



Chuangxingwell



Rotavirus+Adenovirus + Norovirus

## ROTA-ADENO-NORO Combo Rapid Test Kit Package Insert

For professional *in vitro* diagnostic use only.



### INTENDED USE

**ROTA-ADENO-NORO Combo Rapid Test Kit** is a rapid, immunochromatographic assay for the simultaneous qualitative detection of rotavirus, adenovirus and norovirus in human stool samples.

Simple, non-invasive and highly sensitivity immunoassay to make a presumptive diagnosis of rotavirus, adenovirus and norovirus infection.

### INTRODUCTION

Enteric viruses have been recognized as the most significant etiological agents of the disease, and four categories of viruses are being considered clinically relevant: group A rotavirus (family *Reoviridae*), norovirus (family *Caliciviridae*), adenovirus 40/41 (subgenus F), and astrovirus.

Rotavirus is the leading cause of severe dehydration in children <5 years of age.

Most rotavirus infections are community-acquired and transmitted by the feco-oral route and peak the winter season between November and February in temperate climates.

Adenovirus, initially recognized as a cause of respiratory disease, is associated also with gastrointestinal, ophthalmological, and neurological infections. Watery, non-bloody diarrhea typically precedes vomiting and children admitted to the hospital for adenovirus gastroenteritis are more likely to present diarrhea that usually lasts more than in rotavirus gastroenteritis (more than 5 days).

Norovirus represents the most common cause of gastroenteritis outbreaks and causes acute, self-limiting gastroenteritis in people from all age groups.

### PRINCIPLE

ROTA-ADENO-NORO Combo Rapid Test Kit is a qualitative immunochromatographic assay to make a presumptive diagnosis of rotavirus, adenovirus and/or norovirus infection.

**Strip A:** The test line zone of the nitrocellulose membrane is pre-coated with monoclonal antibodies against rotavirus.

**Strip B:** The test line zone of the nitrocellulose membrane is pre-coated with monoclonal antibodies against adenovirus.

**Strip C:** The test line zone of the nitrocellulose membrane is pre-coated with monoclonal antibodies against norovirus.

During the process, the sample reacts with the antibodies against rotavirus (strip A) and/or adenovirus (strip B) and/or norovirus (strip C), forming conjugates. The mixture moves upward on the membrane by capillary action. If the sample is rotavirus positive, antibodies present on the membrane (test line) capture the conjugate complex and a **red** line will be visible in strip A, if the sample is adenovirus positive, antibodies present on the membrane (test line) capture the conjugate complex and a **red** line will be visible in strip B and if the sample is norovirus positive, antibodies present on the membrane (test line) capture the conjugate complex and a **red** line will be visible in strip C. Although the sample is positive or negative, the mixture continues to move across the membranes and the **green** control line always appears (for all the strips).

The presence of these **green** lines (in the control zone (C)) indicates that sufficient volume is added; proper flow is obtained and serves as an internal control for the reagents.

### PRECAUTIONS

- For professional *in vitro* use only.
- Do not use after expiration date.
- Do not use the test if its pouch is damaged.
- Specimens should be considered as potentially hazardous and handle in the same manner as an infectious agent. A new test must be used for each sample to avoid contaminations errors.
- Tests should be discarded in a proper biohazard container after testing.
- Reagents contain preservatives. Avoid any contact with the skin or mucous membrane. Consult safety data sheet, available on request.
- Components provided in the kit are approved for use with the **ROTA-ADENO-NORO Combo Rapid Test Kit**. Do not use any other commercial kit component.
- Follow Good Laboratory Practices, wear protective clothing, use disposal gloves, goggles and mask. Do not eat, drink or smoke in the working area.

### STORAGE AND STABILITY

Store as packaged in the sealed pouch either at refrigerated or room temperature (2-30°C/35.6-86°F) with a valid period of 24 months.

The test is stable until the expiration date printed on the sealed pouch.

The test must remain in the sealed pouch until use and use the test kit within 2 hours once the foil pouch is opened.

Do not freeze.

### MATERIALS

MATERIAL PROVIDED	MATERIAL REQUIRED BUT NOT PROVIDED
<ul style="list-style-type: none"> <li>• 10 tests/kit</li> <li>• <b>ROTA-ADENO-NORO Combo Rapid Test Kit</b></li> <li>• Package Insert.</li> <li>• 10 vials with diluent for sample dilution.</li> </ul>	<ul style="list-style-type: none"> <li>• Specimen collection container.</li> <li>• Disposable gloves.</li> <li>• Timer.</li> <li>• Spatula.</li> </ul>

### SPECIMEN COLLECTION

Stool samples should be collected in clean and dry containers. Collect sufficient quantity of feces: 1-2 g or 1-2mL for liquid samples.

