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DIAQUICK Influenza Ag Dipstick

(en) English

REF	**Content**
Z09440CE	- 25 dipsticks individually packed (25x REF Z09440B) - 1x 10 mL buffer - 25 sterile swabs - 25 extraction tubes - 1 positive control (A, B) - 1 negative control (A, B) - 1 workstation - 1 package insert

For professional in vitro diagnostic use only.

INTENDED USE

The DIAQUICK Influenza Ag Dipstick is a rapid chromatographic immunoassay for the qualitative detection of influenza A and B antigens in nasopharyngeal swab, throat swab or nasal aspirate specimens. It is intended to aid in the rapid differential diagnosis of influenza A and B viral infections.

DIAGNOSTIC SIGNIFICANCE

Influenza (commonly known as 'flu') is a highly contagious, acute viral infection of the respiratory tract. It is a communicable disease easily transmitted through the coughing and sneezing of aerosolized droplets containing live virus.[1] Influenza outbreaks occur each year during the fall and winter months. Type A viruses are typically more prevalent than type B viruses and are associated with most serious influenza epidemics, while type B infections are usually milder.
The gold standard of laboratory diagnosis is 14-day cell culture with one of a variety of cell lines that can support the growth of influenza virus.[2] Cell culture has limited clinical utility, as results are obtained too late in the clinical course for effective patient intervention. Reverse Transcriptase Polymerase Chain Reaction (RT-PCR) is a newer method that is generally more sensitive than culture with improved detection rates over culture of 2-23%.[3] However, RT-PCR is expensive, complex and must be performed in specialized laboratories.
The DIAQUICK Influenza Ag Dipstick qualitatively detects the presence of Influenza A and/or Influenza B antigen in nasopharyngeal swab or throat swab or nasal aspirate specimens, providing results within 15 minutes. The test uses antibodies specific for Influenza A and Influenza B to selectively detect Influenza A and Influenza B antigen in nasopharyngeal swab, throat swab or nasal aspirate specimens.

TEST PRINCIPLE

The DIAQUICK Influenza Ag Dipstick is a qualitative, lateral flow immunoassay for the detection of Influenza A and Influenza B nucleoproteins in nasopharyngeal swab, throat swab or nasal aspirate specimens. In this test, antibody specific to the Influenza A and Influenza B nucleoproteins is separately coated on the test line regions of the test Dipstick. During testing, the extracted specimen reacts with the antibody to Influenza A and/or Influenza B that are coated onto particles. The mixture migrates up the membrane to react with the antibody to Influenza A and/or Influenza B on the membrane and generate one or two colored lines in the test regions. The presence of this colored line in either or both of the test regions indicates a positive result. To serve as a procedural control, a colored line will always appear in the control region if the test has performed properly.

REAGENT COMPOSITION

The DIAQUICK Influenza Ag Dipstick contains anti-Influenza A and B particles and anti- Influenza A and B coated on the membrane.

MATERIAL REQUIRED BUT NOT PROVIDED

- Timer
- Aspiration device (nasal)

REAGENT PREPARATION

This test is ready to use.

STORAGE AND STABILITY

Store the test at room temperature or refrigerated (2-30°C).
The test is stable through the expiration date printed on the sealed pouch.
The test must remain in the sealed pouch until use.
DO NOT FREEZE!
Do not use beyond the expiration date.

WARNINGS AND PRECAUTIONS

Please read all the information in this package insert before performing the test.
1. For professional in vitro diagnostic use only. Do not use after the expiration date.
2. The test should remain in the sealed pouch until ready to use.
3. All specimens should be considered potentially hazardous and handled in the same manner as an infectious agent.
4. The used test should be discarded according to local regulations.

SPECIMEN COLLECTION AND STORAGE

- **Nasopharyngeal swab sample**

Insert a sterilized swab into a nasal cavity securely from a nostril and collect mucoepidermis wiping turbinate several times.

- **Throat swab sample**

Insert a sterilized swab into pharynx and collect mucoepidermis mainly wiping flare region of post-pharyngeal wall and palatine tonsil several times and be careful not to make saliva attach to the swab.

