OnSite® CMV IgG/IgM Rapid Test

REF R0224C

Instructions for Use

INTENDED USE

The *OnSite* CMV IgG/IgM Rapid Test is a lateral flow immunoassay for the simultaneous detection and differentiation of IgM and IgG antibodies to cytomegalovirus (CMV) in human serum, plasma or whole blood. It is intended to be used by professionals as an aid in the diagnosis of infection with CMV.

Any interpretation or use of this preliminary test result must also rely on other clinical findings as well as on the professional judgment of health care providers. Alternative test method(s) should be considered to confirm the test result obtained by this device.

SUMMARY AND EXPLANATION OF THE TEST

Cytomegalovirus (CMV) infections are widespread and usually asymptomatic; however, the virus may persist as a latent or chronic infection[1]. The relatively frequent incidence and the severity of the disease in newborns and immunosuppressed individuals clearly establish this agent as an important human pathogen[2-4]. CMV infection can be classified as congenital (acquired before birth), perinatal (acquired at birth) and postnatal (acquired after birth).

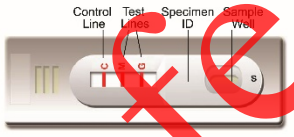
The age at which most postnatal CMV infections are acquired varies with socioeconomic conditions. Only about 10% to 15% of the children in the United States are seropositive; by the age of 35, however, about 50% of the population is seropositive[2-4]. The majority of individuals that contract postnatal CMV infections remain asymptomatic. A small percentage of individuals will develop a negative heterophile-antibody infectious mononucleosis syndrome. In immunocompromised patients CMV infections happen frequently, often from reactivation of latent infection, and may be life-threatening[2-4].The prognosis for congenitally infected infants who are asymptomatic at birth must be guarded. Five to ten percent of these infants may exhibit various degrees of mental retardation and central nervous system motor disorders during their life[5]. Ten to twenty-five percent may subsequently develop hearing loss[6]. Surveys show the incidence of congenital CMV infection to be from 0.5% to 2.5%. Consequently, a careful documentation of the long-term effects of intrauterine infection is important[7].

Anti-CMV IgM is produced during the first 2-3 weeks of acute infection with CMV and exist transiently in most patients[8-10]. Anti-CMV IgM can persist for up to 6-9 months in primary infections and can also be present during re-activation[10]. Anti-CMV IgG is produced following acute infection and remains detectable for life[11,12]. De novo appearance of anti-CMV IgG in the serum of a patient known previously to be seronegative (seroconversion) indicates a primary infection[10]. Anti-CMV IgG indicate a past infection from 2 weeks to year's duration[10].

The *OnSite* CMV IgG/IgM Rapid Test allows detection and differentiation of IgG and IgM antibodies to CMV in human serum, plasma or whole blood. The test can be performed within 10-15 minutes by minimally skilled personnel without the use of laboratory equipment.

TEST PRINCIPLE

The *OnSite* CMV IgG/IgM Rapid Test is a lateral flow chromatographic immunoassay. The test strip in cassette device consists of: 1) a colored conjugate pad containing CMV antigens conjugated with colloidal gold (CMV conjugates) and a control antibody conjugated with colloidal gold and 2) a nitrocellulose membrane strip containing two test lines (G and M lines) and a control line (C line). The G line is pre-coated with anti-human IgG for detection of anti-CMV IgG. The M line is pre-coated with anti-human IgM for detection of anti-CMV IgM. The C line is pre-coated with a control line antibody.



When an adequate volume of test specimen and sample diluent is dispensed into the sample well of the cassette, the specimen migrates by capillary action across the test strip. Anti-CMV IgG, if present in the specimen, will bind to the CMV conjugates. The immunocomplex is then captured on the membrane by the pre-coated anti-human IgG forming a colored G line, indicating a CMV IgG positive test result. Anti-CMV IgM, if present in the specimen, will bind to the CMV conjugates. The immunocomplex is then captured on the membrane by the pre-coated anti-human IgM forming a colored M line, indicating a CMV IgM positive result.

