SPECTRUM

The Creative Approach To Bioscience

Typhoid IgG/IgM Rapid Test-Cassette

(Serum / Plasma)

REF: 1200 001 30 test

INTENDED USE

The Spectrum Typhoid IgG/IgM Rapid Test is a lateral flow immunoassay for the qualitative detection and differentiation of IgG and IgM anti-Salmonella typhi (S. typhi) and paratyphi in human serum or plasma. It is intended to be used as a screening test and as an aid in the diagnosis of infection with S. typhi and paratyphi. Any reactive specimen with the Spectrum Typhoid IgG/IgM Rapid Test must be confirmed with alternative testing method(s).

SUMMARY AND EXPLANATION OF THE TEST

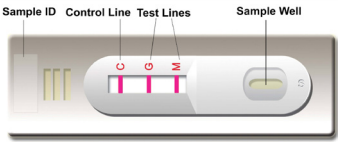
Typhoid fever and paratyphi fever are bacterial infections caused by Salmonella typhi and paratyphi A, B, and C respectively, which are transmitted through the ingestion of tainted food and water. Worldwide an estimated 17 million cases and 600,000 associated deaths occur annually1. Patients who are infected with HIV are at significantly increased risk of clinical infection. 1-5% of patients become chronic carriers harboring S. typhi in the gallbladder.

The clinical diagnosis of infections depends on isolation of S. typhi and paratyphi from blood, bone marrow or a specific anatomic lesion. In facilities that can not afford to perform this complicated and time-consuming procedure, Filix-Widal test is used to facilitate diagnosis. However, many limitations lead to difficulties in the interpretation of the Widal test[3,4].

In contrast, the Spectrum Typhoid IgG/IgM Rapid Test is a simple, fast laboratory test that simultaneously detects and differentiates IgG and IgM antibodies to S. typhi and paratyphi antigen5 thus aiding in the determination of current or previous exposure to S. typhi and paratyphi. IgM positive or IgM /IgG both positive suggest current infection, while IgG positive suggests late stage of infection, previous infection, or latent infection.

TEST PRINCIPLE

The Spectrum Typhoid IgG/IgM Rapid Test is a lateral flow chromatographic immunoassay. The test cassette consists of: 1) a burgundy colored conjugate pad containing recombinant H antigen and O antigen conjugated with colloidal gold (HO conjugates) and rabbit IgG-gold conjugates, 2) a nitrocellulose membrane strip containing two test bands (G and M bands) and a control band (C band). The M band is pre-coated with monoclonal anti-human IgM for the detection of IgM anti-S. typhi and paratyphi, G band is pre-coated with reagents for the detection of IgG anti-S. typhi and paratyphi , and the C band is pre-coated with goat anti rabbit IgG.



When an adequate volume of test specimen is dispensed into the sample well of the cassette, the test specimen migrates by capillary action across the test cassette. IgM antibodies if present in the patient specimen will bind to the HO conjugates. The immunocomplex is then captured on the membrane by the pre-coated anti-human IgM antibody, forming a burgundy colored M band, indicating a S. typhi or paratyphi IgM positive test result.

IgG antibodies if present in the patient specimen will bind to the HO conjugates. The immunocomplex is then captured by the pre-coated reagents on the membrane, forming a burgundy colored G band, indicating a S. typhi or paratyphi IgG positive test result.

Absence of any test bands (M and G) suggests a negative result. The test contains an internal control (C band) which should exhibit a burgundy colored band of the immunocomplex goat anti-rabbit IgG/ rabbit IgG-gold conjugate regardless of the color development on any of the test bands. Otherwise, the test result is invalid and the specimen must be retested with another device.

REAGENTS AND MATERIALS PROVIDED

1. Individually sealed foil pouches containing:
   a. One cassette device.
   b. One desiccant.
2. Plastic droppers.
3. Sample Diluent (1 bottle, 5 mL)
4. One package insert (instruction for use).

