SARS-CoV-2 Antigen Rapid Test (Immunochromatography)

FOR PROFESSIONAL USE ONLY

Product Name

SARS-CoV-2 Antigen Rapid Test (Immunochromatography)

Intended Use

The SARS-CoV-2 Antigen Rapid Test is intended for in vitro qualitative detection to SARS-CoV-2 antigen in human anterior nasal swabs, nasopharyngeal swab or oropharyngeal swab samples.

This product is used for SARS-CoV-2 Antigen test of novel coronavirus suspected populations appear symptoms within 7 days. Positive result of the antigen test can be used for early triage and rapid management of suspected populations, but it cannot be used as diagnosis basis of SARS-CoV-2 infection. Negative results do not rule out SARS-CoV-2 infection and should not be used as the sole basis for treatment or patient management decisions. Further nucleic acid detection should be carried out for suspected population whose antigen test result is positive or negative.

This reagent is only for professional use, not suitable for family test. The test results are only for clinical reference and it is recommended to conduct comprehensive analysis of the disease condition in combination with clinical manifestations of patients and other laboratory tests, it is not suitable for screening of general population.

Test Principle

According to the gold immunochromatographic test principle, the nitrocellulose membrane is coated with SARS-CoV-2 monoclonal antibody 2 and goat anti-mouse IgG antibody, the gold conjugate pad solid phase is fixed with SARS-CoV-2 monoclonal antibody 1. When the antigen is contained in the sample, the antigen binds with the corresponding gold labeled monoclonal antibody to form a compound, moving forward under the chromatography, then combines with the coated antibody in the test line to form Au-novel coronavirus (SARS-CoV-2) monoclonal antibody 1-antigen-novel coronavirus (SARS-CoV-2) monoclonal antibody 2 complex to condenses into a red band (Test line, T) , indicating a positive result. When the sample does not contain antigen, complex cannot be formed in the test line, and no red band appears, indicating negative result.

No matter whether the samples contain antigens or not, the gold labeled monoclonal antibody will combine with the coated goat anti-mouse IgG antibody at the quality control line to form a Au-novel Coronavirus

(SARS-CoV-2) monoclonal antibody 1-goat anti-mouse IgG antibody complex and condenses into a red band (quality control line, C) .

Components

The test line is coated with SARS-CoV-2 monoclonal antibody 2(monoclonal antibody, mouse origin). Gold conjugate pad solid phase SARS-CoV-2 monoclonal antibody 1(monoclonal antibody, mouse origin). The quality control line is coated with goat anti-mouse IgG antibody(Polyclonal antibody, goat origin).

Extraction Reagent: Tris(hydroxymethyl)methyl aminomethane buffer with surfactant.

This product provides three different packaging forms, the packaging form 1, 2 or 3 can be selected according to the demands.

Package type 1:

Specification / Ingredients	20 tests/kit	25 tests/kit	40 tests/kit	Remark
Test cassettes and desiccants in a sealed foil pouch	20	25	40	
Extraction Reagent	6.5mL*2	7.5mL*2	6.5mL*4	
Extraction tube	20	25	40	Optional
Swab	20	25	40	Optional
IFU	1	1	1	

Package type 2:

Specification / Ingredients	20 tests/kit	25 tests/kit	40 tests/kit	Remark
Test cassettes and desiccants in a sealed foil pouch	20	25	40	
Extraction Reagent	0.5mL*20	0.5mL*25	0.5mL*40	
Extraction tube	20	25	40	
Swab	20	25	40	Optional
IFU	1	1	1	

Package type 3:

Specification / Ingredients	20 tests/kit	25 tests/kit	40 tests/kit	Remark
Test cassettes and desiccants in a sealed foil pouch	20	25	40	
Extraction Reagent	0.5mL*20	0.5mL*25	0.5mL*40	
Swab	20	25	40	Optional
IFU	1	1	1	

MATERIAL NEEDED BUT NOT PROVIDED

1. Timer
2. Personal protective equipment, such as protective gloves, medical mask, goggles and lab coat.
3. Appropriate biohazard waste container and disinfectants.