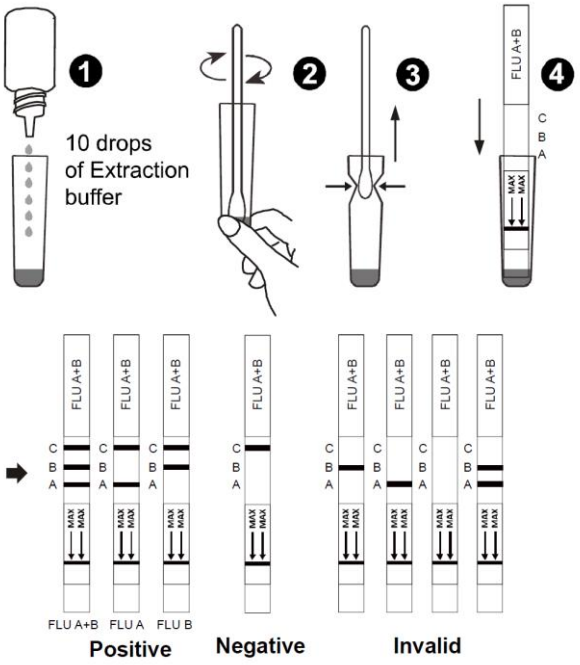
- **Nasal aspirate**

Connect an aspiration catheter to an aspiration trap that is attached to an aspiration device, insert the catheter to nasal cavity from a nostril, start the aspiration device and then collect nasal aspirate sample. Dip a sterilized swab into the collected nasal aspirate sample and make the specimen cling to the swab.

TEST PROCEDURE

Allow the test, specimen, extraction buffer to equilibrate to room temperature (15-30°C) prior to testing.

1. Remove the test Dipstick from the sealed foil pouch and use it as soon as possible. Best results will be obtained if the assay is performed immediately after opening the foil pouch.
2. Place the Extraction Tube in the workstation. Hold the extraction reagent bottle upside down vertically. Squeeze the bottle and let the solution drop into the extraction tube freely without touching the edge of the tube. Add **10 drops of solution of extraction reagent** (Approx. 400 µL) to the Extraction Tube. See illustration 1.
3. Place the swab specimen in the Extraction Tube. Rotate the swab for approximately 10 seconds while pressing the head against the inside of the tube to release the antigen in the swab. See illustration 2.
4. Remove the swab while squeezing the swab head against the inside of the Extraction Tube as you remove it to expel as much liquid as possible from the swab. Discard the swab in accordance with your biohazard waste disposal protocol. See illustration 3.
5. With arrows pointing down, place the dipstick into the tube of solution and then start the timer. If the procedure is followed correctly, the liquid should be below the maximum line (MAX) on the test dipstick. See the illustration 4.
6. Wait for the colored line(s) to appear. Read the result at **15 minutes**. Do not interpret the result after 20 minutes.



INTERPRETATION OF RESULTS

(Please refer to the illustration above)

POSITIVE Influenza A:* Two distinct colored lines appear. One colored line should be in the control region (C) and another colored line should be in the Influenza A region (A). A positive result in the Influenza A region indicates that Influenza A antigen was detected in the sample.

POSITIVE Influenza B:* Two distinct colored lines appear. One colored line should be in the control region (C) and another colored line should be in the Influenza B region (B). A positive result in the Influenza B region indicates that Influenza B antigen was detected in the sample.

POSITIVE Influenza A and Influenza B:* Three distinct colored lines appear. One colored line should be in the control region (C) and two colored line should be in the Influenza A region (A) and Influenza B region (B). A positive result in the Influenza A region and Influenza B region indicates that Influenza A antigen and Influenza B antigen were detected in the sample.
***NOTE**: The intensity of the color in the test line regions (A or B) will vary based on the amount of Flu A or B antigen present in the sample. So any shade of color in the test regions (A or B) should be considered positive.

NEGATIVE: One colored line appears in the control region (C). No apparent colored line appears in the test line regions (A or B).

INVALID: Control line fails to appear. Insufficient specimen volume or incorrect procedural techniques are the most likely reasons for control line failure. Review the procedure and repeat the test with a new test Dipstick. If the problem persists, discontinue using the test kit immediately and contact your local distributor.

QUALITY CONTROL AND CALIBRATION

Internal procedural controls are included in the test. A red line appearing in the control region (C) is an internal positive procedural control. It confirms sufficient specimen volume and correct procedural technique. A clear background is an internal negative procedural control. If the test is working properly, the background in the result area should be white to light pink and not interfere with the ability to read the test result.

