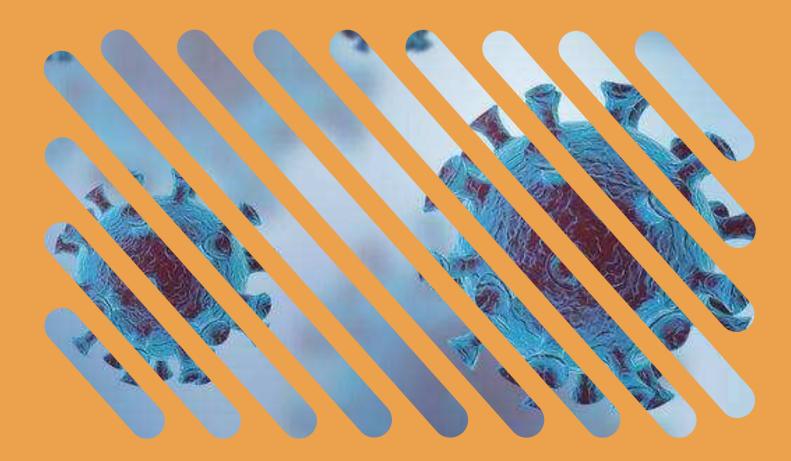


## COVID-19 Detection One-Stop Solutions



Hangzhou Laihe Biotech Co., Ltd.

## FSC CE FDA EUA ISO

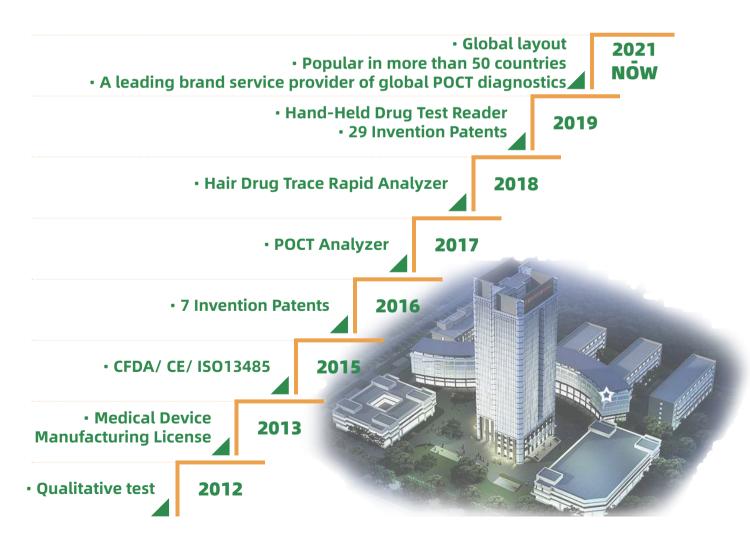
## **Company Profile**

Founded in 2012, Hangzhou Laihe Biotech Co., Ltd., has always focused on the development and industrialization of POCT instant diagnosis, monitoring and health information technology field, and is committed to providing fast, accurate and reliable health detection products and services to the public.

LYHER<sup>®</sup> brand has been registered in more than 40 countries worldwide, including China, America, Australia, and many European and Asian countries, etc.

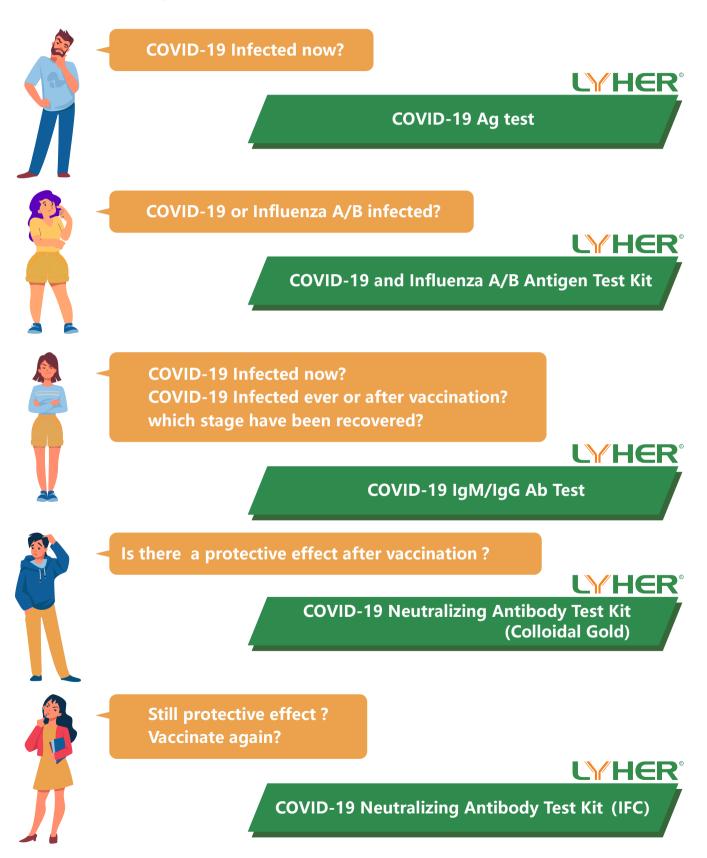
LYHER® Novel Coronavirus Test Kit has been certified by the US FDA EUA, Australian TGA, EU CE and some authorities of countries like German, France, Netherlands in Europe, like Brazil, Peru, Bolivia in South America, and Japan, Thailand, Indonesia, Malaysia, Vietnam in southeast Asia, and many other global authorities as well. LYHER kits have been shortlisted in the whitelist of importers, meanwhile some other synchronous registration in China NMPA, WHO and other authorities are also in progress. Our product is also the first batch of German novel coronavirus self-test products that have been entered into the BfArm list of enterprises.