Storage and Shelf-Life

Store in the sealed pouch at 4-30℃, avoid hot and sunshine, valid for 24 months and avoid using expired products. DO NOT FREEZE. The reagent can be transported at room temperature for a short time. Some protective measures should be taken in hot summer and cold winter to avoid high temperature or freeze-thaw. It must be used in one hour if opened (Humidity≤60%, Temp: 20℃-30℃). Please use immediately when the humidity＞60%.

Sample Requirement

Sample Collection

Collection method of anterior nasal swab:

Insert the swab about 2.5 cm into the nostril and rotate 5 times against the nasal wall. This should take approximately 15 seconds per nostril. Sample both nostrils with same swab.

Collection method of nasopharyngeal :

The operator holds the swab by the right hand and holds the head of the subject fixedly by left hand. Do not overexert to avoid traumatic hemorrhage. When the cusp of the swab touching the paries posterior of the pharyngonasal cavity, letting the swab remain in the place for a few seconds (about 3 seconds) and rotating the swab gently for one cycle, and then remove the swab slowly. Using the same swab, repeat this process for the other nostril to ensure that an adequate sample is collected from both nasal cavities.

Collection method of oropharyngeal swab :

The head of the person to be collected is slightly tilted and his mouth is wide open, exposing the pharyngeal tonsils on both sides. Wipe the swab across the root of the tongue. Wipe the pharyngeal tonsils on both sides of the person to be collected back and forth with a little force for at least 3 times, and then wipe up and down the posterior pharyngeal wall for at least 3 times. Avoid touching your tongue, cheeks or teeth when sampling. Just after drinking water or beverages, sampling samples cannot be used for testing.

Note:

1. The sample should not be inactivated.
2. If non inactivated Virus Transport Medium VTM/UTM or Saline Buffer need to be used for the transportation of anterior nasal, nasopharyngeal or oropharyngeal swab samples, It is recommended to use a low volume (maximum not more than 1mL) to avoid affecting the sensitivity as much as possible. It is recommended to dilute the extracted sample 1:1 in reagent SARS-CoV-2 (sample extraction) provided.
3. When using samples previously extracted by Transport Medium (VTM, UTM, Saline Buffer), it is recommended to dilute the extracted sample 1:1 in reagent SARS-CoV-2 (sample extraction) provided.

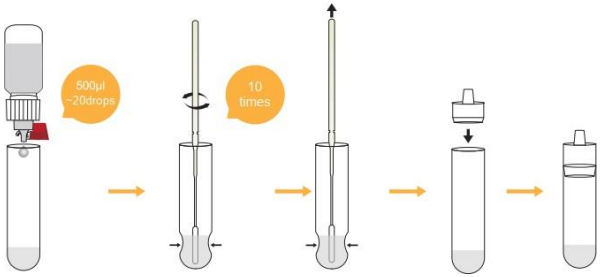
Sample preservation

After the samples of human anterior nasal swabs, nasopharyngeal swabs and oropharyngeal swabs are collected, the swabs should be processed as soon as possible and tested within 1 hour. If it cannot be tested immediately, it can be stored at 2-8°C for 4hours and long-term storage is not recommended.

Sample Treatment

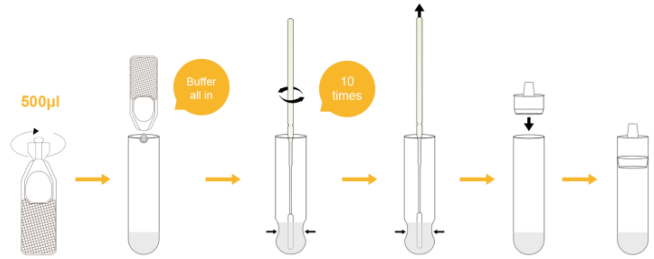
Package type 1 treatment method:

1. Add 500μL of sample extraction reagent to the sample extraction tube(add about 20 drops vertically if using a dropping bottle).
2. Insert the swab after sampling into the solution of the sample extraction tube, and rotate vigorously against the inner wall of the tube to squeeze the swab for 10 times to make the sample dissolve in the solution as much as possible.
3. Squeeze the swab head along the inner wall of the extraction tube to keep the liquid in the tube as much as possible. Take out and discard the swab, and the twisted liquid is taken as the sample to be tested.
4. Cover the emitter and wait for inspection.