The samples can be stored in the refrigerator (2-8°C/36-46.4°C) for 1-2 days prior to testing. For longer storage, maximum 1 year, the specimen must be kept frozen at -20°C/4°F. The samples will be brought to room temperature before to testing.

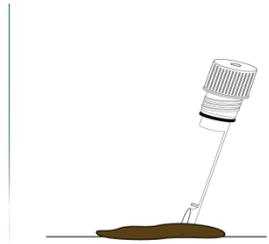
Homogenise stool sample as thoroughly as possible prior to preparation.

### SPECIMEN PREPARATION

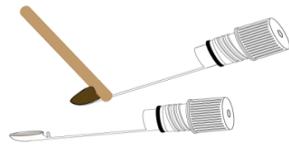
- 1 Remove the cap of the vial with diluent for sample dilution (figure 1) and use the spoon to collect sufficient sample quantity. For solid stool, insert the spoon in 4 different areas of the stool sample (figure 2), remove any excess sample with a spatula (figure 3), and place the spoon cap back into the vial for sample dilution (figure 4). For liquid stool, take a spoonful of the sample (figure 3) and transfer it into the vial for sample dilution.
2. Close the vial for sample dilution tightly and shake it to dilute and mix the sample with the diluent (figure 4).



**Figure 1**  
Vial for sample dilution



**Figure 2**  
Insert the spoon in 4 different areas of the stool.



**Figure 3**  
Remove the excess of sample with a spatula.  
Liquid samples: full spoon.



**Figure 4**  
Put the sample into the vial, close the cap and shake.

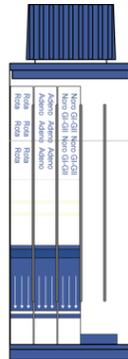
Allow the test, stool sample, controls and diluent to reach room temperature (15-30°C/59-86°F) prior to testing. Do not open pouches until the performance of the assay.

1. Shake the vial with the sample vigorously to obtain a good sample dilution.
2. Remove the **ROTA-ADENO-NORO Combo Rapid Test Kit** from its sealed bag just before using it (figure 5).
3. Take the vial containing the diluted sample (figure 6), place it inside the multiplex tube (figure 7). Screw the cap of the multiplex tube tightly (figure 8). The bottom of the collection tube will break

and the diluent+sample solution reaches the sample zone of the strips (figure 9).

4. Leave the multiplex tube vertically on a flat surface and read the results at **10 minutes**. Do not read the test results later than 10 minutes.

If the test does not run due to solid particles (the sample is not homogenized), migration process can stop on one or more strips. In this case, tap the end of the multiplex tube on hard surface to allow migration to start again.



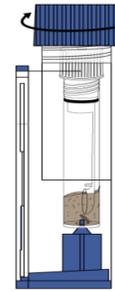
**Figure 5**  
ROTA-ADENO-NORO  
Combo Rapid Test Kit



**Figure 6**  
Vial with the diluted sample inside.



**Figure 7**  
Introduce the vial with the diluted sample into the multiplex.



**Figure 8**  
Close the cap and the bottom of the diluent vial will break.



**Figure 9**  
Reaction takes place.  
**Read results at 10 minutes.**

### INTERPRETATION OF THE RESULTS

Strip A: rotavirus, Strip B: adenovirus, Strip C: norovirus

	NEGATIVE	
	<p>Only one <b>green</b> line in the control zone (C) in the three strips (A,B and C)</p>	<p>There is no rotavirus, adenovirus and norovirus presence.</p>
	POSITIVE	
	<p>In addition to the <b>green</b> line (control line C), a <b>red</b> line appears in each strip, test line (T)</p>	<p>There is rotavirus, adenovirus and norovirus presence.</p>