It is recommended to test the positive and negative control swabs, which are supplied with this kit, as a good laboratory practice to confirm the test procedure and to verify proper test performance.

PERFORMANCE CHARACTERISTICS

Sensitivity, Specificity and Accuracy

The DIAQUICK Influenza Ag Dipstick has been evaluated with specimens obtained from the patients. RT-PCR is used as the reference method for the DIAQUICK Influenza Ag Dipstick. Specimens were considered positive if RT-PCR indicated a positive result. Specimens were considered negative if RT-PCR indicated a negative result.

Nasopharyngeal Swab Specimen

		Type A			Type B		
		RT-PCR		Total	RT-PCR		Total
		Positive	Negative		Positive	Negative	
Flu A+B	Positive	100	2	102	85	2	87
	Negative	1	180	181	2	200	202
Total		101	182	283	87	202	289
Relative Sensitivity		99.0%			97.7%		
Relative Specificity		98.9%			99.0%		
Accuracy		98.9%			98.6%		

Throat Swab Specimen

		Type A			Type B		
		RT-PCR		Total	RT-PCR		Total
		Positive	Negative		Positive	Negative	
Flu A+B	Positive	58	1	59	65	1	66
	Negative	3	150	153	4	162	166
Total		61	151	212	69	163	232
Relative Sensitivity		95.1%			94.2%		
Relative Specificity		99.3%			99.4%		
Accuracy		98.1%			97.8%		

Nasal Aspirate Specimen

		Type A			Type B		
		RT-PCR		Total	RT-PCR		Total
		Positive	Negative		Positive	Negative	
Flu A+B	Positive	46	2	48	94	1	95
	Negative	0	241	241	2	158	160
Total		46	243	289	96	159	255
Relative Sensitivity		100%			97.9%		
Relative Specificity		99.2%			99.4%		
Accuracy		99.3%			98.8%		

Reactivity with Human Influenza Strain

The DIAQUICK Influenza Ag Dipstick was tested with the following human influenza strains and a discernible line at appropriate test-line regions was observed:

Influenza A Virus	*Influenza B Virus*
A/NWS/33 10(H1N1) A/Hong Kong/8/68(H3N2) A/Port Chalmers/1/73(H3N2) A/WS/33(H1N1) A/New Jersey/8/76(HswN1) A/Mal/302/54(H1N1) A/chicken/Yuyao/2/2006 (H5N1) A/swine/Hubei/251/2001 (H9N2) A/Duck/Hubei/216/1983(H7N8) A/Duck/Hubei/137/1982(H10N4) A/Anhui/1/2013 (H7N9)	B/R5 B/Russia/69 B/Lee/40 B/Hong Kong/5/72

Specificity Testing with Various Viral Strains

Description	Test Level
Human adenovirus C	5.62 x 10^5 TCID50/mL
Human adenovirus B	1.58 x 10^4 TCID50/mL
Adenovirus type 10	3.16 x 10^3 TCID50/mL
Adenovirus type 18	1.58 x 10^4 TCID50/mL
Human coronavirus OC43	2.45 x 10^6 LD50/mL
Coxsackievirus A9	2.65 x 10^4 LD50/mL 1.58 x 10^5 TCID50/mL
Coxsackievirus B5	1.58 x 10^7 TCID50/mL
Human herpesvirus 5	1.58 x 10^4 TCID50/mL
Echovirus 2	3.16 x 10^5 TCID50/mL
Echovirus 3	1 x 10^4 TCID50/mL
Echovirus 6	3.16 x 10^6 TCID50/mL
Herpes simplex virus 1	1.58 x 10^6 TCID50/mL
Human herpesvirus 2	2.81 x 10^5 TCID50/mL
Human Rhinovirus 2	2.81 x 10^4 TCID50/mL
Human Rhinovirus 14	1.58 x 10^6 TCID50/mL
Human Rhinovirus 16	8.89 x 10^6 TCID50/mL
Measles	1.58 x 10^4 TCID50/mL
Mumps	1.58 x 10^4 TCID50/mL
Sendai virus	8.89 x 10^7 TCID50/mL
Parainfluenza virus 2	1.58 x 10^7 TCID50/mL
Parainfluenza virus 3	1.58 x 10^8 TCID50/mL
Respiratory syncytial virus	8.89 x 10^4 TCID50/mL
Human respiratory syncytial virus	1.58 x 10^5 TCID50/mL
Rubella	2.81 x 10^5 TCID50/mL
Varicella-Zoster	1.58 x 10^3 TCID50/mL

TCID50 = Tissue Culture Infectious Dose is the dilution of virus that under the conditions of the assay can be expected to infect 50% of the culture vessels inoculated.