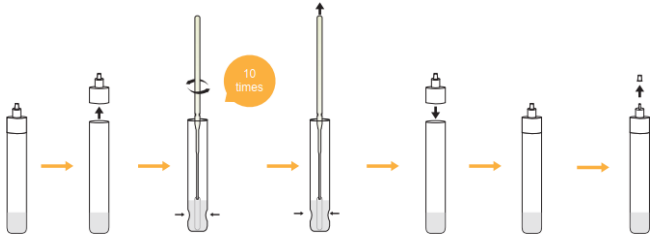
Package type 2 treatment method:

1. Add 500μL of sample extraction reagent into the sample extraction tube (Twist off the cap of individual buffer bottle).
2. Insert the swab after sampling into the solution of the sample extraction tube, and rotate vigorously against the inner wall of the tube to squeeze the swab for 10 times to make the sample dissolve in the solution as much as possible.
3. Squeeze the swab head along the inner wall of the extraction tube to keep the liquid in the tube as much as possible. Take out and discard the swab, and the twisted liquid is taken as the sample to be tested.
4. Cover the emitter and wait for inspection.



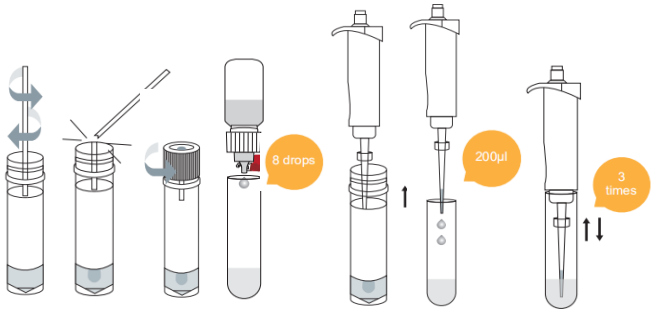
Package type 3 treatment method:

1. Open the sample extraction tube.
2. Insert the swab after sampling into the solution of the sample extraction tube, and rotate vigorously against the inner wall of the tube to squeeze the swab for 10 times to make the sample dissolve in the solution as much as possible.
3. Squeeze the swab head along the inner wall of the extraction tube to keep the liquid in the tube as much as possible. Take out and discard the swab, and the twisted liquid is taken as the sample to be tested.
4. Close the lid and open the emitter cap for inspection.



Transport media (VTM, UTM, Saline Buffer**) test procedures**

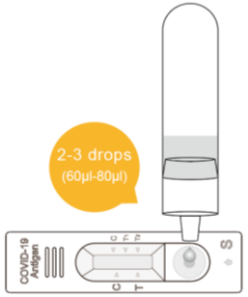
1. Put the swab sample into ≤1mL non-inactivated virus transport medium (VTM, UTM, Saline Buffer). Stir the swab more than 5 times.
2. Add 200μL of sample extraction reagent to the sample extraction tube(add about 8 drops vertically if using a dropping bottle).
3. Take 200μL sample containing (VTM, UTM, Saline Buffer) solution with pipette, add it into the sample extraction tube containing 200μL sample extraction, and mix 3 times.
4. Cover the cap of the sample extraction tube and leave it for one minute, waiting for testing.



Test Procedure

Instructions must be read entirely before taking the test. Leave the reagent and sample at room temperature for 30 minutes before use. Return to room temperature. Do not open the inner packing until it is ready. Use it as soon as possible after opening the inner packing.

