

## **EZER™ Norovirus Antigen Rapid Test Device**

### **INTENDED USE**

The *EZER™* Norovirus Antigen Rapid Test Device is an *in vitro* immunochromatographic assay for the qualitative detection of Norovirus antigens in human feces specimen. It is useful as an aid in management and monitoring of viral gastroenteritis. It's an *in vitro* diagnostic test for professional use only.

### **BACKGROUND**

Norovirus is one of the major causes of nonbacterial gastroenteritis world-wide, accounting for 19% – 42% of non-bacterial diarrheal outbreaks.

Norovirus infectious diarrhea is prevalent around the world, and the infection can occur all year. Its harm to the world is increasingly serious, which has caused people's attention.

The Norovirus is widely distributed and occurs in the form of outbreaks, with schools, hospitals and factories as the main outbreak sites. There are no age or gender differences among the outbreak patients, while the sporadic cases are mainly concentrated in children under 2 years old and the elderly. General symptoms of Norovirus infection mainly include abdominal pain, diarrhea, vomiting, low-grade fever, systemic muscle pain and so on.

### **PRINCIPLE**

*EZER™* Norovirus Antigen Rapid Test Device is a qualitative lateral flow immunochromatographic assay for the detection Norovirus antigen in feces specimens.

This product consisting of three parts: the lower part of the sample, the reagent part and the expansion part, and has a long square-shaped carrier.

The reagent part comprises a colloidal gold-labeled anti-Norovirus antibody. In the expanded part, the membrane is pre-coated with anti- Norovirus antibody on the T test line region of the test. After the sample is dropped from the lower portion of the sample plate of the test plate, the colloidal gold-labeled antibody is dissolved to form an immune complex with the Norovirus antigen in the sample.

The immune complex moves due to the capillary phenomenon of the developing portion, and is captured by the anti-Norovirus antibody fixed on the membrane and generates a colored line. The presence of Norovirus is then determined by visual inspection of the presence of the red line. Meanwhile, anti-Norovirus antibody conjugated colloidal gold, which was not consumed in the reaction, is bound to the anti-

immunoglobulin antibody fixed on the Control portion to generate a purple-red line, showing that reaction on the test strip was successful.

### **CONTENTS**

Norovirus Antigen Rapid Test Device (20 Pcs)  
Stool Collection Tube (with sampling rod and extraction solution) (20 Pcs)  
Package insert (1 Pc)

### **WARNINGS AND PRECAUTIONS**

1. For *in vitro* Diagnostic Use.
2. Do not use the device components beyond the expiration date.
3. Pathogenic microorganisms may be present in clinical specimens. All specimen and the related contaminated items need to be handled, stored, and disposed following "Standard Precautions" and institutional guidelines.
4. Wear protective clothing such as laboratory coats, masks, disposable gloves, and eye protection when specimens are handled.
5. Ensure foil pouch containing test device is not damaged before opening for use.
6. The test device should be used immediately after opening the packaging. When it absorbs moisture, the quality deteriorates and an accurate result cannot be obtained.
7. Please do not touch the sample drop and the judgment part of the test board directly by hand.
8. Do not reuse the device.
9. Please ensure that appropriate samples are used for testing. Too much or too little sample size may lead to deviation of results.
10. If the test is invalid, one should consider the possible improper handling, inaccurate operation procedure, or device quality. Repeat the test with a new device ensuring that the test procedure has been followed accurately.
11. All samples and used accessories should be treated as infectious and discarded according to local regulations.

### **STORAGE CONDITIONS**

Test devices must be stored at 2~30°C. DO NOT FREEZE. Devices must be at ambient room temperature at time of testing.

### **SAMPLE COLLECTION AND PREPARATION**

DOs and DON'Ts of Sample Collection

- Stool specimens should be collected in a clean

container that do not contain media, preservatives or detergents as any of these additives may interfere the results.

- The feces samples need to be performed as soon as possible after collection. If not, the specimen collected may be stored for one week at 2~8°C or stored a longer period at -20°C.

- Do test sample immediately.

- Use only stool collection tube provided with the kit. Prepare test samples with stool collection tube (with extraction buffer) for immediate testing after collection. If immediate testing is not possible, collected samples can be held refrigerated (2~8°C) for up to 48 hours prior to testing. Inadequate sample collection or improper sample handling may yield a false-negative result.