## **Development Course**



## **LYHER**<sup>®</sup>

## Are you still worried about COVID-19?





## Novel Coronavirus(COVID-19) Antigen Test Kit(Colloidal Gold)

(for professional use and home use)

**Specimen:** nasopharyngeal or oropharyngeal or nasal swab, saliva, sputum

SARS-CoV-2 stands for severe acute respiratory syndrome coronavirus 2. SARS-CoV-2 is the strain of coronavirus that causes the COVID-19 disease.

#### What is a coronavirus antigen test?

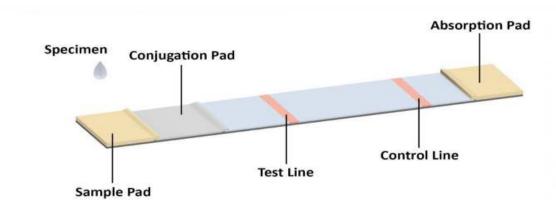
An antigen test is a diagnostic test that checks to see if you're infected with the coronavirus.

The test looks for proteins (antigens) in a sample taken from your nose or throat. **Antigen tests are faster than PCR tests.** 

LYHER® Novel Coronavirus (COVID-19) Antigen Test Kit (Colloidal Gold) is an in vitro diagnostic kit. The assay is for the direct and qualitative detection of antigen of SARS-CoV-2 **Protein N** from nasopharyngeal, oropharyngeal, Nasal, Saliva and sputum secretions specimens.



## **Test Principle**



The test line is coated with anti-SARS-CoV-2 antibodies

The Control line is coated with goat-anti-mouse IgG antibodies

The conjugation pad is coated with anti-SARS-CoV-2 monoclonal antibodies

If the specimen contains the antigen of SARS-CoV-2, a colored test line(T line) will be visible in the result window. If the specimen does not contain the antigen of SARS-CoV-2, no test line will show, only quality control line(C line) will appear

#### **Product Features**



**CE Marked** 

Ð





Easy to collect samples



No equipment needed



Easy

to read

results



Room temperature storage

## **Product Portfolio**

#### Nasopharyngeal or oropharyngeal (for professional use only)

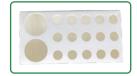




Extraction buffer



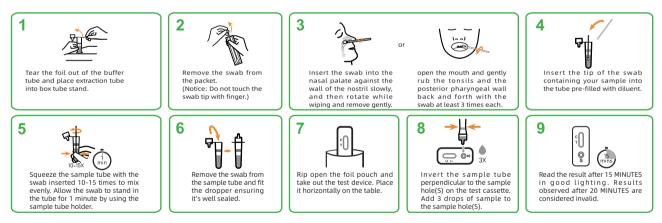
Sterile swab



Work station

#### **Test Procedure**

Test device



#### Clinical data (For professional use only)

#### **CLINICAL EVALUATION:**

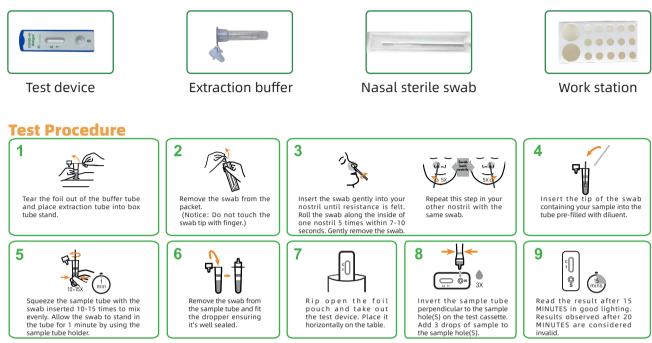
Clinical evaluation was performed to compare the results obtained by The LYHER<sup>®</sup> Novel Coronavirus (COVID-19) Antigen Test Kit and RT-PCR. The results were summarized below:

#### Table 1: COVID-19 Rapid Test vs. RT-PCR

Test Results of Lyher Kit		Clinical diagnosis(PCR results)			
		Positive(+)	Negative(-)	Total	
	Positive(+)	193	1	194	
	Negative(-)	10	381	391	
	Total	203	382	585	

Clinical Sensitivity: 95.07% (91.13%-97.61%)\* Clinical Specificity: 99.74% (98.55%-99.99%)\* Total coincidence rate: 98.12% (97.02%-99.22%)\* \*95% Confidence Interval

#### Pre-nasal area (for professional use and home use)



#### Clinical Data(Professional use clinical data)

#### **Performance Characteristics**

#### **CLINICAL EVALUATION:**

Clinical evaluation was performed to compare the results obtained by The LYHER® Novel Coronavirus (COVID-19) Antigen Test Kit and RT-PCR. The results were summarized below:

#### Table 1: COVID-19 Rapid Test vs. RT-PCR (Nasal)

Testergebnisse des	Klinische Diagnose (PCR-Ergebnisse)			- [	Test results from	Clinical di	iagnosis(PC	R results)
Lyher-Kits	Positive(+)	Negative(-)	Total		the Lyher kit	Positive(+)	Negative(-)	Total
Positive(+)	145	1	144		Positive(+)	193	1	194
Negative(-)	7	249	256		Negative(-)	10	381	391
Total	152	250	402		Total	203	382	585

Sensitivity: 95,39% (90,74%, 98,13%)\* Specificity: 99,60% (97,79%, 99,99%)\* Total Accurately: 98,01% (96,12%, 99,14%)

#### Self test clinical data

The LYHER<sup>®</sup> COVID-19 antigen self-test was examined with nasal mucus samples from individuals either infected or uninfected with SARS-CoV-2 and compared with a molecular test (RTPCR test), in order to determine sensitivity and specificity. The study was done with 411 samples.

COVID-19 Antigen Self-Test Compared to RT-PCR						
Test results from the		Clinical Diagnosis (PCR results)				
	Lyher kit	Positive(+)	Negative(-)	Total		
	Positive(+)	152	1	153		
	Negative(-)	8	250	258		
	Total	160	251	411		

Sensitivity: 95.0% Specificity: 99.6%

A feasibility study showed that 100% of participants understood how the results should be interpreted. Of the participants, 70% found the instructions for use very clear and 30% clear. Of the participants, 76% found the reading of the test result very clear and 23% clear. Of the participants, 67% found the test very easy and 33% easy. 97.81% of different test results were interpreted accurately. 84.67% of participants completed the test without help.

#### Saliva/sputum (for professional use and home use)











Test device

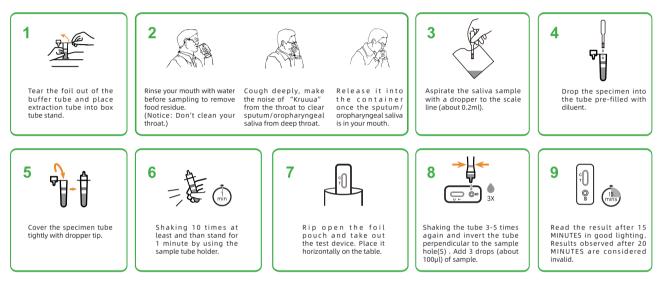
Extraction buffer

Specimen cup

disposable dropper

Work station

#### **Test Procedure**



#### Clinical Data(For professional use only)

Clinical evaluation was performed to compare the results obtained by The LYHER<sup>®</sup> Novel Coronavirus (COVID-19) Antigen Test Kit and RT-PCR. The results were summarized below: **Table 1: COVID-19 Rapid Test vs. RT-PCR** 

Test Results of	Clinical diagnosis(PCR results)				
Lyher Kit	Positive(+)	Negative(-)	Total		
Positive(+)	63	0	63		
Negative(-)	5	68	73		
Total	68	68	136		

Clinical Sensitivity: 92.65% (83.67%-97.57%)\* Clinical Specificity: 100.00% (94.72%-100.00%)\* Total coincidence rate: 96.32% (91.63%-98.80%)\*