1. Open the tear hole of the aluminum foil bag, take out the test cassette and lay it flat.
2. Apply 2-3 drops of the treated sample extract solution(60μL-80μL)vertically in to the sample well of the test cassette.
3. The results are observed after 15 minutes and the results were invalid after 20 minutes.

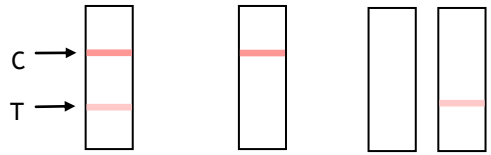


Interpretation of Result

POSITIVE: Two distinct red lines appear. One line should be in the control region (C) and the other line should be in the test region (T).

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

INVALID: Control line fails to appear, indicating that the operation error or reagent failure.



Positive **Negative** **Invalid**

Limitation

1. The result of the product should not be taken as a confirmed diagnosis, for clinical reference only. Judgement should be made along with RT-PCR results, clinical symptoms, epidemic condition and further clinical data.
2. If the virus antigen level in the sample is lower than the detection limit, the test result may be negative.
3. As the duration of the disease increases, the number of antigens in the sample may decrease. After the sample is collected, compared with RT-PCR analysis, 7 days after the onset of symptoms, the result may be negative.
4. Due to the limitation of the detection method, the negative result cannot exclude the possibility of infection. The positive result should not be taken as a confirmed diagnosis. Judgement should be made along with clinical symptoms and further diagnosis methods.
5. This reagent can only qualitatively detect SARS-CoV-2 antigens in human anterior nasal swabs, nasopharyngeal swab, oropharyngeal swab. It cannot determine the certain antigen content in the samples.
6. The accuracy of the test depends on the sample collection process. Improper sample collection, improper sample transportation and storage or freezing and thawing of the sample will affect the test results.
7. It is optimum when eluting swabs with the matched samples extraction solution. Using other diluents may result in wrong results.
8. The solution and test cassettes must be equilibrated to room temperature(20℃~30℃) before used, otherwise the results may be incorrect.
9. Sensitivity maybe decrease if the sample did not test directly. Please test the sample as soon as possible.
10. Positive results may be found in patients with SARS-CoV infection.
11. Analysis the possibility of false negative results:

1)Inappropriate sample collection, using other non-matching solution, sample transfer time is too long, the volume of solution added when eluted the swab are too much, non-standardized elution operation, low virus titer in the sample, these may all lead to false negative results.

2) Mutations in viral genes may lead to changes in antigen epitope, leading to false negative results.

12. Analysis the possibility of false positive results:

1) Inappropriate sample collection, using other non-matching solutions, non-standardized elution operation, these may all lead to false positive results.

2) Cross-contamination of samples may lead to false positive results.

3) Excess blood or mucin on the swab specimen may interfere with test performance and may yield a false positive result.

13. Analysis the possibility of invalid result:

1)If the sample volume is not enough, the chromatography cannot be carried out successfully.

2)The test cassettes would invalid if the package was broken. The packaging status must be carefully checked before use.

14.In different stages of infection, samples of different viral load may have different coincidence rates with nucleic acid test results.

15.When sampling anterior nasal swabs and nasopharyngeal swab, both nostrils need to be sampled with the same swab. If you only take it once, it may cause wrong results.

Quality Control

The test device has a test line (T) and a control line (C) on the surface of the test device. Neither the test line nor the control line are visible in the result window before applying a specimen. The control line is used for procedural control and should always appear if the test procedure is performed properly and the test reagents of the control line are working.

The appearance of control line (C) is confirmed sufficient specimen volume, adequate membrane wicking and correct procedural technique.

Performance Characteristics

1.Clinical performance

The performance was established with 500 oropharyngeal swabs collected from 500 patients who were suspected of SARS-CoV-2, including 100 positive samples and 400 negative samples. PCR was selected as the comparison method, and the comparison results are shown in the table below.