1. Label information of studied specimens on the stool collection tube.

2. Sample Preparation

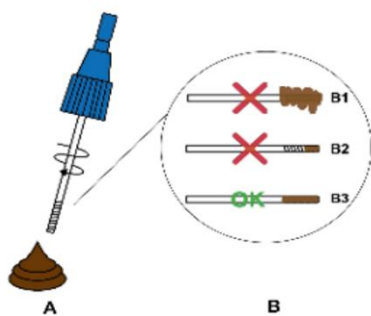
- (1) Open the stool collection tube by unscrewing the top and use the collection stick to randomly pierce in 2~5 different sites, to collect the feces specimen 50mg (A), too more (B1) or too less (B2) are both not available. Put the "collection stick" back to the stool collection tube

- (2) For the liquid or semi-liquid specimen, use pipette (not provide) to transfer 80µL specimen into stool collection tube containing the extraction buffer.

3. Tighten the cap onto the specimen collection tube, then shake the specimen collection tube vigorously to mix the specimen.

**Note: All the specimen should be mixed into solution.**

4. Do not leave specimen at room temperature for prolonged periods. Specimens can temporarily store at 2~8°C for 7 days. For longer storage, the extracted specimen may be frozen at -20°C. Avoid multiple freeze-thaw cycles.



## PROCEDURE

**Reagents, specimens, and devices must be at room temperature (15–30 °C) for testing.**

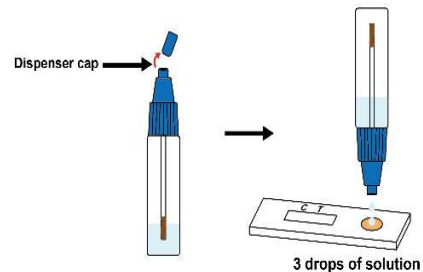
1. Bring the specimen and test components to room temperature if refrigerated or frozen.
2. Once the specimen is thawed, mix well prior to performing the assay.
3. Remove a test cassette from its foil pouch and place it on a flat surface.
4. Shake the stool collection tube vigorously to ensure a homogenous liquid suspension.

5. Twist off (or cut) the blue tip on the top of the sample preparation tube and dispense 3 drops of the extracted specimen (approximately 80µL) to the sample well of the cassette.

6. Do not overload the solution.

7. Avoid trapping air bubbles in the sample well

8. Read results at 15 minutes and disregard after 30 minutes. A positive result may be visible at 3 minutes. However, the complete reaction time of 15 minutes is required to confirm a negative result.



## INTERPRETATION OF RESULTS

Allow the samples to react according to the procedure and read the red lines that appear in the reading area.

### Positive Result:

A colored line appears in the control line region [C] and another colored line appears in the test line region [T].



### Negative Result:

One red line appears in the control line region (C). No line appears in the test line region.



### Invalid Result:

The 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 device

If the problem persists, discontinue using the kit and contact your local distributor.



## QUALITY CONTROL

Internal procedural controls are included in the test. A colored line appearing in the control region (C) is an internal procedural control. It confirms sufficient specimen volume and correct procedural technique. Control standards are not supplied with this Device; 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.

## PERFORMANCE CHARACTERISTICS

### 1. Clinical Study Data Summary

The EZER™ Norovirus Antigen Rapid Test Device was compared with colloidal gold methods in a respective study and check by PCR. A multi-center evaluation was conducted using 1231 stool samples collected from children and young adults with symptoms of diarrhea and/or gastroenteritis.

Result for Norovirus	The Reference Kit			Total
	+	-		
The EZER™	+	294	17	311
Norovirus Antigen	-	15	905	920
Rapid Test Device	Total	309	922	1231

Positive percent agreement: 95.15% (92.12%~97.26%)

Negative percent agreement: 98.16% (97.06%~98.92%)

Positive predictive value: 94.53% (91.39%~96.78%)

Negative predictive value: 98.37% (97.33%~99.08%)

Overall percent agreement: 97.40% (96.35%~98.22%)

### 2. Limit of detection

Type	Concentration
Norovirus GI	$3.25 \times 10^4$ copies/mL
Norovirus GII	$3.93 \times 10^4$ copies/mL

### 3. High Dose Hook Effect

No high dose hook effect was observed when tested with up to a concentration of  $2.31 \times 10^7$  copies/mL

### 4. Reaction with Various Serotype

The current test kit is able to detect the following serotype of the Norovirus: GI.Pd-GI.3, GI.P4-GI.5, GII.2, GII.P16\_GII.2, GII.P12\_GII.3, GII.4, GII.Pe\_GII.4, GII.P7-GII.6, GII.14, GII.17.

