative
Enterovirus	10^5 pfu/mL	Negative
Respiratory syncytial virus	10^5 pfu/mL	Negative
Rinovirus	10^5 pfu/mL	Negative
Haemophilus influenzae	10^5 pfu/mL	Negative
Streptococcus pneumoniae	10^6 cfu/mL	Negative
Streptococcus pyogenes	10^6 cfu/mL	Negative
Candida albicans	10^6 cfu/mL	Negative
Pooled human nasal wash – representative of normal respiratory microbial flora	Not applicable	Negative
Bordetella pertussis	10^6 cfu/mL	Negative
Mycoplasma pneumoniae	10^6 cfu/mL	Negative
Chlamydia pneumoniae	10^6 cfu/mL	Negative
Legionella pneumophila	10^6 cfu/mL	Negative
Staphylococcus aureus	10^6 cfu/mL	Negative
Staphylococcus epidermidis	10^6 cfu/mL	Negative
Mycobacterium tuberculosis	10^6 cfu/mL	Negative
Pneumocystis jirovecii (PJP)	10^6 cfu/mL	Negative

4. Interference

Common substances (such as throat medicine and blood) may affect the performance of the COVID-19 VIRUS Rapid Antigen Detection Test. This was studied by spiking these substances into SARS-CoV-2 negative and positive specimens, respectively. The results demonstrate that at the concentrations tested, the substances studied do not affect the performance of the COVID-19 VIRUS Rapid Antigen Detection Test. List of potentially interfering substances andconcentrations tested:

1. Whole Blood	4%	8. Zicam	5% v/v
2. Mucin	0.5%	9. Alkalol	1:10 dilution
3. Menthol/Benzocaine	1.5 mg/mL	10. Sore Throat Phenol Spray	15% v/v
4. Naso GEL(NeilMed)	5% v/v	11. Tobramycin	4 µg/mL
5. Phenylephrine	15% v/v	12. Mupirocin	10 mg/mL
6. Oxymetazoline	15% v/v	13. Fluticasone Propionate	5% v/v
7. Cromolyn	15% v/v	14. Oseltamivir Phosphate	5 mg/mL

5. Sensitivity and Specificity

a. Day 0–7

Summary of positive and negative agreement with real patient specimen type.

Test Result	PCR-Confirmed Samples		
	Positive	Negative	Total
Positive	50	1	51
Negative	0	50	50
Positive agreement		98.04% (95% CI 89.70% to 99.65%)	
Negative agreement		100% (95% CI 92.87% to 100.00%)	

Sensitivity: 98.04% Specificity: 100%
Sensitivity is called as Positive Percent Agreement (PPA), or true positive/ (true positive + false negative).
Specificity is called as Negative Percent Agreement (NPA), or true negative/ (true negative + false positive).

b. Day 0–14

Summary of positive and negative agreement with real patient specimen type.

Test Result	PCR Confirmed Samples		
	Positive	Negative	Total
Positive	53	2	55
Negative	0	50	50
Positive agreement		96.36% (95% CI 87.68% to 99.00%)	
Negative agreement		100% (95% CI 92.87% to 100.00%)	

Sensitivity: 96.36% Specificity: 100%

LIMITATIONS OF TEST

1. The contents of this kit are to be used for the qualitative detection of SARS antigens from nasopharyngeal and nasal swabs.
2. This test detects both viable (live) and non-viable SARS-CoV-2. Test performance depends on the amount of virus (antigen) in the sample.
3. A negative test result may occur if the level of antigen in a sample is below the detection limit of the test or if the sample was collected or transported improperly.
4. Failure to follow the Instructions for Use may adversely affect test performance and/or invalidate the test result.
5. Test results must be evaluated in conjunction with other clinical data available to the physician.
6. Positive test results do not rule out co-infections with other pathogens.
7. Positive test results do not differentiate between SARS-CoV, HCoV-NL63 (nucleocapsid protein ≥50 ng/mL) and SARS-CoV-2.
8. Negative test results are not intended to rule in other non-SARS viral or bacterial infections.
9. If the differentiation of specific SARS viruses and strains is needed, additional testing, in consultation with state or local public health departments, is required.
10. The test results of this kit are for clinical reference only and should not be used as the sole basis for clinical diagnosis. The clinical management of patients should be considered in combination with their symptoms/signs, medical history, other laboratory tests and treatment responses.

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ORDERING INFORMATION

Please call our Customer Service Department at 1-800-203-5108 for assistance or email **CustomerService@covistix.com**. Additional information can be found online at **www.Sorrentotherapeutics.com**.

Sorrento Therapeutics, Inc.
4955 Directors Place
San Diego, CA 92121