LD50 = Lethal Dose is the dilution of virus that under the conditions of the assay can be expected to kill 50% of the suckling mice inoculated.

Precision

Intra-Assay and Inter-Assay

Within-run and Between-run precision has been determined by using five specimens of Influenza standard control. Three different lots of the DIAQUICK Influenza Ag Dipstick have been tested using negative, Influenza A weak, Influenza B Weak, Influenza A Strong and Influenza B Strong. Ten replicates of each level were tested each day for 3 consecutive days. The specimens were correctly identified>99% of the time.

Cross-reactivity

The following organisms were tested at 1.0x108org/mL and all found to be negative when tested with the DIAQUICK Influenza Ag Dipstick:

Arcanobacterium	*Pseudomonas aeruginosa*
Candida albicans	*Staphylococcus aureus subspaureus*
Corynebacterium	*Staphylococcus epidermidis*
Enterococcus faecalis	*Staphylococcus saprophylicus*
Enterococcus faecium	*Streptococcus agalactiae*
Escherichia coli	*Streptococcus bovis*
Haemophilus	*Streptococcus dysgalatiae / subsp.dysgalatiae*
Moraxella catarrhalis	*Streptococcus oralis formerly Streptococcus*
Neisseria gonorrhoeae	*Streptococcus pneumoniae*
Neisseria lactamica	*Streptococcus pygenes*
Nesseria subllava	*Streptococcus salivarius*
Proleus vulgaris	*Streptococcus sp group F.type 2*

TRACEABILITY

For the comparison of the DIAQUICK Influenza Ag Dipstick a leading commercial RT-PCR test was used, which represents the gold standard.

EXPECTED VALUES

T The DIAQUICK Influenza Ag Dipstick has been compared with a leading commercial RT-PCR test. The correlation between these two systems is over 97%.

LIMITATIONS

1. The DIAQUICK Influenza Ag Dipstick is for professional in vitro diagnostic use only. The test should be used for the detection of Influenza A and/or B virus in nasopharyngeal swab, throat swab or nasal aspirate specimens.
   Neither the quantitative value nor the rate of increase in Influenza A and/or B virus concentration can be determined by this qualitative test.
2. The DIAQUICK Influenza Ag Dipstick will only indicate the presence of Influenza A and/or B virus in the specimen from both viable and non-viable Influenza A and B strains.
3. As with all diagnostic tests, all results must be interpreted together with other clinical information available to the physician.
4. A negative result obtained from this kit should be confirmed by culture. A negative result may be obtained if the concentration of the Influenza A and/or B virus present in the nasopharyngeal swab is not adequate or is below the detectable level of the test.
5. Excess blood or mucus on the swab specimen may interfere with test performance and may yield a false positive result.
6. The accuracy of the test depends on the quality of the swab sample. False negatives may result from improper sample collection or storage.

7. The use of over-the-counter and prescription nasal sprays at high concentrations can interfere with results, leading to either invalid or incorrect test results.
8. A positive result for influenza A and/or B does not preclude an underlying co-infection with another pathogen, therefore the possibility of an underlying bacterial infection should be considered.

WASTE MANAGEMENT

The used test should be discarded according to local regulations.

LITERATURE

1. Williams, KM, Jackson MA, Hamilton M. (2002) Rapid Diagnostic Testing for URIs in Children; Impact on Physician Decision Making and Cost. Infec. Med. 19(3): 109-111.
2. Betts, R.F. 1995. Influenza virus, p. 1546-1567. In G.L. Mandell, R.G. Douglas, Jr. and J.E. Bennett (ed.), Principle and practice of infectious diseases, 4th ed. Churchill Livingstone, Inc., New York, N.Y.
3. WHO recommendations on the use of rapid testing for influenza diagnosis, World Health Organisation, July 2005.

USED SYMBOLS

Symbol	Description
Cont.	Content