todylaboratories®

Rapid Tests

CE IVD REF C61RT1026

# Rotavirus and Adenovirus Combo Rapid Test Cassette (Feces) Package Insert

A rapid, one step test for the qualitative detection of rotavirus and adenovirus in human feces.
For professional in vitro diagnostic use only.

## INTENDED USE

The Rotavirus and Adenovirus Combo Rapid Test Cassette (Feces) is a rapid chromatographic immunoassay for the qualitative detection of rotavirus and adenovirus in human feces specimens to aid in the diagnosis of rotavirus or adenovirus infection.

## SUMMARY

Acute diarrhea disease in young children is a major cause of morbidity worldwide and is a leading cause of mortality in developing countries.[1] Rotavirus is the most common agent responsible for acute gastroenteritis, mainly in young children.[2] Its discovery in 1973 and its association with infantile gastroenteritis represented a very important advancement in the study of gastroenteritis not caused by acute bacterial infection. Rotavirus is transmitted by oral-fecal route with an incubation period of 1-3 days. Although specimen collections taken within the second and fifth day of the illness are ideal for antigen detection, the rotavirus may still be found while diarrhea continues. Rotaviral gastroenteritis may result in mortality for populations at risk such as infants, the elderly and immunocompromised patients.[3] In temperate climates, rotavirus infections occur mainly in the winter months. Endemics as well as epidemics affecting some thousand people have been reported.[4] With hospitalized children suffering from acute enteric disease up to 50% of the analyzed specimen were positive for rotavirus.[5] The viruses replicate in the cell nucleus and tend to be host species specific producing a characteristic cytopathic effect (CPE). Because rotavirus is extremely difficult to culture, it is unusual to use isolation of the virus in diagnosing an infection. Instead, a variety of techniques have been developed to detect rotavirus in feces.
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.[6,7,8,9] 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.[5,6,7,8,9] 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.
The Rotavirus and Adenovirus Combo Rapid Test Cassette (Feces) is a rapid chromatographic immunoassay for the qualitative detection of rotavirus and adenovirus in human feces specimen, providing results in 10 minutes. The test utilizes antibody specific for rotavirus and adenovirus to selectively detect rotavirus and adenovirus from human feces specimens.

## PRINCIPLE

The Rotavirus and Adenovirus Combo Rapid Test Cassette (Feces) is a qualitative, lateral flow immunoassay for the detection of rotavirus and adenovirus in human feces specimen.
In this test, the membrane is pre-coated with anti-rotavirus antibody on the T1 test line region of the test and anti-adenovirus antibody on the T2 test line region of the test. During testing, the specimen reacts with the particle coated with anti-rotavirus antibody and anti-adenovirus antibody. The mixture migrates upward on the membrane chromatographically by capillary action to react with anti-rotavirus antibody and anti-adenovirus antibody on the membrane and generate a colored line. The presence of these colored lines in test line region indicates a positive result, while their absence indicates a negative result. To serve as a procedural control, a colored line will always appear in the control line region indicating that proper volume of specimen has been added and membrane wicking has occurred.

## REAGENTS

The test contains anti-rotavirus antibody and anti-adenovirus antibody coated particles and anti-rotavirus antibody and anti-adenovirus antibody coated on the membrane.

## PRECAUTIONS

- For professional *in vitro* diagnostic use only. Do not use after expiration date.
- The test cassette should remain in the sealed pouch until use.
- Do not eat, drink or smoke in the area where the specimens or kits are handled.
- Do not use test if pouch is damaged.
- Handle all specimens as if they contain infectious agents. Observe established precautions against microbiological hazards throughout testing and follow standard procedures for proper disposal of specimens.
- Wear protective clothing such as laboratory coats, disposable gloves and eye protection when specimens are being tested.
- The used test should be discarded according to local regulations.
- Humidity and temperature can adversely affect results.

## STORAGE AND STABILITY

Store as packaged in the sealed pouches either 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 containing desiccant until use. **DO NOT FREEZE.** Do not use beyond the expiration date.

## SPECIMEN COLLECTION AND PREPARATION

1. Viral detection is improved by collecting the specimens at the onset of the symptoms. It has been reported that the maximum excretion of rotavirus and adenovirus in the feces of patients with gastroenteritis occurs 3-5 days after onset of symptoms. If the specimens are collected long after the onset of diarrheic symptoms, the quantity of antigen may not be sufficient to obtain a positive reaction or the antigens detected may not be linked to the diarrheic episode.
2. The feces specimen must be collected in a clean, dry, waterproof container containing no detergents, preservatives or transport media.
3. Bring the necessary reagents to room temperature before use.

