Tigsun Flu A/B, RSV, COVID-19 Ag Combo test

INTENDED USE

The product is used to detect the antigen of Influenza/RSV/COVID-19 by qualitative detection of nasal swabs, nasopharyngeal swabs and oropharyngeal swabs.
The laboratory diagnosis method is virus isolation and culture, and the cell culture identification cycle is about 14 hours, which seriously affects the guidance of timely medication for patients in clinical practice, which is limited in clinical application. Compared with cell culture, reverse transcription polymerase chain reaction(RT-PCR) has higher sensivity, but the cost of RT-PCR is higher, the experimental time needs 4-6 hours, and it is highly professional in laboratory operation, so its filed application is limited. The product used latex chromatography is suitable for the diagnosis of influenza A, influenza B, RSV and COVID-19.

For in vitro diagnostic use only. For professional use only.

SUMMARY

Influenza is mainly caused by viral infection in the upper respiratory tact (nasal cavity, throat and bronchus) and only a few influenza is caused by viral infection in the lung.Generally, the infection lasts about a week. The main clinical signs are: sudden high fever,muscle soreness, headache, restlessness, dry cough, sore throat and rhinitis. In infants, the elderly or those susceptible to cancer, diabetes, cardiovascular and pulmonary disease, the vast majority of patients do not need treatment can be self-healing in 1-2 weeks. Infections can lead to many serious complications, such as pneumonia and even death. Influenza virus are mainly influenza A and influenza B;there are for subtypes of influenza A: H3N2, H1N1, H5N1, and H7N9.
Respiratory syncytial virus(RSV) is one of the most imporatant causes of respiratory tract infection(including bronchiolitis and pneumonia) in infants under 1 year old. The initial symptoms of RSV are similar to mild cold symptoms, such as runny nose, mild cough, fever etc, even difficulty breathing. Severe lower respiratory disease can occur at any age, especially in the elderly or people with cardiovascular, pulmonary and immue system diseases. RSV mainly invades the human body through the respiratory tract and spreads through the air (dust, droplets). RSV can survive for up to 6 hours in the environment. When contaminated hands or objects directly contact the eye or nasal mucosa, it is most likely to be infected.
2019 Novel Coronavirus, now known as SARS-CoV-2 (previously known as 2019-nCoV), is a new β-type coronavirus, which is a single-stranded RNA virus that can cause human respiratory infections. Its genetic characteristics are significantly different from severe acute respiratory syndrome (SARS)-associated coronavirus and Middle East respiratory syndrome (MERS)-associated coronavirus. The main infection site of the SARS-CoV-2 is the lower respiratory tract, which has a higher incidence in the elderly. The incubation period of infection is variable. Common symptoms after infection with SARS-CoV-2 include respiratory symptoms, fever, cough, shortness of breath, and difficult breathing. In more severe cases, infection can cause pneumonia, severe acute respiratory syndrome, kidney failure, and even death. The WHO has named the disease caused by SARS-CoV-2 as coronavirus disease 2019 (abbreviated “COVID-19”). SARS-CoV-2 is highly contagious and mainly transmitted through contact, droplet or airborne routes.

Principle

The test kits used the latex immunochromatography technology.

Influenza A/B:

On the nitrocellulose membrane, McAb2 to influenza A virus and McAb 2 to influenza B were coated on the detection line(T2) and (T1) respectively, Goat anti mouse IgG was coated on the position of quality control line(C), and the mouse influenza virus A/B monoclonal antibody 1 labeled with red latex microspheres was fixed on the latex binding pad. When the positive samples of influenza B virus were detected, the antigen of influenza B virus in the samples could bind with the monoclonal antibody 1 against influenza B virus labeled with red latex on the latex binding pad to form a sandwich complex and move along the membrane under the action of chromatography. When passing through the detection line (T1), it binds to the pre coated McAb-2 of influenza B virus and agglomerates to form a red band; When the positive samples of influenza A virus were detected, the antigen of influenza A virus in the samples could bind with the monoclonal antibody 1 against influenza A virus labeled with red latex on the latex binding pad to form a sandwich complex and move along the membrane under the action of chromatography. When passing through the detection line (T2), it binds to the pre coated McAb-2 of influenza A virus and agglomerates to form a red band. it combines with Goat anti mouse IgG to form a red band in quality control line (C); when testing negative samples, the negative samples only show red at the quality control line (C).