	<p><b>NEGATIVE</b></p> <p>Strip C (norovirus) → green line</p> <p><b>POSITIVE</b></p> <p>Strip A (rotavirus) → green/red lines Strip B (adenovirus) → green/red lines</p>	<p>There is rotavirus and adenovirus presence. Viral infection caused by rotavirus and adenovirus.</p>
	<p><b>NEGATIVE</b></p> <p>Strip B (adenovirus) → green line</p> <p><b>POSITIVE</b></p> <p>Strip A (rotavirus) → green/red lines Strip C (norovirus) → green/red lines</p>	<p>There is rotavirus, norovirus presence. Viral infection caused by rotavirus and norovirus.</p>
	<p><b>NEGATIVE</b></p> <p>Strip A (rotavirus) → green line</p> <p><b>POSITIVE</b></p> <p>Strip B (adenovirus) → green/red lines Strip C (norovirus) → green/red lines</p>	<p>There is adenovirus and norovirus presence. Viral infection caused by adenovirus and norovirus.</p>
	<p><b>NEGATIVE</b></p> <p>Strip B (adenovirus) → green line Strip C (norovirus) → green line</p> <p><b>POSITIVE</b></p> <p>Strip A (rotavirus) → green/red lines</p>	<p>There is rotavirus presence. Viral infection caused by rotavirus.</p>
	<p><b>NEGATIVE</b></p> <p>Strip A (rotavirus) → green line Strip C (norovirus) → green line</p> <p><b>POSITIVE</b></p> <p>Strip B (adenovirus) → green/red lines</p>	<p>There is adenovirus presence. Viral infection caused by adenovirus.</p>

	<p><b>NEGATIVE</b></p> <p>Strip A (rotavirus) → green line Strip B (adenovirus) → green line</p> <p><b>POSITIVE</b></p> <p>Strip C (norovirus) → green/red lines</p>	<p>There is norovirus presence. Viral infection caused by norovirus.</p>
<p>Any other results</p>	<p>Invalid results either A, B or C, we recommend repeating the assay using the same sample with another test.</p>	

**Notes:** The intensity of the red coloured test line in the result line region (T) will vary depending on the concentration of antigens in the specimen.

Positive results detailed in the above table should be followed up with additional confirmatory diagnostic procedures.

Single or dual simultaneous virus infections are more frequent than triple.

**Invalid results:** Total absence of any control coloured lines (green) indicates an invalid result, regardless of the appearance or not of the test lines (red). Wrong procedural techniques or deterioration of the reagents are mostly the main reasons for control line failure. Review the procedure and repeat the assay with a new test. If the problem persists, discontinue using the kit and contact your local distributor.

### QUALITY CONTROL

Internal procedural controls are included in **ROTA-ADENO-NORO Combo Rapid Test Kit**. Green lines appearing in the results window are internal controls, which confirm sufficient specimen volume and correct procedural technique.

### LIMITATIONS

- **ROTA-ADENO-NORO Combo Rapid Test Kit** must be carried out within 2 hours of opening the sealed bag.
- An excess of stool sample could cause wrong results (brown bands appear). Dilute the sample with the diluent and repeat the test.
- The intensity of test line may vary depending on the concentration of antigens.
- After one week of infection, the number of viruses in faeces is decreasing, making the sample less reactive. Stool samples should be collected within one week of the onset symptoms.
- The use of other samples different from human fecal samples has not been established.
- The quality of **ROTA-ADENO-NORO Combo Rapid Test Kit** depends on the quality of the sample; proper fecal specimens must be obtained.

- Positive results determine the presence of rotavirus, adenovirus and/or norovirus in fecal samples. A positive result should be followed up with additional laboratory techniques to confirm the results. A confirmed infection should only be made by a physician after the evaluation of all clinical and laboratory findings and must be based in the correlation of the results with further clinical observations.
- Negative results should not be considered as conclusive; it is possible that the concentration of antigen is lower than the detection limit value. If symptoms or situation still persist a rotavirus, adenovirus and/or norovirus determination should be carried out with another technique.

### EXPECTED VALUES

Currently, rotavirus, norovirus, astrovirus and adenovirus 40/41 have been recognized as the most significant etiological agents of childhood viral gastroenteritis in industrialized countries.

In children, group A rotavirus is the major etiologic agent of viral gastroenteritis and is responsible for 29 to 45% of hospitalizations worldwide. Recent work has showed that noroviruses are the second most frequent etiologic agents of viral gastroenteritis in children.

In the European Union, it is estimated that 3.6 million episodes of rotavirus gastroenteritis occur annually. Rotavirus gastroenteritis is estimated to occur at a rate of 1 symptomatic infection in every 7 children each year, accounting for 231 deaths, more than 87000 hospitalizations, and almost 700000 outpatient visits. It has been estimated that rotavirus accounts for 39% diarrheal hospitalizations and from 25.3% to 63.5% of community-acquired acute gastroenteritis in children <5 years of age.

### PERFORMANCE CHARACTERISTICS

#### Clinical sensitivity and specificity

An evaluation was performed using **ROTA-ADENO-NORO Combo Rapid Test Kit** and other commercial test.