## MATERIALS

**Materials provided**
• Test Cassettes • Droppers • Specimen collection tubes with extraction buffer • Package Insert
**Materials required but not provided**
• Specimen Collection Containers • Centrifuge and pipette to dispense 80 µL if required • Timer

## DIRECTIONS FOR USE

**Allow the test, specimen, buffer, and/or controls to reach room temperature (15-30°C) prior to testing.**
1. To collect fecal specimens: Collect sufficient quantity of feces (1-2mL or 1-2g) in a clean, dry specimen collection container to obtain enough virus particles. Best results will be obtained if the assay is performed within 6 hours after collection. Specimen collected may be stored for 3 days at 2-8°C if not tested within 6 hours. For long term storage, specimens should be kept below - 20°C.
2. To process fecal specimens:
• For **Solid Specimens**:
Unscrew the cap of the specimen collection tube, then randomly **stab the specimen collection applicator into the fecal specimen in at least 3 different sites** to collect approximately **50 mg of feces** (equivalent to 1/4 of a pea). Do not scoop the fecal specimen.
• For **Liquid Specimens**:
Hold the dropper vertically, aspirate fecal specimens, and then transfer 2 drops of the liquid specimen (approximately 50 µL) into the specimen collection tube containing the extraction buffer.
Tighten the cap onto the specimen collection tube, then **shake the specimen collection tube vigorously** to mix the specimen and the extraction buffer. Leave the collection tube for reaction for 2 minutes.
3. Bring the pouch to room temperature before opening it. Remove the test cassette from the foil pouch and use it as soon as possible. Best results will be obtained if the test is performed immediately after opening the foil pouch.
4. Hold the specimen collection tube upright and **unscrew the tip** of the specimen collection tube. Invert the specimen collection tube and **transfer 2 full drops of the extracted specimen** (approximately 80 µL) to the specimen well (S) of the test cassette, then start the timer. Avoid trapping air bubbles in the specimen well (S). See illustration below.
5. Read the results at **10 minutes** after dispensing the specimen. Do not read results after 20 minutes.
**Note**: If the specimen does not migrate (presence of particles), centrifuge the diluted sample contained in the extraction buffer vial. Collect 80 µL of supernatant, dispense into the specimen well (S). Start the timer and continue from step 5 onwards in the above instructions for use.

## INTERPRETATION OF RESULTS



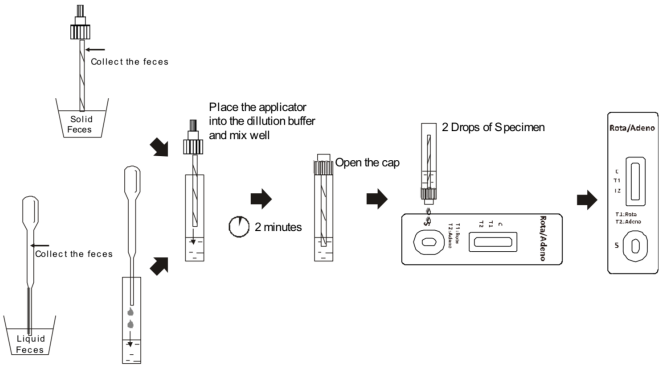
**POSITIVE:**
**Rotavirus Positive:** * A colored line appears in the control line region (C) and another colored line appears in the T1 line region.
**Adenovirus Positive**: * A colored line appears in the control line region (C) and another colored line appears in the T2 line region.
**Rotavirus and Adenovirus Positive**: * A colored line appears in the control line region (C) and two other colored lines appear in T1 line region and T2 line region respectively.
***NOTE**: The intensity of the color in the test line region (T1/T2) will vary depending on the concentration of rotavirus or adenovirus antigens present in the specimen. Therefore, any shade of color in the test line region (T1/T2) should be considered positive.



**NEGATIVE:** One colored line appears in the control region (C). No line appears in the test line region (T1/T2).



**INVALID:** Control line (C) 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 cassette. If the problem persists, discontinue using the test kit immediately and contact your local distributor.