RSV/ COVID-19 virus:
On the nitrocellulose membrane, RSV and COVID-19 virus were coated on the detection line(T), Goat anti mouse IgG was coated on the position of quality control line(C), and the mouse anti COVID-19 virus and RSV antibody 1 labeled with red latex microspheres was fixed on the latex binding pad. When the positive samples were detected, the antigen of RSV and COVID-19 virus in the samples could bind with the monoclonal antibody 1 against RSV and COVID-19 virus labeled with red latex on the latex binding pad to form a sandwich complex respectively and move along the membrane under the action of chromatography. When passing through the detection line (T), the antigen of RSV and COVID-19 virus in the sample can bind with the mouse anti COVID-19 virus and RSV monoclonal antibody 2 form a red band at the quality control line (C), it combines with Goat anti mouse IgG to form a red band in quality control line (C); when testing negative samples, the negative samples only show red at the quality control line (C).
Therefore, whether a COVID-19/ Influenza A and B/ RSV antigen exists in clinical samples, a red band will appear at the quality control line (C).

PRECAUTION

1. This product is only used for in vitro diagnositcs, please do not use expired products.
2. Please do not use if the aluminum foil bag is damaged or the product is damaged before use.
3. Low temperature storage test card needs to be restored to room temperature before opening to avoid moisture absorption.Open the packaging bag of the test card before use. If the test card is opened for a long time, the test result may be affected by moistureCheck if the contents are complete before use. Reagent kits should be kept sealed and dry. The test cassette should be used in 1 hour after opened to avoid moisture.
4. There is no ribbon between the quality control line and the test line, indicating that the error detection should be retried.
5. It is recommended to use fresh samples instead of frozen samples.
6. If the virus sample is used to treat the sample, it can be detected directly without dilution of the sample extract.
7. Because this product can read the effect visually, in order to ensure the correct interpretation results, do not interpret the results in dim light.
8. Pay attention to safety measures during operation, such as wearing protective clothing and gloves. The used swabs, test cards, extraction tubes, etc. should be removed before they are discarded. It is recommended to disinfect with high pressure steam or soak in 0.1% hypochlorite. Waste residual reagents, samples and accessories should be treated separately as medical waste or production waste according to the relevant provisions on waste articles.
9. Inspectors should be trained in the necessary biosafety skills before testing.

MATERIAL

Material Provided

1. 25 Individual sealed pouches, each pouch contains 1 test cassette.
2. Treatment Reagent (25 pcs)
3. Reagent Tubes and Caps(25 pcs).
4. Swabs (25 pcs)
5. Instructions for use.

Material Required but not Provided

1. Timers
2. Personal protective equipment, such as protective gloves, medical mask, goggles and lab coats
3. Appropriate biohazard waste containers and disinfectants.

STORAGE AND STABILITY

1. The original packaging should be stored in a cool and dry place at 2~30℃，it is valid for 24 months.
2. The reagent card must be tested within 1 hour after being removed from the aluminum foil bag. The sample extract should be capped immediately after use and placed in the shade. Please use it within the validity period.
3. Production date and expiration date are printed on the label

QUALITY CONTROL

1. Controls may also be used to demonstrate that the reagents and assay procedure perform properly.
2. We recommends that Positive and Negative Controls be run: once for each untrained operator, once for each new shipment of kits , as deemed additionally necessary by your internal quality control procedures, and in accordance with Local, State and Federal regulations or accreditation requirements.
3. Positive and Negative Control swabs are supplied in the kit and should be tested using the Test Procedure provided in this Instructions for use or Package Insert.
4. Do not perform patient tests or report patient test results if either of the QC test results fail. Repeat the test or contact Tigsun Technical Support before testing patient samples.

SPECIMEN COLLECTION

It is recommended to use PP (polypropylene) rod polyester sponge, rayon or polyester cotton ball swabs for sample collection.

Nasal Swab Specimen Collection:

1. Carefully insert the swab into one nostril of the patient. Using gentle rotation, push the swab until resistance is met at the level of the turbinates (up to 2.5 cm or 1 inch from the edge of the nostril).

2. Rotate the swab several times (~5 times) against the nasal wall. Remove and repeat this process by using the same swab into the second nostril to ensure that an adequate sample is collected from both nasal cavities.