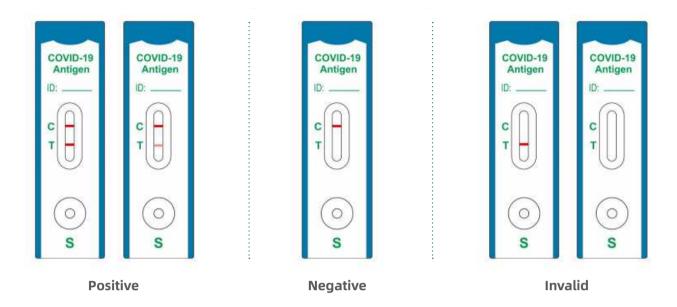
#### Self test clinical data

Clinical evaluation was performed to compare the results obtained by The LYHER<sup>®</sup> SARS-CoV-2 Antigen Rapid Test Kit for self-testing (Saliva) and RT-PCR. The results were summarized below:

COVID-19 Antigen Self-Test Compared to RT-PCR						
Т	est results from the	Clinical Diagnosis (PCR results)				
	Lyher kit	Positive(+)	Negative(-)	Total	8 C	
	Positive(+)	94	0	94	r	
	Negative(-)	16	460	476	Т	
	Total	110	460	570	*	

Clinical Sensitivity (true positive rate): 85.45% (77.46%-91.45%)\* Clinical Specificity (true negative rate): more than 99% (99.20%-100.00%)\* Total coincidence rate: 97.19%(95.48%-98.39%)\* \*95% Confidence Interval

#### **Interpretation of Results**



**POSITIVE:** Two colored lines appear on the membrane. One colored line appears in the control region (C) and the other line appears in the test region (T).

**NEGATIVE:** Only a single colored line appears in the control region (C). No visible colored line appears in the test region (T).

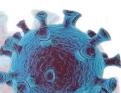
**INVALID:** The control line does not appear. The tests results which do not show a control line after the specified reading time should be discarded. The sample collection should be checked and repeated with a new test. Stop using the test kit immediately and contact your local dealer if the problem persists.

#### CAUTION

1. The color intensity in the test region (T) may vary depending on the concentration of virus proteins present in the nasal mucus sample. Therefore, any color in the test region should be considered positive. It should be noted that this is only a qualitative test and cannot determine the concentration of viral proteins in the nasal mucus sample.

2. Insufficient sample volume, improper procedure or expired tests are the most likely reasons why the control line does not appear.







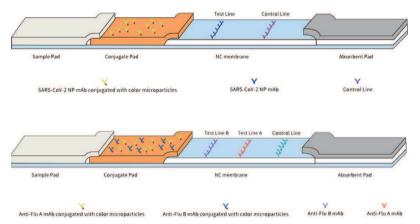
## COVID-19 and Influenza A/B **Antigen Test Kit** (for professional use and home use)

At present, the prevention and control of new coronavirus pneumonia (NPV) has entered a critical period, however, the prevalence of influenza A/B virus infection is gradually increasing, and its clinical manifestations are similar to npv pneumonia, it is difficult to be differentiated by clinical manifestation and chest imaging, and the treatment of the two infections is quite different.



The rapid differential detection protocol for influenza virus and new coronavirus infection is helpful for rapid, safe and labor-saving differential diagnosis of influenza A/B virus and new coronavirus infection, as well as identification of co-infection.

## **Test Principle**



The immune colloidal gold technique is used in the assay to detect antigens of SARS-CoV-2 and Influenza A/B. The sample pad is coated with colloidal gold bound antibodies. The quality control area is coated with goat anti-mouse IgG, and test area with anti-SARS-CoV-2 or Influenza A/B antibodies. When testing, if there are any SARS-CoV-2 or Influenza A/B antigen, the T line will become visiable red. The C line should be red after add sample.

## **Product Features**



**CE Marked** 



**Result** in 15mins



Easy to collect samples



No equipment needed



Easy to read results



Room temperature storage

#### Nasopharyngeal or oropharyngeal (for professional use only)



Test device

**Test Procedure** 

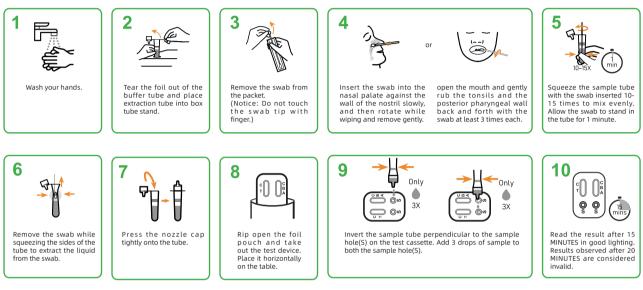
Extraction buffer

# ------



Sterile swab

Work station



#### Clinical data (For professional use only)

#### **Performance Characteristics**

#### **CLINICAL EVALUATION:**

Clinical evaluation was performed to compare the results obtained by The LYHER® Test Kit and RT-PCR. The results were summarized below:

