Rapid Response™

Zika Virus IgG/IgM Test

(Whole Blood/Serum/Plasma)

REF ZIKMG-13S
ZIKMG-13C
ZIKMG-13C40

Product Insert

A rapid test for the qualitative detection of antibodies (IgG and IgM) to Zika virus in whole blood, serum, or plasma.

For professional *in vitro* diagnostic use only.

Intended Use

The Rapid Response™ Zika Virus IgG/IgM Test is a rapid chromatographic immunoassay for the qualitative detection of IgG and IgM antibodies to Zika virus in human whole blood, serum, or plasma as an aid in the diagnosis of Zika Virus infections.

Summary

Zika virus (ZIKV) is a mosquito-borne flavivirus that was first isolated from a rhesus monkey in the Zika forest of Uganda in 1947[1]. In 1968, isolation from human hosts occurred in resident's antibody in humans from a multitude of countries in Africa and parts of Asia. In 2015, ZIKV first appeared outside of Africa and Asia when it was isolated in Brazil where is has caused a minor outbreak following the 2014 FIFA World Cup [1]. ZIKV is closely related to other mosquito-borne flaviviruses such as the dengue, yellow fever, West Nile, and Japanese encephalitis viruses. ZIKV causes a disease known as Zika fever, which is characterized by a maculopapular rash covering the body, fever, joint pain, and malaise[2][3]. Although there have yet to be serious complications arising from ZIKV, it's appearance across the globe, mosquito-driven transmission cycle, and possible spread via sexual contact make ZIKV an important emerging pathogen whose global impact is yet to be discovered.

Diagnosis for ZIKV infection include PCR tests to detect viral DNA as well as additional tests to detect ZIKV antibody (IgM) in serum. IgM for ZIKV is typically detectable around 3-5days after infection, but cross-reactivity with closely related dengue, yellow fever, Japanese encephalitis, and West Nile viruses are possible. These cross-reactive results were more common in patients that denoted signs of previous flavivirus infection than patients with primary ZIKV infection. For best diagnosis practices, serum samples should be analyzed as early as possible with a second test 2 to 3.

The Rapid Response™ Zika Virus IgG/IgM Test is a rapid test that utilizes a combination of Zika antigen coated colored particles for the detection of IgG and IgM antibodies to ZIKV in human whole blood, serum, or plasma.

Principle

The Rapid Response™ Zika Virus IgG/IgM Test is a qualitative membrane-based immunoassay for the detection of Zika antibodies in whole blood, serum, or plasma. This test consists of two components, an IgG component and an IgM component. In the IgG component, anti-human IgG is coated in IgG test line region. During testing, the specimen reacts with Zika antigen-coated particles in the test cassette. The mixture then migrates upward on the membrane chromatographically by capillary action and reacts with the anti-human IgG in IgG test line region. If the specimen contains IgG antibodies to Zika, a colored line will appear in IgG test line region. In the IgM component, anti-human IgM is coated in IgM test line region. During testing, the specimen reacts with anti-human IgM. Zika IgM antibodies, if present in the specimen, reacts with the anti-human IgM and the Zika antigen-coated particles in the test cassette, and this complex is captured by the anti-human IgM, forming a colored line in IgM test line region.

Therefore, if the specimen contains Zika IgG antibodies, a colored line will appear in IgG test line region. If the specimen contains Zika IgM antibodies, a colored line will appear in IgM test line region. If the specimen does not contain Zika antibodies, no colored line will appear in either of the test line regions, indicating a negative result. To serve as a procedural control, a colored line will always appear in the control line region indicating that the proper volume of specimen has been added and membrane wicking has occurred.

Reagents

The test cassette contains Zika antigen conjugated colloidal gold particles and anti-human IgM, anti-human IgG coated on the membrane.

Precautions

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

Materials

Materials provided

- Test cassettes
- Buffer solution
- Droppers
- Product insert

Materials required but not provided

- Specimen collection containers
- Lancets (for fingerstick whole blood only)
- Centrifuge (for plasma only)
- Micropipette
- Timer

Storage and Stability

The kit can be stored at room temperature or refrigerated 35.6-86°F (2-30°C). The test cassette is stable through the expiration date printed on the sealed pouch. The test cassette must remain in the sealed pouch until use. **DO NOT FREEZE.** Do not use beyond the expiration date.