3. Withdraw the swab from the nasal cavity. The sample is now ready for processing using the kit.

The virus sampling solution or the sample extraction solution provided by this kit should be used as soon as possible after the sample collection. If it can not be treated immediately, the specimen should be stored immediately in a dry, sterilized and tightly sealed plastic tube. It can be stored for 4 hours at room temperature, 12 hours at 2℃-8℃, 12 months at -20℃ and at least 3 years at -70℃.

TEST PROCEDURE

Please read the manual carefully before use. All reagents should be tested at room temperature before use.

Ⅰ. Sample extraction

1. Hold the prefilled treatment reagent vertically. Break the tip and squeeze the bulb to dispense all buffer in the 1 piece of treatment reagent (~0.7ml) into the reagent tube.
2. Soak the swab swab after sampling into the sample extraction solution in the extraction tube and stir.
3. From the outer side of the extraction tube, press the cotton stick with your fingers several times to make the sample extract fully soak the cotton stick.
4. Pull out the cotton stick so that the liquid on the cotton stick remains in the tube as much as possible, and take out and discard the swab. Cover the dripper.

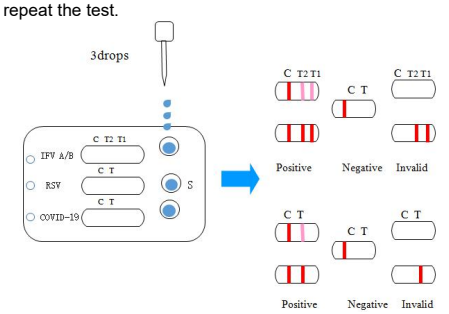
Ⅱ.Test procedure

1.Take out the test card from the aluminum foil bag, write the sample number and put it on the horizontal table.
2.Drop 80 uL (about 3 drops) of treated sample extract into each well of the sample adding hole of the test card or directly add 80 uL of treated virus collection solution into each hole.
3.After 15minutes, observe the result, it's valid time is 30 minutes.

RESULT INTERPRETATION

According to different regions and different populations, it is suggested that each laboratory should built its own reference range.

1. Positive Result: Two or three bands appear. One red band was located in the detection line (T/T1/T2), and the other was in the quality control line (C). The positive results showed Influenza A and B /RSV / COVID-19 antigen was detected in the samples by T/T2/T1.
2. Negative Result: Only one red band appeared in quality control line (C). There was no red band in the detection line (T/T1/T2). Negative results showed that Influenza A and B /RSV / COVID-19 antigen was not detected in the samples, or the content was below the detectable range.
3. Invalid Result: There is no red band in quality control line (C), which indicates that the operation process is incorrect or the detection card has deteriorated and damaged. Please use another card to test again. Sometimes, because of the large amount of antigen in the sample, the band at the detection line (T/ T1/T2) is very deep, but there is no band at the quality control line (C). At this time, please dilute the sample and repeat the test.



LIMITATIONS OF PROCEDURE

1. The collection and treatment of samples have a great impact on pathogen detection. Improper collection, storage, freshness or repeated freezing and thawing of samples will affect the detection resultsThis reagent is a qualitative assay. It is not designed to determine the quantitative concentration of influenza A virus, influenza B virus, RSV and COVID-19 antigen.
2. Due to the limitation of the detection reagent methodology, the sensitivity of the analysis is generally lower than that of the nuclear acid reagent. Therefore, negative test results can not exclude the possibility of virus infection, and can not be used as the only basis for diagnosis, treatment or other management decisions. If the test result is negative and the patient has clinical symptoms, it is recommended to use virus isolation culture or nucleic acid test for review, and the diagnosis shall be made by the comprehensive judgment of the attending physician.
3. For the detection of influenza A virus, influenza B virus, RSV and COVID-19, a positive result cannot exclude bacterial infection or mixed infection of other viruses outside the test indicators. It is recommended to conduct further experiments on positive results to confirm the subtypes of influenza A virus, influenza B virus, RSV, and COVID-19, and consult the local public health prevention agency for consultation.
4. The positive rates of samples in different stages of different courses were not consistent.
5. During sample collection, patients vaccinated with live attenuated vaccine may result in positive test results.
6. Positive and negative predictive values depend largely on prevalence. The detection performance of some viruses may vary with the detection prevalence and population.
7. The test results are only the reference for clinical diagnosis.