Test Results of Lyher Kit		Clinical diagnosis(PCR results)			
		Positive(+)	Negative(-)	Total	
	Positive(+)	51	0	51	
	Negative(-)	2	140	142	
	Total	53	140	193	

#### Table 2: Lyher Test Kit - Influenza A

Test Results o	of Cli	Clinical diagnosis(PCR results)			
Lyher Kit	Ро	sitive(+)	Negative(-)	Total	
Positive(+)		32	0	32	
Negative(-)		0	161	161	
Total		32	161	193	

Clinical Sensitivity: 100.00% (99.64%,100.00%)\* Clinical Specificity: 100.00% (99.84%,100.00%)\* Total coincidence rate: 100.00% (99.85%,100.00%)\* Clinical Sensitivity: 96.23% (91.10%,100.00%)\* Clinical Specificity: 100.00% (99.82%,100.00%)\* Total coincidence rate:98.96% (97.53%,100.00%)\*

#### Table 2: Lyher Test Kit - Inluenza B

Test Results of	Clinical di	Clinical diagnosis(PCR results)				
Lyher Kit	Positive(+)	Negative(-)	Total			
Positive(+)	17	0	17			
Negative(-)	1	175	176			
Total	18	175	193			

Clinical Sensitivity: 94.44% (83.86%,100.00%)\* Clinical Specificity: 100.00% (99.84%,100.00%)\* Total coincidence rate: 99.48% (98.47%,100.00%)\* \*95% Confidence Interval

#### Pre-nasal area (for home use)





Test device

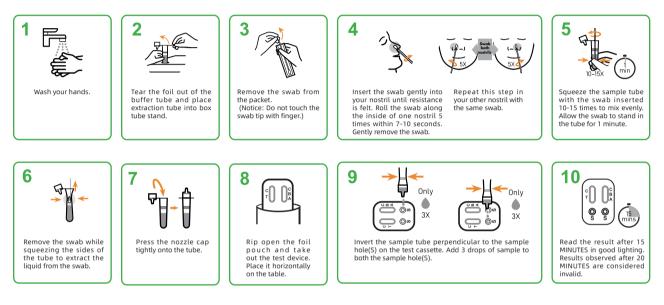
**Test Procedure** 

Extraction buffer

## Nasal sterile swab



Work station



#### Self test clinical data

Clinical evaluation was performed to compare the results obtained by The LYHER® COVID-19 and Influenza A/B Antigen Test Kit for self-testing and RT-PCR. The results were summarized below:

#### Table 2: COVID-19 Rapid Test vs. RT-PCR

Test Results of Lyher Kit		Clinical diagnosis(PCR results)			
		Positive(+)	Negative(-)	Total	
	Positive(+)	103	0	103	
	Negative(-)	7	460	467	
	Total	110	460	570	

Clinical Sensitivity (true positive rate): 93.67% (87.33%-97.40%)\* Clinical Specificity (true negative rate): more than 99% (99.20%-100.00%)\* Total coincidence rate: 98.77%(97.49%-99.50%)\* \*95% Confidence Interval

#### Table 2: Influenza A Test vs. RT-PCR

Test Results of	Clinical diagnosis(PCR results)				
Lyher Kit	Positive(+)	Negative(-)	Total		
Positive(+)	72	0	72		
Negative(-)	1	280	281		
Total	73	280	353		

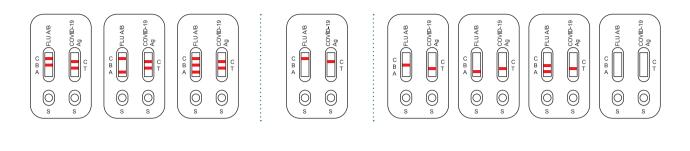
Clinical Sensitivity (true positive rate) : 98.63% (92.60%-99.97%)\* Clinical Specificity (true negative rate) : more than 99% (98.69%-100.00%)\* Total coincidence rate: 99.72% (98.43%-99.99%)\* \*95% Confidence Interval

#### Table 2: Influenza B Test vs. RT-PCR

Test Results of	Clinical diagnosis(PCR results)				
Lyher Kit	Positive(+)	Negative(-)	Total		
Positive(+)	30	0	30		
Negative(-)	0	323	323		
Total	30	323	353		

Clinical Sensitivity (true positive rate) : more than 99% (88.43%-100.00%)\* Clinical Specificity (true negative rate) : more than 99% (98.86%-100.00%)\* Total coincidence rate: more than 99% (98.96%-100.00%)\*

### **Interpretation of Results**



Positive

Negative

Invalid

**Influenza A POSITIVE:** It is positive for Influenza A antigen if two Red lines appear. One Red line should be in the control line region (C), and the other one appears in the A test line region.