SYMBOLS IN PRODUCT LABELLING

EC REP	Authorised Representative		Temperature Limitation
IVD	For in-vitro diagnostic use		Use by/Expiration Date
LOT	Batch Code/Lot number		CAUTION. Consult instructions for use
REF	Catalogue Number		
	Consult instructions for use		Manufactured by

MATERIALS MAY BE REQUIRED AND NOT PROVIDED

1. Positive Control
2. Negative Control

MATERIALS REQUIRED BUT NOT PROVIDED

1. Clock or Timer

WARNINGS AND PRECAUTIONS

For in Vitro Diagnostic Use

1. This package insert must be read completely before performing the test. Failure to follow the insert gives inaccurate test results.
2. Do not open the sealed pouch, unless ready to conduct the assay.
3. Do not use expired devices.
4. Bring all reagents to room temperature (15°C-30°C) before use.
5. Do not use the components in any other type of test kit as a substitute for the components in this kit.
6. Do not use hemolized blood specimen for testing.
7. Wear protective clothing and disposable gloves while handling the kit reagents and clinical specimens. Wash hands thoroughly after performing the test.
8. Users of this test should follow the US CDC Universal Precautions for prevention of transmission of HIV, HBV and other blood-borne pathogens.
9. Do not smoke, drink, or eat in areas where specimens or kit reagents are being handled.
10. Dispose of all specimens and materials used to perform the test as biohazardous waste.
11. Handle the Negative and Positive Control in the same manner as patient specimens.
12. The testing results should be read within 15 minutes after a specimen is applied to the sample well or sample pad of the device. Reading the test after 15 minutes may give erroneous results.
13. Do not perform the test in a room with strong air flow, ie. an electric fan or strong air-conditioning.

REAGENT PREPARATION AND STORAGE INSTRUCTIONS

All reagents are ready to use as supplied. Store unused test devices unopened at 2°C-30°C. If stored at 2°C-8°C, ensure that the test device is brought to room temperature before opening. The test device is stable through the expiration date printed on the sealed pouch. Do not freeze the kit or expose the kit over 30°C.

SPECIMEN COLLECTION AND HANDLING

Consider any materials of human origin as infectious and handle them using standard biosafety procedures.

Plasma

1. Collect blood specimen into a lavender, blue or green top collection tube (containing EDTA, citrate or heparin, respectively in Vacutainer®) by veinpuncture.
2. Separate the plasma by centrifugation.
3. Carefully withdraw the plasma into a new pre-labeled tube.

Serum

1. Collect blood specimen into a red top collection tube (containing no anticoagulants in Vacutainer®) by veinpuncture.
2. Allow the blood to clot.
3. Separate the serum by centrifugation.
4. Carefully withdraw the serum into a new pre-labeled tube.

Test specimens as soon as possible after collecting. Store specimens at 2°C-8°C if not tested immediately.

Store specimens at 2°C-8°C for up to 5 days. The specimens should be frozen at -20°C for longer storage.

Avoid multiple freeze-thaw cycles. Prior to testing, bring frozen specimens to room temperature slowly and mix gently. Specimens containing visible particulate matter should be clarified by centrifugation before testing. Do not use samples demonstrating gross lipemia, gross hemolysis or turbidity in order to avoid interference on result interpretation.

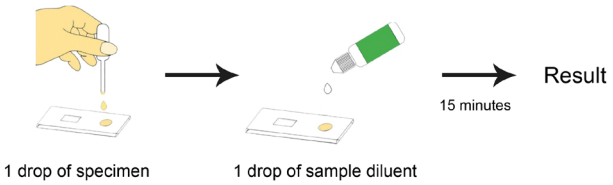
ASSAY PROCEDURE

Step 1: Bring the specimen and test components to room temperature if refrigerated or frozen. Mix the specimen well prior to assay once thawed.

Step 2: When ready to test, open the pouch at the notch and remove device. Place the test device on a clean, flat surface.

Step 3: Be sure to label the device with specimen's ID number.

Step 4: Fill the plastic dropper with the specimen.
Holding the dropper vertically, dispense 1 drop (about 30-45 µL) of specimen into the sample well making sure that there are no air bubbles.
Then add 1 drop (about 35-50 µL) of Sample Diluent immediately.



Step 5: Set up timer.
Step 6: Results can be read in 15 minutes.

Don't read result after 15 minutes. To avoid confusion, discard the test device after interpreting the result.

QUALITY CONTROL

1. ***Internal Control:*** This test contains a built-in control feature, the C band. The C line develops after adding specimen and sample diluent. Otherwise, review the whole procedure and repeat test with a new device.
2. ***External Control:*** Good Laboratory Practice recommends using external controls, positive and negative, to assure the proper performance of the assay, particularly under the following circumstances:
   a. New operator uses the kit, prior to performing testing of specimens.
   b. A new lot of test kit is used.
   c. A new shipment of kits is used.
   d. The temperature used during storage of the kit falls outside of 2-30°C.
   e. The temperature of the test area falls outside of 15 -30°C.
   f. To verify a higher than expected frequency of positive or negative results.
   g. To investigate the cause of repeated invalid results.