Also both nasopharyngeal swab and oropharyngeal swab were collected from the above135 patients and the results were consistent.

SARS-CoV-2 Antigen Rapid Test	PCR		Total
	Positive	Negative	
Positive	95	1	96
Negative	5	399	404
Total	100	400	500

PPA: 95.00% (95%CI:88.83%-97.85%)

NPA: 99.75% (95%CI:98.60%-99.96%)

OPA: 98.80% (95%CI: 97.41%-99.45%)

The performance of SARS-CoV-2 Antigen Rapid Test (Immunochromatography) was established with 610 anterior nasal swab samples of patients who were suspected of SARS-CoV-2.

SARS-CoV-2 Antigen Rapid Test Performance against with Comparator Method

SARS-CoV-2Antigen Rapid Test	PCR		Total
	Positive	Negative	
Positive	102	1	103
Negative	8	499	507
Total	110	500	610

PPA: 92.73% (95%CI:86.30%-96.27%)

NPA: 99.80% (95%CI:98.88%-99.96%)

OPA: 98.52% (95%CI: 97.22%-99.22%)

EXPLANATION OF TERMS:

PPA: Positive Percent Agreement = True Positives / True Positives + False Negatives

NPA: Negative Percent Agreement = True Negatives / True Negatives + False Positives.

OPA: Overall Percent Agreement = True Positives + True Negatives / Total

CI: Confidence Interval

2. Limit of Detection

The minimum detection limit of SARS-CoV-2 Antigen Rapid Test was determined to be 8 $TCID_{50}$/mL.

3. Analytical specificity

1)Interfering substances

The test results showed do not be interfered with the following substances.

Name	Concentration	Results
Mucin	0.50%	Negative
Blood (human)	5%	Negative
Guaiacol glyceryl ether	1μg/mL	Negative
Arbidol Hydrochloride Hydrate	1mg/mL	Negative
Zanamivir	2mg/mL	Negative
Meropenem	1mg/mL	Negative
Oseltamivir	3mg/mL	Negative
Ritonavir	1mg/mL	Negative
Peramivirtrihydrate	3mg/mL	Negative
Ribavirin	1mg/mL	Negative
Histamine hydrochloride	2mg/mL	Negative
Levofloxacin	1mg/mL	Negative
Oxymetazolin hydrochloride	1mg/mL	Negative
Ceftriaxone sodium	1mg/mL	Negative
Cefradine	100mg/mL	Negative
Cefalexin	100mg/mL	Negative
Benzocaine	5mg/mL	Negative
Tobramycin	2mg/mL	Negative
Lopinavir	1mg/mL	Negative
Azithromycin	3mg/mL	Negative
Watermelon frost buccal tablets	100mg/mL	Negative
Dexamethasone	0.5mg/mL	Negative
Flunisolide	2mg/mL	Negative
Beclomethasone	10mg/mL	Negative
Sodium chloride	0.90%	Negative
Alpha-interferon	1mg/mL	Negative
Phenylephrine hydrochloride	5mg/mL	Negative
Acetaminophen	10mg/mL	Negative
Ibuprofen	1mg/mL	Negative
Aspirin	5mg/mL	Negative
Acetylsalicylic acid	5mg/mL	Negative
Hydrocortisone	1mg/mL	Negative
Albuterol	1mg/mL	Negative
Chlorpheniramine	5mg/mL	Negative
Diphenhydramine	5mg/mL	Negative
Budesonide	10mg/mL	Negative
Mometasone	1mg/mL	Negative
Fluticasone	1mg/mL	Negative
NeilMed	5mg/mL	Negative
Menthol	0.15mg/mL	Negative
Quinine (malaria)	150uM	Negative
Lamivudine (retroviral drug)	1mg/mL	Negative
Biotin	100μg/mL	Negative
HAMA	600ng/mL	Negative

2) Cross-reactivity

By testing 26 viruses and 14 other microorganisms, except for the Human SARS-coronavirus Nucleoprotein, other viruses and microorganisms have no effect on the test results.

