

## BioTracer™ Dengue Combo Rapid Card

※ Product code : 17311

### ▶ INTENDED PURPOSE

**BioTracer™ Dengue Combo Rapid Card** is intended for detection of NS1 antigen and IgG and IgM antibodies to dengue virus (DEN 1, DEN2, DEN3, and DEN4) in human serum, plasma or human blood specimens.

### ▶ EXPLANATION OF THE TEST

Dengue is the most rapidly spreading mosquito-borne viral disease in the world. Dengue virus (DEN) is a small single-stranded RNA virus comprising four distinct serotypes (DEN-1 to -4). These closely related serotypes of the dengue virus belong to the genus *Flavivirus*, family *Flaviviridae*. Humans are the main amplifying host of the virus. Dengue virus circulating in the blood of viraemic humans is ingested by female mosquitoes during feeding. Serological detection is a common method for the diagnosis of infection with dengue viruses. NS1 is a non-structural and highly-conserved glycoprotein recognized as a marker of acute phase of dengue infection. NS1 antigen was found circulating in sample of infected patients from the first day and up to 9 days after onset fever. Anti-dengue IgM starts to appear at 3 days after initial exposure and remain in the circulation for about 30-60 days. Anti-dengue IgG raise at around 7 days, peak at 2-3 weeks, and persist for life. The **BioTracer™ Dengue Combo Rapid Card** is a chromatographic immunoassay kit for rapid qualitative determination for dengue infection.

### ▶ PRINCIPLE OF THE METHOD

**BioTracer™ Dengue Combo Rapid Card** is based on the principle of an immunochromatography in vitro test for the qualitative determination of NS1 antigen using Dengue NS1 Ag's detection device and dengue virus specific IgG or IgM using Dengue IgG/IgM's detection device in serum, plasma or whole blood.

#### [Dengue NS1 Ag]

When the specimens are added to the sample pad, they move to the conjugate pad and resuspend the dengue NS1 specific antibody conjugated gold complex. The mixtures move along the membrane by capillary action and react with monoclonal anti-dengue NS1 antibodies immobilized on the test reaction zone. If dengue NS1 antigens are present enough in the sample, a colored band in the test reaction zone will be appeared. If there are no dengue NS1 antigen or not sufficient in the sample, the area will remain colorless. The sample continues to move to the control reaction zone and forms a red or purple color, indicating the test is working properly and the result is valid.

#### [Dengue IgG/IgM]

When the specimens are added to the sample well and sample diluent are added to the sample pad, they move to the conjugate pad and resuspend the recombinant dengue virus envelope protein-gold conjugate. The mixtures move along the membrane by capillary action and react with the anti-human IgG or IgM antibodies immobilized in two lines on the test reaction zone. If antibodies against dengue are present enough in the sample, a colored band of dengue IgG or IgM in the test reaction zone will be appeared. If there are no antibodies against dengue or not sufficient in the sample, the area will remain colorless. The sample continues to move to the control reaction zone and forms a red or purple color, indicating the test is working properly and the result is valid.

### ▶ CONTENTS

1. **BioTracer™ Dengue Combo Rapid Card** contains the following items to perform the test.

- 1) Two Test devices
  - ① Dengue NS1 Ag device
  - ② Dengue IgG/IgM device
- 2) Sample diluent(for Dengue IgG/IgM)
- 3) Capillary tube(for Dengue IgG/IgM)
- 4) Dropper(for Dengue NS1 Ag)
- 5) Package insert

2. Active ingredients of main components

#### [Dengue NS1 Ag]

1 test strips included; Gold conjugate: monoclonal anti-dengue NS1-colloidal gold, chicken IgY-colloidal gold, Test line: monoclonal anti-dengue NS1, Control line: polyclonal anti-chicken IgY.

#### [Dengue IgG/IgM]

1 test strips included; Gold conjugate: recombinant dengue virus envelope protein-colloidal gold, mouse IgG-colloidal gold, Test line "G": monoclonal anti-human IgG, Test line "M": monoclonal anti-human IgM, Control line: polyclonal anti-mouse IgG.