Results were as follows:

		Other Test (ELISA)		
		Positive	Negative	Total
<b>ROTA-ADENO-NORO Combo Rapid Test Kit</b>	Positive	18	1	19
	Negative	0	43	43
Total		18	44	62

<b>ROTA-ADENO-NORO Combo Rapid Test Kit (Rotavirus) vs Other Test (ELISA)t</b>			
Sensitivity	Specificity	PPV	NPV
>99%	98%	>94%	>99%

And evaluation was performed using **ROTA-ADENO-NORO Combo Rapid Test Kit** and PCR.

Results were as follows:

		PCR		
		Positive	Negative	Total
<b>ROTA-ADENO-NORO Combo Rapid Test Kit</b> Adenovirus	Positive	7	0	7
	Negative	0	52	52
	Total	7	52	59

<b>ROTA-ADENO-NORO Combo Rapid Test Kit (Adenovirus) vs PCR</b>			
Sensitivity	Specificity	PPV	NPV
>99%	>99%	>99%	>99%

And evaluation was performed using **ROTA-ADENO-NORO Combo Rapid Test Kit** and other commercial test (Simple Norovirus).

Results were as follows:

		Simple Norovirus		
		Positive	Negative	Total
<b>ROTA-ADENO-NORO Combo Rapid Test Kit</b> Norovirus GI	Positive	2	0	2
	Negative	0	48	48
	Total	2	48	50

<b>ROTA-ADENO-NORO Combo Rapid Test Kit(Norovirus GI) vs Simple Norovirus</b>			
Sensitivity	Specificity	VPP	VPN
>99%	>99%	>99%	>99%

		Simple Norovirus		
		Positive	Negative	Total
<b>ROTA-ADENO-NORO Combo Rapid Test Kit</b> Norovirus GII	Positive	10	0	10
	Negative	0	48	48
	Total	10	48	58

<b>ROTA-ADENO-NORO Combo Rapid Test Kit(Norovirus GII) vs Simple Norovirus</b>			
Sensitivity	Specificity	VPP	VPN
>99%	>99%	>99%	>99%

The results showed that **ROTA-ADENO-NORO Combo Rapid Test Kit** has a high sensitivity and specificity to detect rotavirus, adenovirus and norovirus.

### Cross reactivity

No cross reactivity was detected against other gastrointestinal pathogens that are occasionally present in feces.

Adenovirus (Strip A and C)	<i>Giardia lamblia</i>	<i>Salmonella typhi</i>
Astrovirus	<i>Helicobacter pylori</i>	<i>Shigella boydii</i>
<i>Campylobacter coli</i>	Hepatitis A	<i>Shigella dysenteriae</i>
<i>Campylobacter jejuni</i>	<i>Listeria monocytogenes</i>	<i>Shigella flexneri</i>
<i>Clostridium difficile</i>	Norovirus (Strip A and B)	<i>Shigella sonnei</i>
<i>Cryptosporidium parvum</i>	Rotavirus (Strip B and C)	<i>Staphylococcus aureus</i>
<i>Entamoeba histolytica</i>	<i>Salmonella enteritidis</i>	<i>Yersinia enterocolitica</i>
Enterovirus	<i>Salmonella paratyphi</i>	
<i>Escherichia coli</i> O157:H7	<i>Salmonella typhimurium</i>	

### REFERENCES

1. ADISSA TRAN; DEBORAH TALMUD; BENOIT LEJEUNE; NICOLAS JOVENIN; FANNY RENOIS; CHRISTOPHER PAYAN; NICOLAS LEVEQUE; LAURENT ANDREOLETTI. "Prevalence of Rotavirus , Adenovirus, Norovirus and Astrovirus infections and coinfections among hospitalized children in Northern France". Journal of Clinical Microbiology, May 2010, p. 1943-1946.

2. D. DONA; E. MOZZO; A. SCAMARCIA; G. PICELLI; M. VILLA; L. CANTARUTTI; C. GIAQUINTO. "Community-Acquired Rotavirus Gastroenteritis compared with adenovirus and norovirus gastroenteritis in Italian children: a pediatric study". Hindawi Publishing Corporation - International Journal of Pediatrics Volume 2016, article ID 5236243, 10 pages.

### SYMBOLS FOR IVD COMPONENTS AND REAGENTS

	Caution		In Vitro Diagnostic Medical Device
	Manufacturer		Date of Manufacture
	CE Marking		Do Not Re-use
	Keep Dry		Keep Away From Sunlight
	Batch Code		Do Not Use if Package is Damaged
	Catalogue Number		Contains Sufficient for <n> Tests
	Use-By Date		Temperature Limit
	Authorized representative in the European Community		



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