Virus	Concentration	Results
HCoV-NL63	1 x 10^5 $TCID_{50}$/mL	Negative
HCoV-OC43	8 x 10^5 $TCID_{50}$/mL	Negative
HCoV-229E	1 x 10^5 $TCID_{50}$/mL	Negative
HCoV-HKU1	10ug/mL	Negative
MERS	4 x 10^4 $TCID_{50}$/mL	Negative
Human SARS-coronavirus Nucleoprotein	25ng/mL	Positive
Adenovirus Type3	1.0 x 10^6 $TCID_{50}$/mL	Negative
Adenovirus Type7	1.0 x 10^6 $TCID_{50}$/mL	Negative
Adenovirus Type1	2 x 10^5 $TCID_{50}$/mL	Negative
Adenovirus Type5	3 x 10^5 $TCID_{50}$/mL	Negative
Adenovirus Type8	2.5 x 10^5 $TCID_{50}$/mL	Negative
Adenovirus Type11	3 x 10^5 $TCID_{50}$/mL	Negative
Adenovirus Type21	3 x 10^5 $TCID_{50}$/mL	Negative
Adenovirus Type55	3 x 10^5 $TCID_{50}$/mL	Negative
Echovirus	4.0 x 10^5 PFU/mL	Negative
Influenza virus A (H1N1)	2.5 x 10^5 PFU/mL	Negative
Influenza virus A(H3N2)	8.0 x 10^4 PFU/mL	Negative
Influenza virus B Strain	3 x 10^5 $TCID_{50}$/mL	Negative
Parainfluenza Type 1	1 x 10^5 $TCID_{50}$/mL	Negative
Parainfluenza Type 2	1 x 10^5 $TCID_{50}$/mL	Negative
Parainfluenza Type 3	1 x 10^5 $TCID_{50}$/mL	Negative
Parainfluenza Type 4	1 x 10^5 $TCID_{50}$/mL	Negative
Respiratory syncytial virus (RSV) type A	4 x 10^5 $TCID_{50}$/mL	Negative
Respiratory syncytial virus (RSV) type B	4 x 10^5 $TCID_{50}$/mL	Negative
Rhinovirus A16	1 x 10^5 $TCID_{50}$/mL	Negative
Human Metapneumovirus (hMPV) 16 Type A1	1 x 10^5 $TCID_{50}$/mL	Negative
Candida albicans	1.8 x 10^6 CFU/mL	Negative
Legionella pneumophila	1 x 10^6 CFU/mL	Negative
Streptococcus pneumoniae	1.0 x 10^6 CFU/mL	Negative
Pseudomonas aeruginosa	1 x 10^6 CFU/mL	Negative
Staphylococcus epidermidis	1 x 10^6 CFU/mL	Negative
Staphylococcus salivarius	1 x 10^6 CFU/mL	Negative
Mycoplaa Pneumoniae	1 x 10^6 CFU/mL	Negative

Chlamydia Pneumoniae	1 x 10^6 CFU/mL	Negative
Streptococcus pyogenes	1 x 10^6CFU/mL	Negative
Mycobacterum tuberculosis	1 x 10^6 CFU/mL	Negative
Hemophilus influenzae	1 x 10^b CFU/mL	Negative
Bordetella pertussis	5 x 10^b CFU/mL	Negative
Pneumocystis	1 x 10^6 CFU/mL	Negative
Pooled human nasal wash	NA	Negative

3)Microbial Interference Studies

By testing 10 other microorganisms, it was found that other microorganisms have no effect on the test results.