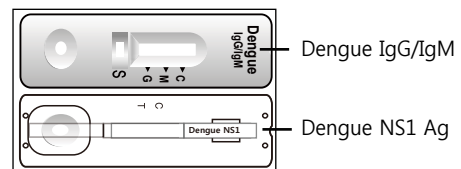
### ▶ SPECIMEN COLLECTION AND PREPARATION

1. Whole blood specimen collection
    - 1) Whole blood is collected in syringe or evacuated tube containing the anticoagulant.
    - 2) Whole blood specimens should be tested immediately after collection. In the case of storing at 2~8°C, it should be tested within 24 hours.
  2. Plasma / Serum specimen collection
    - 1) Plasma or serum specimens should be tested immediately after collection.
    - 2) Do not leave the specimens at room temperature for prolonged period. Specimens may be stored at 2-8°C for up to 3 days. For long term storage, specimens should be kept below -20°C.
- ※ Specimens containing precipitate may yield inconsistent test results. Such specimens must be clarified prior to assay.

### ▶ TEST PROCEDURE

Allow the specimens and sealed pouch containing the test devices to room temperature prior to use.

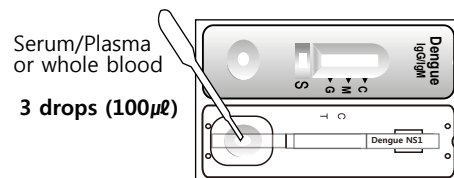
1. Remove the dengue combo test device from the sealed pouch, and place it on a clean and flat surface.



※ Caution: Perform the test immediately after removing the test device from the foil pouch.

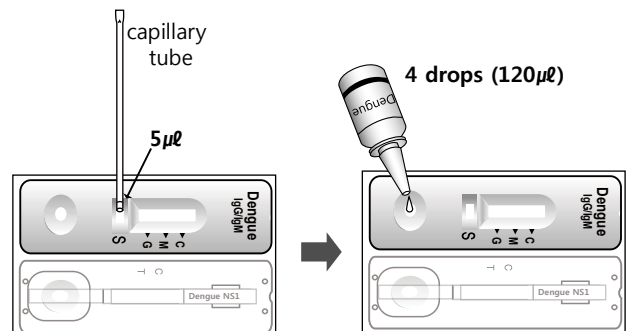
#### [Dengue NS1 Ag]

2. Apply **3 drops** (about 100 µL) of serum(or plasma) or whole blood specimens into the sample well (S) of the **Dengue NS1 Ag device** using disposable dropper provided in the kit.
3. Read the test result at **15~20 minutes. Do not read the result after 20 minutes.**



#### [Dengue IgG/IgM]

2. Transfer **5µL** of serum, plasma or whole blood in the sample well (S) of the **Dengue IgG/IgM device** using disposbale capillary tube provided in the kit.
3. Add 4 drops (about 120µL) of **sample diluent** into the diluent well of the test device.
4. Read the test result at **15~20 minutes. Do not read the test result after 20 minutes.**



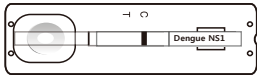
**▶ READING AND INTERPRETATION OF RESULT**

**[Dengue NS1 Ag]**

1. Control (C) band means that the test is working properly.
2. Test (T) band indicates the test result.

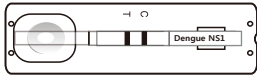
**NEGATIVE:**

The presence of only Control(C) band indicates a negative result.



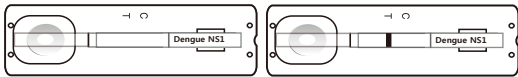
**POSITIVE:**

The presence of Test band (T) with Control (C) band indicates a positive result(refer to back page).



**INVALID:**

If control (C) band is not appeared in the result window after performing test, the result is considered invalid.



**[Dengue IgG/IgM]**

1. Control (C) band means that the test is working properly.
2. Test ('G' and 'M') band indicates the test result.

**NEGATIVE:**

The presence of only Control(C) band indicates a negative result.