INTERPRETATION OF ASSAY RESULT

1. ***NEGATIVE OR NON-REACTIVE RESULT:*** If only the C band is present, the absence of any burgundy color in the both test bands (M and G) indicates that no anti-S. typhi or paratyphi antibody is detected in the specimen. The result is negative or non-reactive.

2. ***POSITIVE OR REACTIVE RESULT:***
   a. In addition to the presence of C band, if only M band is developed, the test indicates for the presence of anti- S. typhi or paratyphi IgM in the specimen. The result is IgM positive or reactive.

   b. In addition to the presence of C band, if only G band is developed, the test indicates for the presence of anti- S. typhi or paratyphi IgG in the specimen. The result is IgG positive or reactive.

   c. In addition to the presence of C band, both M and G bands are developed, the test indicates for the presence of anti-S. typhi or paratyphi IgG and IgM in the specimen. The result is both IgG and IgM positive or reactive.

Samples with positive or reactive results should be confirmed with alternative testing method(s) and clinical findings before a positive determination is made.

3. ***INVALID:*** If no C band is developed, the assay is invalid regardless of any burgundy color in the test bands as indicated below. Repeat the assay with a new device.

PERFORMANCE CHARACTERISTICS

1. *Clinical Performance For IgM Test*

A total of 334 samples from susceptible subjects were tested by the Spectrum Typhoid IgG/IgM Rapid Test and by a commercial S. typhi IgM EIA. Comparison for all subjects is shown in the following table.

	Spectrum Typhoid IgG/IgM Rapid Test		
IgM EIA	Positive	Negative	Total
Positive	31	3	34
Negative	2	298	300
Total	33	302	334

Relative Sensitivity: 91%, Relative Specificity: 99.3%, Overall Agreement: 98.5%

2. *Clinical Performance For IgG Test*

A total of 314 samples from susceptible subjects were tested by the Spectrum Typhoid IgG/IgM Rapid Test and by a commercial S. typhi IgG EIA kit. Comparison for all subjects is shown in the following table.

	Spectrum Typhoid IgG/IgM Rapid Test		
IgG EIA	Positive	Negative	Total
Positive	13	1	14
Negative	2	298	300
Total	15	299	314

Relative Sensitivity: 92.9% , Relative Specificity: 99.3%, Overall Agreement: 99.0%

3. *Performance comparison with blood culture*

Nine (9) S. paratyphi A and eleven (11) S. typhi specimens confirmed with the blood culture were tested with the Spectrum Typhoid IgG/IgM Rapid Test. The Spectrum Typhoid IgG/IgM Rapid Test correctly indentified 9 S. paratyphi A and 10 S. typhi specimens. The agreement was 95%.

LIMITATIONS OF TEST

1. The Assay Procedure and the Test Result Interpretation must be followed closely when testing the presence of antibodies to S. typhi or paratyphi in serum or plasma from individual subjects. Failure to follow the procedure may give inaccurate results.
2. The Spectrum Typhoid IgG/IgM Rapid Test is limited to the qualitative detection of antibodies to S. typhi or paratyphi in human serum or plasma. The intensity of the test band does not have linear correlation with the antibody titer in the specimen.
3. A negative result for an individual subject indicates absence of detectable anti-S. typhi or paratyphi antibodies. However, a negative test result does not preclude the possibility of exposure to S. typhi or paratyphi .
4. A negative result can occur if the quantity of anti-S. typhi or paratyphi antibodies present in the specimen is below the detection limit of the assay, or the antibodies that are detected are not present during the stage of disease in which a sample is collected.
5. If the symptom persists, while the result from Spectrum Typhoid IgG/IgM Rapid Test is negative or non-reactive result, it is recommended to re-sample the patient few days late or test with an alternative test method, such as bacterial culture method.
6. Some specimens containing unusually high titer of heterophile antibodies or rheumatoid factor may affect expected results.
7. The results obtained with this test should only be interpreted in conjunction with other diagnostic procedures and clinical findings.

REFERENCES

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4.
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