### 5. Cross-reactivity evaluation

The EZER™ Norovirus Antigen Rapid Test Device has been tested for no cross-reactivity with pathogenic microorganism as follow:

#### 1) Bacteria

*Staphylococcus aureus*, *Pseudomonas aeruginosa*, *Salmonella Enteritidis*, *Group C Streptococcus*, *Escherichia coli*, *Enterococcus faecalis*, *Klebsiella pneumonia*, *Streptococcus pneumonia*, *Citrobacter freundii*, *Vibrio parahaemolyticus*, *Haemophilus influenza*, *Candida albicans*, *Proteus mirabilis*, *Streptococcus agalactiae*, *Lactobacillus plantarum*, *Bacillus subtilis*

#### 2) Viruses

Influenza virus type A, Influenza virus type B, Rotavirus, Adenovirus, Enterovirus, Coxsackie virus.

#### 3) Mycoplasma or Chlamydia

*Mycoplasma pneumoniae*, *Chlamydia pneumoniae*, *Chlamydia trachomatis*.

### 6. Interfering Substances

1) Not disturbed by the color and viscosity of fecal specimens.

2) The concentration of the following substances in the

sample below the level indicated in the list will not interfere with the test results.

hemoglobin	1000mg/dL
bilirubin	60mg/dL

3) The following drugs containing no less than 10 times the blood concentration after entering the body show no influence on the assessment results: aspirin, amoxicillin, metronidazole, acyclovir, berberine hydrochloride tablets and other drugs.

4) When the concentration of mucin was  $\leq 0.1\%$ , norfloxacin was  $\leq 8$  mg/L, loperamide was  $\leq 1$  mg/L, levofloxacin was  $\leq 4$  mg/L, ceftriaxone sodium was  $\leq 40$  mg/L, ribavirin was  $\leq 2$  mg/L, and ciprofloxacin was  $\leq 25$  mg/L, the interfering substances had no significant effect on the detection of the kit.

## LIMITATIONS OF THE PROCEDURE

1. The EZER™ Norovirus Antigen Rapid Test Device is a qualitative test and cannot determine the amount of antigen in the sample.

2. Positive test results do not rule out co-infections with other pathogens.

3. A false-negative test result may occur if the sample collected may contain antigen titer below the reagent's sensitivity threshold or if the sample was collected or transported improperly; therefore, a negative test result does not eliminate the possibility of the virus infection.

4. Specimen obtained early with sudden onset of symptoms will contain the highest viral titers, the amount of antigen in a sample may decrease as the duration of illness increases.

5. The results obtained with this test should be interpreted in conjunction with other diagnostic procedures and clinical findings.










6. Negative results should be treated as presumptive and confirmed with other assays, if necessary, for clinical management.

7. 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.

## REFERENCES

- Wadell, G. Laboratory Diagnosis of Infectious Diseases: Principles and Practices. New York: Springer-Verlag, Volume II, 1988: 284-300.
- WILHELM I, ROMAN E, SANCHEZ-FAUQUIER A. Viruses causing gastroenteritis. Clin Microbiol Infect. April. 2003, vol.9:247-262
- Joukje S J , Harry V , Zheng D P , et al. Norovirus Illness Is a Global Problem: Emergence and Spread of Norovirus GII.4 Variants, 2001-2007[J]. The Journal of Infectious Diseases, 2009, 200(5):802-812.

Index of Symbols

	Attention, see instructions for use		Tests per kit		Authorized Representative
	For <i>in vitro</i> diagnostic use only		Use by		Do not reuse
	Store between 2~30°C		Lot Number		Catalog #



**Lotus NL B.V.**

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