Dia Sure

Adenovirus Rapid Test (Nasal/NP Swab and Nasal Washes/Aspirate)

INTENDED USE

The Adenovirus Rapid Test is a rapid visual immunoassay for the qualitative presumptive detection of adenovirus nasal/nasopharyngeal swabs and nasal washes/aspirates of humans. This kit is intended to be used as an aid in the diagnosis of adenovirus infection.

INTRODUCTION

Acute diarrheal disease in young children is a major cause of morbidity worldwide and is a leading cause of mortality in developing countries. Research has shown that enteric adenoviruses, primarily Ad40 and Ad41, are a leading cause of diarrhea in many of these children, second only to the rotaviruses. These viral pathogens have been isolated throughout the world, and can cause diarrhea in children year round. Infections are most frequently seen in children less than two years of age, but have been found in patients of all ages. Further studies indicate that adenoviruses are associated with 4-15% of all hospitalized cases of viral gastroenteritis.
Rapid and accurate diagnosis of gastroenteritis due to adenovirus is helpful in establishing the etiology of gastroenteritis and related patient management. Other diagnostic techniques such as electron microscopy (EM) and nucleic acid hybridization are expensive and labor-intensive. With the self-limiting nature of adenovirus infection, such expensive and labor-intensive tests may not be necessary.

PRINCIPLE

The Adenovirus Rapid Test has been designed to detect adenovirus through visual interpretation of color development in the internal strip. The membrane was immobilized with anti-adenovirus monoclonal antibody on the test region. During the test, the specimen is allowed to react with colored anti-adenovirus monoclonal antibody colloidal gold conjugates, which were precoated on the sample pad of the test. The mixture then moves on the membrane by a capillary action, and interact with reagents on the membrane. If there were enough adenovirus in specimens, a colored band will form at the test region of the membrane. Presence of this colored band indicates a positive result, while its absence indicates a negative result. Appearance of a colored band at the control region serves as a procedural control. This indicates that proper volume of specimen has been added and membrane wicking has occurred.

MATERIALS

Materials Provided

- Individually packed test
- Extraction Tube
- Swab
- Buffer
- Package insert
- Nozzle with Filter
- Tube Stand

Materials Required but Not provided

- Centrifuge
- Specimens collection container
- Timer

PRECAUTIONS

- For professional *in vitro* diagnostic use only.
- Do not use after expiration date indicated on the package. Do not use the test if its foil pouch is damaged. Do not reuse tests.
- This kit contains products of animal origin. Certified knowledge of the origin and/or sanitary state of the animals does not totally guarantee the absence of transmissible pathogenic agents. It is therefore, recommended that these products be treated as potentially infectious, and handled observing the usual safety precautions (do not ingest or inhale).
- Avoid cross-contamination of specimens by using a new specimen collection container for each specimen obtained.
- Read the entire procedure carefully prior to performing any tests.
- Do not eat, drink or smoke in the area where the specimens and kits are handled. Handle all specimens as if they contain infectious agents. Observe established precautions against microbiological hazards throughout the procedure and follow the standard procedures for proper disposal of specimens. Wear protective clothing such as laboratory coats, disposable gloves and eye protection when specimens are assayed.
- Buffered Saline contains sodium azide which may react with lead or copper plumbing to form potentially explosive metal azides. When disposing of buffered saline or extracted samples, always flush with copious quantities of water to prevent azide build up.
- Do not interchange or mix reagents from different lots.
- Humidity and temperature can adversely affect results.
- The used testing materials should be discarded in accordance with local, state and/or federal regulations.

STORAGE AND STABILITY

- The kit should be stored at 2-30°C until the expiry date printed on the sealed pouch.
- The test must remain in the sealed pouch until use.
- **Do not freeze.**
- Cares should be taken to protect components in this kit from contamination. Do not use if there is evidence of microbial contamination or precipitation. Biological contamination of dispensing equipments, containers or reagents can lead to false results.

SPECIMEN COLLECTION AND STORAGE

Specimen Collection:
Acceptable specimens for testing with the Adenovirus Rapid Test include samples from nasal/nasopharyngeal swabs, nasal washes/aspirates. Do not use specimens that are obviously contaminate with blood, as it may interfere with the flow of sample with the interpretation of test results. Use freshly collected specimens for best test performance. Rapid tests will have more reliable clinical performance when performed early in the course of infection.
To ensure optimal performance, use the swabs supplied in the kit. Alternatively, sterile nylon, foam or rayon nasal swabs can be used for specimen collection. Do not use calcium alginate swabs.