**Influenza B POSITIVE:**It is positive for Influenza B antigen if two Red lines appear. One red line should be in the control line region (C), and the other one appears in the B test line region.

**Influenza A and B POSITIVE:** It is positive for both the antigens of Influenza A and Influenza B if three Red lines appear. One Red line should be in the control line region (C), and another two should appear in A test line region and B test line region.

**NEGATIVE:** One Red line appears in the control region (C). No apparent red line appears in the influenza A and B test region (T).

#### CAUTION

1. The color intensity in the test region (T) may vary depending on the concentration of virus proteins present in the nasal mucus sample. It should be noted that this is only a qualitative test and cannot determine the concentration of viral proteins in the nasal mucus sample.

2. Insufficient sample volume, improper procedure or expired tests are the most likely reasons why the control line does not appear.

3. The true positive result should show a red line on the T line. If it is a very weak faint water mark (not red), it may be caused by too many samples, or there are interferents in the sample, or it is not time to read the result, so it should not be judged as positive.





1.For qualitative detection of the neutralizing antibody against novel coronavirus in Serum, plasma and whole blood from the People who have been vaccinated to determine whether it has a protective effect.

2.Quantitative detection of the neutralizing antibody against novel coronavirus in Serum, plasma and whole blood from the People who have been vaccinated to determine whether it has a protective effect and should vaccinate again or not.



The vaccine of COVID-19 generally needs two injections, and usually produces protective neutralizing antibodies about 7 days after the second injection. However, due to the difference of individual immunity, not everyone who has been vaccinated will produce neutralizing antibodies.

Some people who have been infected with the COVID-19 also produce protective neutralizing antibodies.

There are no definite evidence whether neutralizing antibodies can protect the mutated COVID-19. There are still lack of sufficient research on the protection period of neutralizing antibody.

## Timetable for the onset of 5 international vaccines

	Sinopharm	Pfizer	Moderna	Jassen	Novavax	AstraZeneca
Vaccine Technology	Inactivated vaccines	mRNA	mRNA	Adenovirus vector	Nano recombinant protein	Chimpanzee adenovirus vector vaccine
Inoculation dose	2 doses, 14-28 days apart	2 doses, 21 days apart	2 doses, 28 days apart	1 dose	2 doses, 28 days apart	2 doses, 28 days apart
Onset time of vaccine	14 days after inoculation	7 days after the second dose	14 days after the second dose	Get the most protection 14 days after inoculation	Start 14 days after the first injection	14 days after the second dose of vaccination; new data shows that there is a protective effect 22 days after the first dose

## **Product Features**



## **Clinic Evaluation**

Sensitivity and Specificity

In order to test the sensitivity and specificity of the COVID-19 neutralizing antibody test kit (IFC), blood samples were collected from COVID-19 Vaccinated people from 3 hospitals. The results were summarized below:

samples

results

storage

Table 1: COVID-19 Test vs. Vaccinated results

Vaccinated	positive	negative	Sensitivity	95%CI		Specificity
Healthy people without inoculation	0	256	/	/	/	100%
7 days after first inoculation	41	215	16.02%	11.47%	21.09%	/
7 days after second inoculation	232	24	90.63%	86.37%	93.90%	/
14 days after second inoculation	249	7	97.27%	94.45%	98.89%	/

### **Kit Contents**

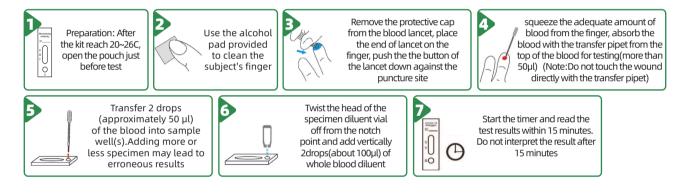
25pcs Test Cassettes

- 25pcs Droppers
- 25pcs lancets
- 25pcs Extraction buffer
- 25pcs Alcohol pad

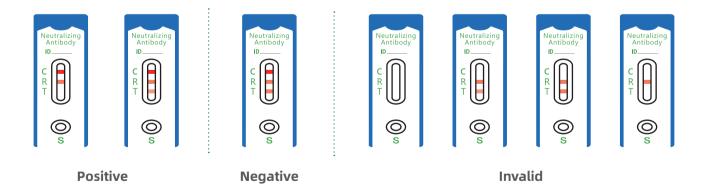




#### **Test Procedure**



#### **Interpretation of Results**



**POSITIVE:** There are no line in the test line region (T), or the color of T-line is lighter then R-line. And the control line region (C) is appeared.