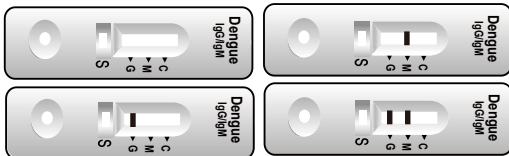
**POSITIVE:**

The presence of Test band ('G' and/or 'M') with Control (C) band indicates a positive result



**INVALID:**

If control (C) band is not appeared in the result window after performing test, the result is considered invalid.



※ The directions may not have been followed correctly or the test device may have been deteriorated. It is recommended that the specimens be re-tested with the new device.

**▶ FOLLOW-UP ACTION**

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.

**▶ LIMITATIONS OF THE METHOD**

A negative result does not preclude the possibility of infection with dengue. Other clinically available tests are required if questionable results are obtained.

**▶ PERFORMANCE CHARACTERISTICS**

1. Sensitivity and Specificity

1) A study was performed using 302 positive and negative specimens. Each specimens were assayed with the **BioTracer™ Dengue NS1 Ag Rapid Card** and a commercially available Dengue NS1 test (ELISA) according to the respective package insert.

		BioTracer™ Dengue NS1 Ag Rapid Card		Total
		Positive	Negative	
ELISA	Positive	98	7	105
	Negative	3	194	197
Total		101	201	302

The relative serological sensitivity was 93.3% (98/105) and the relative serological specificity was 98.5% (194/197).

2) A study was performed using 342 positive and negative specimens. Each specimens were assayed with the **BioTracer™ Dengue IgG/IgM Rapid Card** and compared with Haemagglutination Inhibition(HI) test.

Reference method (HI test)	BioTracer™ Dengue IgG/IgM Rapid Card			Total
	IgM Positive	IgG Positive	Negative	
Dengue IgM Positive	25	0	5	30
Dengue IgG Positive	0	59	3	62
Negative	12	8	230	250
Total	37	67	238	342

The relative serological sensitivity was 91.3% (84/92) and the relative serological specificity was 92.0% (230/250).

2. Reproducibility

- 1) Within run performance test was determined by one analyst with ten devices of one lot for 1 negative and 3 different positive control specimens. There was no variation within the test devices of one lot.
- 2) Between run performance test was determined by three analyst with 3 different lots for 1 negative and 3 different positive control specimens. There was no variation between different analyst.

**▶ WARNING AND PRECAUTIONS**

1. For in vitro diagnostic use only.
2. Do not eat or smoke while handling specimens.
3. Wear protective gloves while handling specimens. Wash hands thoroughly afterward.
4. Do not use test kit if the packing is damaged or the seal is broken.
5. Avoid splashing or aerosol formation while handling specimens.
6. Clean up spilled specimens thoroughly using an appropriate disinfectant.
7. Decontaminate and dispose of all specimens, tested kits and potentially contaminated materials, as if they were infectious waste, in a biohazard container.

**▶ STORAGE AND SHELF LIFE**

**BioTracer™ Dengue Combo Rapid Card** should be stored at 1~30°C (34~86°F). The test device is sensitive to humidity as well as to heat. Do not use it beyond the expiration date, 24 months from manufacturing date.

**▶ LITERATURE REFERENCE**

1. Gubler DJ, Trent DW. Emergence of epidemic dengue/dengue hemorrhagic fever as a public health problem in the Americas. *Infect Agents Dis* 1994;2:383–393
2. Innis BL, and Nisalak A, et al: An enzyme-linked immunosorbent assay to characterize dengue infections where denude and Japanese encephalitis co-circulate. *Am. J. Trop. Med. Hygiene*. 1989; 40: 418-427.
3. Dengue Guidelines for Diagnosis, Treatment, Prevention and Control. WHO. 2009
4. Lam, S.K., Lum, L.C.S. (1998). Rapid dengue diagnosis: a prospective study using a commercial rapid test. In *Dengue Bulletin* Vol. 22. World Health Organization Regional Office for South-East Asia and Western Pacific Regions.

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