## QUALITY CONTROL

An internal procedural control is included in the test. A colored line appearing in the control line region (C) is an internal positive procedural control. It confirms sufficient specimen volume, adequate membrane wicking and correct procedural technique.
Control standards are not supplied with this kit; however, 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

1. The Rotavirus and Adenovirus Combo Rapid Test Cassette (Feces) is for in vitro diagnostic use only. The test should be used for the detection of human rotavirus and adenovirus in feces specimens only. Neither the quantitative value nor the rate of increase in human rotavirus and adenovirus concentration can be determined by this qualitative test.
2. The Rotavirus and Adenovirus Combo Rapid Test Cassette (Feces) will only indicate the presence of rotavirus and adenovirus in the specimen and should not be used as the sole criteria for the conforming rotavirus and adenovirus to be etiological agent for diarrhea.
3. As with all diagnostic tests, all results must be interpreted together with other clinical information available to the physician.
4. 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 rotavirus or adenovirus infection with low concentration of virus particles.

## EXPECTED VALUES

The Rotavirus and Adenovirus Combo Rapid Test Cassette (Feces) has been compared with latex agglutination method, demonstrating an overall accuracy of ≥96%.

## PERFORMANCE CHARACTERISTICS

**Clinical Sensitivity, Specificity and Accuracy**
The performance of the Rotavirus and Adenovirus Combo Rapid Test Cassette (Feces) has been evaluated the clinical specimens collected from children and young adults in comparison with latex agglutination method. The results show that the Rotavirus and Adenovirus Combo Rapid Test Cassette (Feces) has high sensitivity and specificity for rotavirus and adenovirus.

| Method | | Latex Agglutination | | Total Results |
|---|---|---|---|---|
| Rotavirus rapid test | Results | Positive | Negative | |
| | Positive | 251 | 7 | 258 |
| | Negative | 7 | 236 | 243 |
| Total Results | | 258 | 243 | 501 |

Relative Sensitivity: 97.3% (95%CI:*94.5%-98.9%)
Relative Specificity: 97.1% (95%CI:*94.2%-98.8%)
Relative Accuracy: 97.2% (95%CI:*95.4%-98.5%) *Confidence Intervals

| Method | | Latex Agglutination | | Total Results |
|---|---|---|---|---|
| Adenovirus rapid test | Results | Positive | Negative | |
| | Positive | 118 | 6 | 124 |
| | Negative | 6 | 251 | 257 |
| Total Results | | 124 | 257 | 381 |

Relative Sensitivity: 95.2% (95%CI:*89.8%-98.2%)
Relative Specificity: 97.7% (95%CI:*95.0%-99.1%)
Relative Accuracy: 96.8% (95%CI:*94.6%-98.4%) *Confidence Intervals

**Precision**
**Intra-Assay**
Within-run precision has been determined by using 10 replicates of seven specimens: a negative, a rotavirus low positive, an adenovirus low positive, a rotavirus medium positive, an adenovirus medium positive, a rotavirus high positive and an adenovirus high positive. The specimens were correctly identified >99% of the time.
**Inter-Assay**
Between-run precision has been determined by 10 independent assays on the same seven specimens: a negative, a rotavirus low positive, an adenovirus low positive, a rotavirus medium positive, an adenovirus medium positive, a rotavirus high positive and an adenovirus high positive. The specimens were correctly identified >99% of the time.
**Cross-reactivity**
Cross reactivity with following organisms has been studied at 1.0 x $10^8$ organisms/ml. The following organisms were found negative when tested with the Rotavirus and Adenovirus Combo Rapid Test Cassette (Feces).

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

**Interfering Substances**
The following potentially Interfering Substances were added to Adenovirus negative and positive specimens. No interference observed.

| | | |
|---|---|---|
| Ascoribic acid: 20mg/dl | Oxalic acid: 60mg/dl | Bilirubin: 100mg/dl |
| Uric acid: 60mg/dl | Urea: 2000mg/dl | Caffeine: 40mg/dl |
| Glucose: 2000mg/dl | Aspirin: 20mg/dl | Albumin: 2000mg/dl |

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**Tody Laboratories Int. SRL**
22 Vadul Moldovei, s1, OP 18, Bucharest, CP 014033, ROMANIA
+4021 269 00 00 +4021 269 06 41
ISO 15189, 17043, 9001, 13485
www.todylaboratories.com