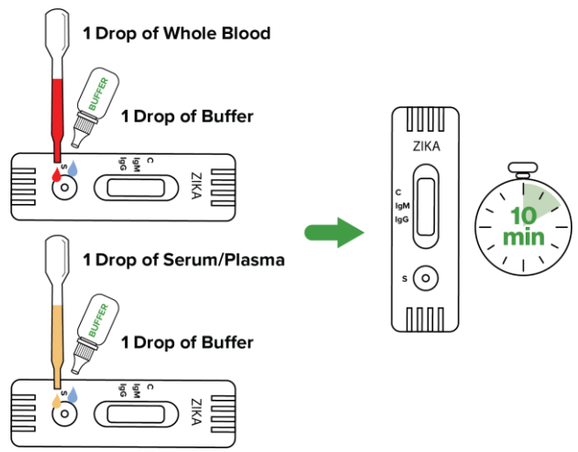
Specimen Collection and Preparation

- The Rapid Response™ Zika Virus IgG/IgM Test can be performed using whole blood, serum, or plasma.
- To collect **Fingerstick Whole Blood Specimens:**
  - Wash the patient's hand with soap and warm water or clean with an alcohol swab. Allow to dry.
  - Massage the hand without touching the puncture site by rubbing down the hand towards the fingertip of the middle or ring finger.
  - Puncture the skin with a sterile lancet. Wipe away the first sign of blood.
  - Gently rub the hand from wrist to palm to finger to form a rounded drop of blood over the puncture site.
  - Add the Fingerstick Whole Blood specimen to the test cassette by using a dropper or micropipette measuring 40µL. The dropper provided with the test dispenses approximately 40µL in one drop even if more blood is aspirated in the dropper.
- Separate serum or plasma from blood as soon as possible to avoid hemolysis. Use only clear, non-hemolyzed specimens.
- Testing should be performed immediately after specimen collection. Do not leave the specimens at room temperature for prolonged periods. Serum and plasma specimens may be stored at 35.6-46.4°F (2-8°C) for up to 3 days. For long-term storage, specimens should be kept below -4°F (-20°C). Whole blood collected by venipuncture should be stored at 35.6°F - 46.4°F (2-8°C) if the test is to be run within 2 days of collection. Do not freeze whole blood specimens. Whole blood collected by fingerstick should be tested immediately.
- Bring specimens to room temperature prior to testing. Frozen specimens must be completely thawed and mixed well prior to testing. Specimens should not be frozen and thawed repeatedly.
- If specimens are to be shipped, they should be packed in compliance with federal regulations for transportation of etiologic agents.

Test Procedure

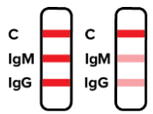
Allow the test cassette, specimen, buffer, and/or controls to reach room temperature (59-86°F; 15-30°C) prior to testing.

1. Bring the pouch to room temperature before opening. Remove the test cassette from the sealed pouch and use it within one hour.
2. Place the test cassette on a clean and level surface.
   - To use a dropper or micropipette: Hold the dropper vertically, and transfer 1 drop of serum/plasma/whole blood (approximately 40 µL to the specimen well of the test cassette, then add 1 drop of buffer (approximately 40 µL) and start the timer.
3. Wait for the colored line(s) to appear. **The test result should be read at 10 minutes.** Do not interpret the result after 20 minutes.

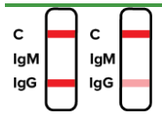


Results Interpretation

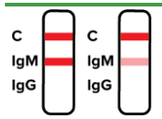
Positive



IgG and IgM:* Three lines appear. One colored line should be in the control line region (C), and two colored lines should appear in IgG test line region and IgM test line region. The color intensities of the lines do not have to match. The result is positive for IgG & IgM antibodies and is indicative of secondary Zika infection.



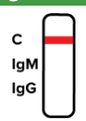
IgG:* Two lines appear. One colored line should be in the control line region (C), and a colored line appears in IgG test line region. The result is positive for Zika virus specific-IgG and is probably indicative of secondary Zika infection.



IgM:* Two lines appear. One colored line should be in the control line region (C), and a colored line appears in IgM test line region. The result is positive for Zika virus specific-IgM antibodies and is indicative of primary Zika infection.