- **Nasal Swab**
  Insert the swab into the nostril that exhibits the most visible drainage, if secretion is not visible, into the nostril that is most congested. Gently push the swab until resistance is met at the level of turbinates (less than one inch into the nostril), rotate the swab a few times against nasal wall. Slowly withdraw the swab while continuing with a rotating motion.
  NOTE: In patients whose nasal cavity is dry, wet the swab with a sterilized physiological saline solution (not supplied in the kit) in advance and then collect a sample with it.
- **Nasopharyngeal Swab**
  Insert the swab carefully into the nostril that presents the most secretion under visual inspection. Keep the swab near the septum floor of the nose while gently pushing the swab into the posterior nasopharynx. Rotate the swab several times.
- **Nasal Wash**
  With the patient's head hyper-extended, instill sterile, normal saline into one nostril with a syringe. Use the minimal amount of saline that your procedure allows, as excessive volume will dilute the antigen in the specimen. To collect the nasal wash, place a clean, dry specimen container directly under the nose with slight pressure on the upper lip. Tilt the head forward allowing the fluid to run out of the nostril into the specimen container. Repeat for the other nostril and collect the wash into the same specimen container.
  NOTE: The normal saline, syringe and specimen container is not supplied in the kit.
- **Nasal Aspirate**
  Insert one aspirating tube with a trap up to the depth of the nasal cavity. Connect another tube to the aspiration device making it a negative pressure. Aspirate a nasal fluid to the trap. Soak the nasal aspirate obtained to a sterile swab.
  NOTE: The aspirating device is not supplied in the kit.
  For nasal wash/aspirate, sample volumes of 1~3 mL are recommended. If transport medium is used, minimal dilution of specimens (1 ml) is recommended.

Specimen Transport and Storage:
Specimens should be tested as soon as possible after collection. If transport of the samples is required, the following transport media are recommended and have been tested and shown not to interfere with the performance of the test:
Brain Heart Infusion Broth Hank's Balanced Salt Solution
M5 Media Saline or Phosphate Buffer Solution
Alternatively, samples may be stored at refrigerated (2~8℃), or at room temperature (15~30℃), in a clean, dry, closed container for up to 8 hours prior to testing. Nasal wash or aspirate specimens may also be stored frozen (-70℃ or colder) for up to one month.

PROCEDURE

Bring devices, reagents and specimens and/or controls to room temperature (15~30℃) before use.

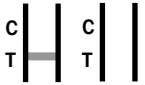
1. For each specimen swab, open the foil pouch just before testing and remove the test device, and put it on a clean, level surface. Label the tube with the patient identification. For best results, the assay should be performed within one hour.
2. Gently mix sample diluent buffer. Add 10 drops into the extraction tube.
3. **For Nasal/ Nasopharyngeal Swabs**
   a. Insert the swab into the extraction tube. Mix well and squeeze the swab several times by compressing the walls of the tube against the swab.
   b. Roll the swab head against the inside of the tube as you remove it. Try to release as much liquid as possible. Dispose of the used swab in accordance with your biohazard waste disposal protocol.

   For Nasal Wash/Aspirate Specimens
   a. Vortex or thoroughly mix specimen. Do not centrifuge, as the removal of cellular material may adversely affect test sensitivity.
   b. Transfer 300 uL of specimen into the extraction tube using transfer pipette.
4. Insert filtered nozzle into sample extraction tube. Invert the tube and add 2 drops (approximately 100uL) of test sample into the sample well by gently squeezing the tube.
5. Read results at 15 minutes and disregard after 30 minutes.

INTERPRETATION OF RESULTS

POSITIVE: Two colored bands appear on the membrane. One band appears in the control region (C) and another band appears in the test region (T).

NEGATIVE: Only one colored band appears, in the control region (C). No apparent colored band appears in the test region (T).



INVALID: Control band fails to appear. Results from any test which has not produced a control band at the specified read time must be discarded. Please review the procedure and repeat with a new test. If the problem persists, discontinue using the kit immediately and contact your local distributor.

NOTE:
6. The intensity of color in the test region (T) may vary depending on the concentration of analytes present in the specimen. Therefore, any shade of color in the test region should be considered positive. Note that this is a qualitative test only, and cannot determine the concentration of analytes in the specimen.
7. Insufficient specimen volume, incorrect operating procedure or expired tests are the most likely reasons for control band failure.