PERFORMANCE CHARACTERISTICS

Limit of Detection

Influenza A virus H1N1(2009)(A/California/08/2009): no more than:10^4TCID$_{50}$/mL,
Seasonal Influenza A virus H1N1(A/PR/8/34): no more than 2×10^3TCID$_{50}$/mL,
Influenza A virus H3N2(A/Hong Kong/8/68): no more than:10^4TCID$_{50}$/mL,
Influenza A virus H5N1(A/Beijing/302/54): no more than:10^4TCID$_{50}$/mL,
Influenza B(Yamagata): no more than:10^4TCID$_{50}$/mL,
Influenza B (Victoria): no more than:10^4TCID$_{50}$/mL,
RSV A (Long): no more than:10^4TCID$_{50}$/mL,
RSV B(WV/14617/85): no more than:10^4TCID$_{50}$/mL,
COVID-19 virus :no more than 5×10^2TCID$_{50}$/mL..

Cross Reactivity (Analytical Specificity)

1. Influenza A,influenza B, RSV, COVID-19 do not cross each other.
2. With respiratory adenovirus, parainfluenza virus, metapneumovirus, respiratory tract infection enterovirus, enterovirus/rhinovirus, coronavirus, boca virus, mycoplasma pneumonia, cytomegalovirus, herpes simplex virus type 1, Neisseria Genus, varicella-zoster virus, Epstein-Barr virus, Staphylococcus aureus, Bacillus pertussis, Staphylococcus epidermidis, Chlamydia pneumoniae, Streptococcus pneumoniae, Pneumocystis, Corynebacterium, Streptococcus pyogenes, Candida albicans, Streptococcus salivarius , Haemophilus influenzae, Lactobacillus, Klebsiella pneumoniae, Legionella pneumophila, Moraxella catarrhalis, etc. have no cross reactivity.

Interfering substance

Common interfering substances, such as blood, mucins, etc., in the samples did not affect the results,nasal spray or nasal drops have no effect on the test results, nasal skin steroids have no effect on test results,allergic symptom relief drugs have no effect on the test results,influenza vaccine has no effect on test results,run throat tablets, oral anesthetics and analgesics had no effect on the test results,antiviral drugs have no effect on test results,antibiotics, nasal ointment did not affect the test results,systemic antimicrobials, no effect on test results.

Hook effects: No Hook effect on detection of high concentrations of influenza A/B / RVS/ COVID-19 virus positive samples(concentrations≤5×10^8 TCID$_{50}$/mL) was observed.

CLINICAL PERFORMANCE

537 clinical case samples, which include 125 confirmed Influenza A positive samples, 77 confirmed Influenza B positive samples, 55 confirmed RSV positive samples, 188 confirmed COVID-19 positive samples and 104 confirmed excluded case samples, were obtained for testing, and then compared the test results between Tigsun COVID-19 Antigen Rapid Test and the confirmed case samples. The results of sensitivity and specificity between the two methods are shown below.

Influenza A :

Influenza A		PCR			%		95% CI	
		POS	NEG	Total			Lower limit	Upper limit
Tigsun combo test	POS	120	1	121	Sensitivity	96.00	90.98	98.28
	NEG	5	411	416	Specificity	99.76	98.64	99.96
	Total	125	412	537				

Influenza B:

Influenza B		PCR			%		95% CI	
		POS	NEG	Total			Lower limit	Upper limit
Tigsun combo test	POS	75	1	76	Sensitivity	97.40	91.02	99.28
	NEG	2	459	461	Specificity	99.78	98.78	99.96
	Total	77	460	537				

RSV:

RSV		PCR			%		95% CI	
		POS	NEG	Total			Lower limit	Upper limit
Tigsun combo test	POS	54	0	54	Sensitivity	98.18	90.39	99.68
	NEG	1	482	483	Specificity	100.00	99.21	100.00
	Total	55	482	537				

COVID-19:

COVID-19		PCR			%		95% CI	
		POS	NEG	Total			Lower limit	Upper limit
Tigsun combo test	POS	184	2	186	Sensitivity	97.87	94.66	99.17
	NEG	4	347	351	Specificity	99.43	97.93	99.81
	Total	188	349	537				

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