**NEGATIVE:**The color of T-line is redder then R-line. And the control line region (C) is appeared.

**INVALID:** Control line fails to appear. Insufficient sample volumes or incorrect procedures are the most likely reasons for control line failure. Review the procedure and repeat the test with a new test cassette. If the problem persists, the test kit should be discontinued of using immediately and your local distributor should be contacted.

## Novel Coronavirus (2019-nCoV) IgM/IgG Antibody Combo Test Kit (Colloidal Gold)



For the qualitative detection of the antibodies of

IgM/IgG against novel coronavirus in serum, plasma or whole blood from patients with clinical suspicion of COVID-19 infection.

The antibody test kit is a product of the human immune response after infection with virus. In general, IgM antibodies appear early in the infection and IgG antibodies appear in middle and late stages on infection. Titers have a continuous increasing process and stay in blood circulation for longer time. The test for specific antibodies can determine whether a patient has "recently or previously infected 2019-nCoV". It helps to avoid "False Negatives" to complementary to nucleic acid test.

In the past 2020 LYHER® Novel Coronavirus(2019-nCov) IgM/IgG Antibody Combo Test Kit have been popular in more than 40 countries all over the world and passed a series of the certifications like EU CE, US FDA EUA, WHO EUL, French Ministry of Health, Malta MCCAA, Australia TGA, the Philippines FDA, Thai FDA, Brazil ANVISA and registered in Bolivia, Peru, Chile etc.

#### **Product Features**



**CE Marked** 



Result in 10mins



Easy to collect samples



No equipment needed



Easy

to read

results



Room temperature storage

## **Clinical trials:**

Sensitivity: 96.37%, Specificity: 99.05%, Total coincidence rate: 97.88%(Kappa=0.957, P < 0.001)

#### FDA EUA NCI Serology Test Evaluation repor

Measure	Estimate	Confidence Interval
IgM Sensitivity	96.7% (29/30)	(83.3%; 99.4%)
IgM Specificity	100% (80/80)	(95.4%; 100%)
IgG Sensitivity	100% (30/30)	(88.7%; 100%)
IgG Specificity	98.8% (79/80)	(93.3%; 99.8%)
Combined Sensitivity	100% (30/30)	(88.7%; 100%)
Combined Specificity	98.8% (79/80)	(93.3%; 99.8%)
Combined PPV for prevalence = 5%	80.8%	(40.9%; 96%)
Combined NPV for prevalence = 5%	100% (99.4%; 100%)	(99.4%; 100%)
Cross-reactivity with HIV+	0.0% (0/10) not detected	

#### **Specimen Collection**



Whole Blood/ Serum/ Plasma





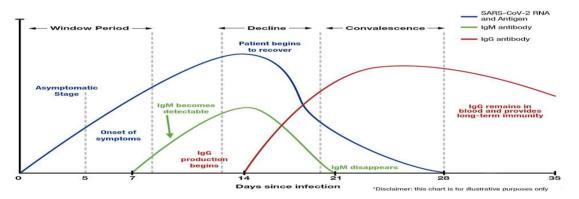
Fingertip blood

#### **Interpretation of Results**

#### **Cross-Reactivity**

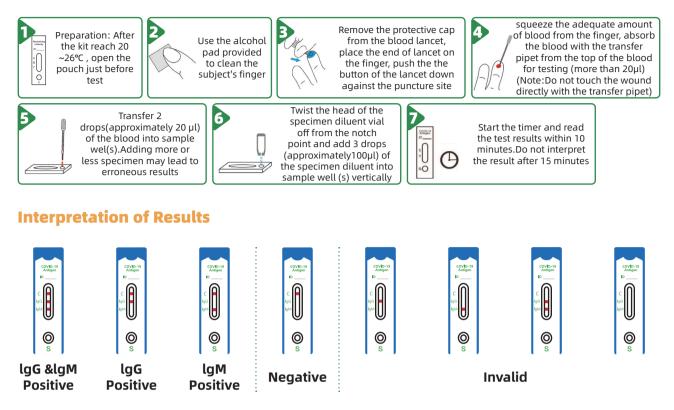
A series of 63 serum specimens confirmed positive for the different antinuclear antibodies (ANA), rheumatoid factor (RF), and other common viruses, such as Influenza (H1N1, H3N2, H5N1, H7N9, Yamagata, Victoria), RSV, RUB, CMV, HSV, VZV, HIV, EBV, adenovirus, rotavirus, mumps, enterovirus, and measles), and Legionella were obtained from outside clinical laboratories. All of the specimens were negative for COVID-19 antibodies. These specimens were then run in the LYHER® IgM/IgG Test Kit for Novel Coronavirus Antibody. The results of this study indicate that the LYHER® IgM/IgG Test Kit for Novel Coronavirus (2019-nCoV) Antibody contains no cross-reacting proteins to other common viruses, Legionella, ANA or rheumatoid factor.