QUALITY CONTROL

- Internal procedural controls are included in the test. A colored band appearing in the control region (C) is considered an internal positive procedural control. It confirms sufficient specimen volume and correct procedural technique.
- External controls are not supplied with this kit. It is recommended that positive and negative controls be tested as a good laboratory practice to confirm the test procedure and to verify proper test performance.

LIMITATIONS OF THE TEST

1. The Adenovirus Rapid Test is for professional *in vitro* diagnostic use, and should be used for the qualitative detection of adenovirus only.
2. As with all diagnostic tests, a definitive clinical diagnosis should not be based on the results of a single test, but should only be made by the physician after all clinical and laboratory findings have been evaluated.
3. If the test result is negative and clinical symptoms persist, additional testing using other clinical methods is recommended. A negative result does not at any time preclude the possibility of adenovirus infection with low concentration of virus particles.

PERFORMACE CHARACTERISTICS

Table 1: Adenovirus Rapid Test vs. ELISA

Relative Sensitivity:
>98.8% (93.5%-99.8%)*
Relative Specificity:
>99.9% (97.1%-100.0%)*
Overall Agreement:
>99.5% (97.4%-99.9*

		Adenovirus Rapid Test		
		+	-	Total
ELISA	+	82	1	83
	-	0	127	127
		82	128	210

Specificity:
Cross reactivity with following organisms has been studied at 1.0 x 10^9 organisms/ml. The following organisms were found negative when tested with the Adenovirus Rapid Test Device (Feces).

Staphylococcus aureus	Neisseria gonorrhea	Acinetobacter spp
Pseudomonas aeruginosa	Group B Streptococcus	Salmonella choleraesius
Enterococcus faecalis	Proteus vulgaris	Gardnerella vaginalis
Group C Streptococcus	Enterococcus faecium	Acinetobacter calcoaceticus
Klebsiella pneumoniae	Proteus mirabilis	E.coli
Branhamella catarrhalis	Candida albicans	Chlamydia trachomatis
Hemophilus influenzae	Neisseria meningitides	

LITERATURE REFERENCES

1. Wadell, G. Laboratory Diagnosis of Infectious Diseases: Principles and Practices. New York: Springer-Verlag, Volume II, 1988: 284-300.
2. Wood, D. J. and A. S. Bailey. "Detection of Adenovirus Types 40 and 41 in Stool Specimens by Immune Electron Microscopy." Journal of Medical Virology, 1987; 21: 191-199.
3. Nishio, Osamu, M. Ooseto, K. Takagi, Y. Yamasita, Y. Ishihara, and S. Isomura. "Enzyme-Linked Immunosorbent Assay Employing Monoclonal Antibodies for Direct Identification of Enteric Adenoviruses (Ad40, 41) in Feces." Microbiol. Immunol. 1990; 34(10): 871-877.
4. Wood, D. J., K. Bijlsma, J. C. de Jong, and C. Tonkin. "Evaluation of a Commercial Monoclonal

Antibody-Based Enzyme Immunoassay for Detection of Adenovirus Types 40 and 41 in Stool Specimens." Journal of Clinical Microbiology, June 1989; 27(6): 1155-1158.
5. Thomas, Eva. E., D. Roscoe, L. Book, B. Bone, L. Browne, and V. Mah. "The Utility of Latex Agglutination Assays in the Diagnosis of Pediatric Viral Gastroenteritis." Am. J. Clin. Pathol. 1994; 101:742-746.

GLOSSARY OF SYMBOLS

ρ	Catalog number	0	Temperature limitation
ι	Consult instructions for use	Λ	Batch code
I	In vitro diagnostic medical device	ε	Use by
μ	Manufacturer	Τ	Contains sufficient for <n> tests
σ	Do not reuse	Α	Authorized representative in the European Community
Υ	CE marking according to IVD Medical Devices Directive 98/79/EC		

Dia Sure

μ

Assure Tech. (Hangzhou) Co., Ltd.
Building 4, No. 1418-50, Moganshan Road,
Gongshu District, Hangzhou,
310011Zhejiang, P.R.China
contact@diareagent.com

Y

A

Lotus NL B.V.
KoninginJulianaplein 10, le Verd,
2595AA,The Hague,Netherlands
peter@lotusnl.com