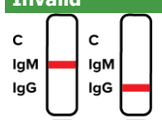
***NOTE:** The intensity of the color in the IgG and/or IgM test line region(s) will vary depending on the concentration of Zika antibodies in the specimen. Therefore, any shade of color in the IgG and/or IgM test line region(s) should be considered positive.

Negative



One colored line should be in the control line region (C). No line appears in IgG and IgM test line region(s).

Invalid



Control line fails to appear. Insufficient buffer volume or incorrect procedural techniques are the most likely reasons for control line failure. Review the procedure and repeat the procedure 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 is an internal valid procedural control, confirming adequate membrane wicking.

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 Rapid Response™ Zika Virus IgG/IgM Test is for in vitro diagnostic use only. The test should be used for the detection of ZIKA virus antibodies in whole blood, serum or plasma specimens only. Neither the quantitative value nor the rate of increase in ZIKA virus antibody concentration can be determined by this qualitative test.
2. The Rapid Response™ Zika Virus IgG/IgM Test will only indicate the presence of ZIKA virus antibodies in the specimen and should not be used as the sole criteria for the diagnosis of ZIKA virus.
3. The continued presence or absence of antibodies cannot be used to determine the success or failure of therapy.
4. Results from immunosuppressed patients should be interpreted with caution.
5. As with all diagnostic tests, all results must be interpreted together with other clinical information available to the physician.
6. 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 ZIKA virus infection.

Performance Characteristics

Sensitivity and Specificity

The Rapid Response™ Zika Virus IgG/IgM Test has been evaluated with specimens obtained from a population of symptomatic and asymptomatic individuals. Results were confirmed by a leading commercial Zika ELISA test.

Zika virus Infection for IgM/IgG test results

Method			ELISA		
Rapid Response™ Zika Virus IgG/IgM Test	Results		Positive		Negative
			IgM	IgG	
	Positive	IgM	10	0	0
		IgG	1	19	0
	Negative		0	1	0
Relative Sensitivity			91%	95%	/

Non-Zika Infection for IgM/IgG test results

Method			ELISA		
Rapid Response™ Zika Virus IgG/IgM Test	Results		Positive		Negative
			IgM	IgG	
	Positive	IgM	0	0	0
		IgG	0	0	1
	Negative		0	0	170
Relative Specificity			/	/	99.4%

Relative sensitivity: (10+19)/(11+20)=93.5% (95%CI*: 78.6%~99.2%);
Relative specificity: 170/171=99.4% (95%CI*: 96.8%~100.0%);
Accuracy: (10+19+170)/(11+20+171)=98.5% (95%CI*: 95.7%~99.7%).
*Confidence Intervals

Cross-reactivity

The Rapid Response™ Zika Virus IgG/IgM Test has been tested by HAMA, RF, HBsAg, HBsAb, HBeAg, HBeAb, HBcAb, Anti-Syphilis, anti-HIV, anti HCV, anti-H. Pylori, MONO, anti-CMV, Dengue IgG, Dengue IgM, anti-Rubella and anti-TOXO positive specimens. The results showed no cross-reactivity.

Interfering Substances

The following potentially interfering substances were added to Zika negative specimens.

Acetaminophen: 20 mg/dL	Caffeine: 20 mg/dL
Acetylsalicylic Acid: 20 mg/dL	Creatin: 200 mg/dL
Albumin: 2 g/dL	Gentisic Acid: 20 mg/dL
Ascorbic Acid: 2g/dL	Hemoglobin 1000mg/dL
Bilirubin: 1g/dL	Oxalic Acid: 60mg/dL

None of the substances at the concentration tested interfered in the assay.

Bibliography

1. Hayes EB (2009) Zika virus outside Africa. Emerg Infect Dis 15: 1347–1350.
2. Simpson DI (1964) Zika virus infection in man. Trans R Soc Trop Med Hyg 58:335–338.
3. Bearcroft WG (1956) Zika virus infection experimentally induced in a human volunteer. Trans R Soc Trop Med Hyg 50: 442–448.

Glossary of Symbols

Consult instructions for use
Test per Kit
EC REP Authorized Representative
Store between 35.6°F to 86°F (2-30°C)
Use by
Do Not Reuse
LOT Lot Number
IVD For *in vitro* diagnostic use only
REF Catalogue #
Manufacturer

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MDSS GmbH
Schiffgraben 41
30175 Hannover, Germany

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Technical Support: 1-888-339-9964