#### Clinical significance and change of the IGM, IgG antibody levels



Test Results			Clinical Cignificance		
PCR	IGM	lgG	- Clinical Significance		
+	-	-	Patient may be in the window period of infection.		
+	+	-	Patient may be in the early stage of infection.		
+	+	+	Patient is in the active phase of infection.		
+	-	+	Patient may be in the late or recurrent stage of infection.		
-	+	-	Patient may be in the early stage of infection. PCR result may be false-negative.		
-	-	+	Patient may have a past infection, and has recovered.		
-	+	+	Patient may be in the recovery stage of infection. Or the PCR result may be false-negative.		

#### **Test Procedure**



**POSITIVE:** Two or three colored lines appear on the membrane. One colored line appears in the control region (C) and the other line appears in the test region (IgM or IgG or both).

**NEGATIVE**: Only a single colored line appears in the control region (C). No visible colored line appears in the test region (IgM or IgG).

**INVALID:** The control line (C) does not appear. The tests results which do not show a control line after the specified reading time should be discarded. The sample collection should be checked and repeated with a new test. Stop using the test kit immediately and contact your local dealer if the problem persists.

## **Packing information**

Code: 303002 Component: 40pcs test kits, 2 bottles of buffers( 4.5ml/bottle) Package Information: 25 boxes/carton 1000 pcs/carton Carton Size:63x35x30.5cm G.W: 9.5kg N.W: 9kg





Code: 303021 Component: 25 pcs test kits, 25 pcs buffers or 2bottles of buffers 25 pcs Lancets 25 pcs alcohol pads Package Information: 40 boxes/carton 1000 pcs/carton Carton Size:63x45x30.5cm G.W: 14.5kg N.W: 13kg



## **Ordering information**

Item	Product name	Product code	Specimen	Specification/Box
1	Novel Coronavirus (COVID-19) Antigen Test Kit	303035	Nasopharyngeal / Oropharyngeal	25Tests
2	Novel Coronavirus (COVID-19) Antigen Test Kit	303036	Nasal	25Tests
3	Novel Coronavirus (COVID-19) Antigen Test Kit for self-testing	303036	Nasal	1Test/2Tests/5Tests/ 7Tests/25Tests
4	Novel Coronavirus (COVID-19) Antigen Test Kit	303034	Saliva/Sputum	5Tests/25Tests
5	SARS-CoV-2 Antigen Rapid Test Kit for self-testing (Saliva)	303107	Saliva/Sputum	1Test/5Tests/ 7Tests/25Tests
6	COVID-19 and Influenza A/B Antigen Test Kit	303050	Nasopharyngeal / Oropharyngeal	20Tests/25 Tests
7	COVID-19 and Influenza A/B Antigen Test Kit for self-testing	303051	Nasal	1Test/5Tests/ 20Tests/25Tests
8	Novel Coronavirus (2019-nCoV) IgM/IgG Antibody Combo Test Kit (Colloidal Gold) with lancet/Alcohol pad	303021	Whole blood /Serum/Plasma	25Tests
9	Novel Coronavirus (2019-nCoV) IgM/IgG Antibody Combo Test Kit (Colloidal Gold)	303002	Whole blood /Serum/Plasma	40Tests
10	COVID-19 neutralizing antibody test kit(Colloidal Gold)	303057	Whole blood /Serum/Plasma	1Test/5Tests /25Tests/40Tests
11	COVID-19 neutralizing antibody test kit (Immunochromatography technique)	303060	Whole blood /Serum/Plasma	25Tests
12	COVID-19 neutralizing antibody test kit immunochromatography Analyzer	311001	1	1 Set







## Hangzhou Laihe Biotech Co., Ltd.

Add.: Room 401-406, F1-3, Building 1, No.425 Miaohouwang Road, Xixing Street, Binjiang District, Hangzhou, 310051

Tel: +86 5718765 3090 E-mail: office@lyher.com

**Fax:** +86 571 8665 8000 **Web:** www.lyherbio.com