Other microorganism	Concentration	Results
Staphylococcus aureus	1 x 10^6CFU/mL	Negative
Escherichia coli	1 x 10^6CFU/mL	Negative
Streptococcus salivarius	1 x 10^6CFU/mL	Negative
Proteus mirabilis	1 x 10^6CFU/mL	Negative
Klebsiella pneumoniae	1 x 10^6CFU/mL	Negative
Staphylococcus haemolyticus	1 x 10^6CFU/mL	Negative
Mumps Virus Ag	2 x $10^3$$TCID_{50}$/mL	Negative
Avian Influenza Virus（H7N9）	8.0 x 10^4PFU/mL	Negative
Measles virus	2 X $10^3$$TCID_{50}$/mL	Negative
Norovirus	1 X $10^5$$TCID_{50}$/mL	Negative

3. Hook Effect:

No high dose hook effect was observed up to 1.6 x 10^5 $TCID_{50}$/mL of SARS-CoV-2 with SARS-CoV-2 Antigen Rapid Test.

Precaution

1. The reagent is a disposable diagnostic reagent in vitro, which is only used for the detection of human anterior nasal swabs, nasopharyngeal swab, or oropharyngeal swab. The operation should be carried out strictly according to the instructions. Do not use expired and damaged products.
2. The strength of the quality control line does not mean the quality of the reagent, as long as its color is clear and visible, that means the reagent is effective.
3. The kit should be sealed and kept away from moisture. Reagents or samples stored at low temperature should be balanced to room temperature before they can be used.
4. Reagents should be used as soon as possible after removal from aluminum foil bags, so as to avoid exposure to air for too long and affecting test results due to dampness.
5. Do not use samples that have been placed for too long or contaminated.
6. Please operate in accordance with the laboratory testing procedures for infectious diseases. Waste after use should be treated in accordance with infectious substances and should not be discarded at will.

Note: Use clean pipettes or nozzles for each sample to avoid cross contamination.

7. Incorrect operation may affect the accuracy of the results, such as sample extraction reagent insufficient or excessive, insufficient sample mixing, insufficient amount, inaccurate detection time,etc.
8. Components in different batch should not be mixed; Inactivated Viral Transport Media (VTM, UTM) may affect results; Extracted specimens for PCR tests cannot be used for the test.
9. When using transport medium(VTM, UTM, Saline Buffer), it is important to ensure that the transport medium containing the specimen is warmed to room temperature, otherwise it may affect the results.
10. If the sample swab is not rotated and squeezed in the sample extraction tube for 10 times, false negative results may occur. If the swab is put into the packaging bag after sample collection, false negative results may occur.
11. There should be appropriate biosafety assurance procedures for those substances containing and suspected sources of infection. The following are relevant considerations:

1) Handle samples and reagents with gloves;
2) Do not suck samples with your mouth;
3) Do not smoke, eat, drink, cosmetic or handle contact lenses while handling these items;
4) Disinfect the spilled sample or reagent with disinfectant;
5) Disinfect and treat all samples, reagents and potential pollutants in accordance with relevant local regulations;
6) Each component of the reagent remains stable until the expiry date under proper handling and storage conditions. Do not use the expired reagent kit.

12. The extraction reagent contains sodium azide as a preservative which may be toxic if ingested. When disposed of through a sink, flush with a large volume of water.

MANUFACTURER / POST-SALE SERVICE UNIT

Qingdao Hightop Biotech Co., Ltd.
Add: No.369 Hedong Road, Hi-tech Industrial Development Zone, Qingdao, Shandong,266112, China
Tel: 0086-532-58710705 Fax: 0086-532-58710706
Web: www.hightopbio.com E-mail: sales@hightopbio.com

EUROPEAN REPRESENTATIVE

CE

MedNet EC-REP GmbH
Borkstrasse 10, 48163 Muenster, Germany

INSTRUCTIONS OF SYMBOL

	Consult instructions for use		Keep dry
	Temperature limit	LOT	Batch code
	For single use	IVD	In vitro diagnostic medical device
	Manufacturer		Date of manufacture
	Use-by date		Contains sufficient for <n> tests
EC REP	European representative		Keep away from sunlight