Absence of any test lines (G or M) suggests a negative test result. The test contains an internal control (C line) which should exhibit a colored line of the immunocomplex of the control antibodies, regardless of color development on the test lines (G and M). If no control line (C line) develops, 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. 10 µL capillary tubes
3. Sample diluent (REF SB-R0224, 5 mL/bottle)
4. Instructions for Use

MATERIALS REQUIRED BUT NOT PROVIDED

1. Positive control
2. Negative control

MATERIALS REQUIRED BUT NOT PROVIDED

1. Clock or timer
2. Lancing device for whole blood test

WARNINGS AND PRECAUTIONS

For *In Vitro* Diagnostic Use

1. Read these Instructions for Use completely before performing the test. Failure to follow the instructions could lead to inaccurate test results.
2. Do not open the sealed pouch until ready to conduct the assay.
3. Do not use expired devices or components.
4. Bring all reagents to room temperature (15-30°C) before use.
5. Do not use components from another test kit to substitute for components of this kit.
6. Do not use hemolyzed blood specimens 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 bio-hazardous waste.
11. Handle negative and positive controls in the same manner as patient specimens.
12. The test result should be read 10 minutes after a specimen is applied to the sample well or sample pad of the device. Any results interpreted outside of the 10-15 minute window should be considered invalid and must be repeated.
13. Do not perform the test in a room with strong air flow, i.e. 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 2-30°C. If stored at 2-8°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 to temperatures above 30°C.

SPECIMEN COLLECTION AND HANDLING

Consider any materials of human origin as infectious and handle them using standard bio-safety procedures.

Plasma/Serum

Step 1: Collect blood specimen into collection tube containing EDTA, citrate or heparin for plasma or collection tube containing no anticoagulants for serum by venipuncture.
Step 2: To make plasma specimen, centrifuge collected specimens and carefully withdraw the plasma into a new pre-labeled tube.
Step 3: To make serum specimen, allow blood to clot, then centrifuge collected specimens and carefully withdraw the serum into a new pre-labeled tube.

Test specimens as soon as possible after collecting. Store specimens at 2-8°C, if not tested immediately. The specimens can be stored at 2-8°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 with result interpretation.

Whole Blood

Step 1: Drops of whole blood can be obtained by either fingertip puncture or venipuncture. Collect blood specimen into a collection tube containing EDTA, citrate or heparin. Do not use hemolyzed blood for testing.

Whole blood specimens should be stored in refrigeration (2-8°C), if not tested immediately. The specimens must be tested within 24 hours of collection.

ASSAY PROCEDURE

Step 1: Bring the specimen and test components to room temperature if refrigerated or frozen. Once the specimen is thawed, mix well prior to performing the assay.

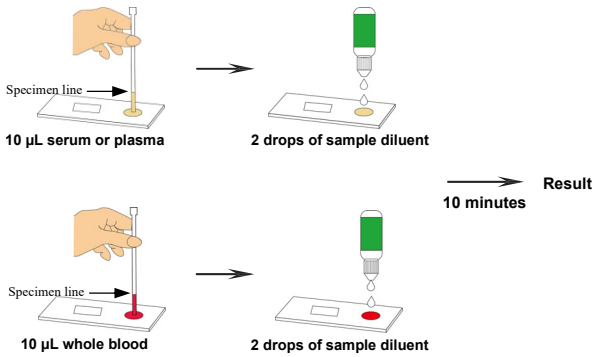
Step 2: When ready to test, open the pouch at the notch and remove the device. Place the test device on a clean, flat surface.

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

Step 4: Fill the capillary tube with specimen not exceeding the specimen line as shown in the images below. The volume of specimen is approximately 10 µL. ***For better precision, transfer specimen using a pipette capable of delivering a 10 µL volume.***

Holding the capillary tube vertically, dispense the entire specimen into the center of the sample well making sure that there are no air bubbles.

Immediately add 2 drops (about 60-80 µL) of sample diluent to the sample well with bottle positioned vertically.



Step 5: Set up the timer.

Step 6: Result should be read at 10 minutes. Positive results may be visible in as soon as 1 minute. Negative results must be confirmed at the end of 15 minutes only. ***Any results interpreted outside of the 10-15 minute window should be considered invalid and must be repeated. Discard used devices after interpreting the result following local requirements governing the disposal of devices.***

QUALITY CONTROL

1. **Internal Control:** This test contains a built-in control feature, the C line. The C line develops after adding the specimen and the sample diluent. If the C line does not develop, review the entire procedure and repeat the 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. A new operator uses the kit, prior to performing the testing of the specimens.
   b. A new lot of test kits is used.
   c. A new shipment of test kits is used.
   d. The temperature during storage of the kits 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 RESULT:** If only the C line develops, the test indicates that anti-CMV antibodies are not detected in the specimen. The result is negative or non-reactive.

2. **POSITIVE RESULT**:

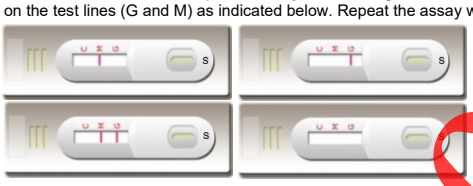
2.1 In addition to the presence of the C line, if only the G line develops, the test result indicates the presence of anti-CMV IgG. The result is anti-CMV IgG positive or reactive.

2.2 In addition to the presence of the C line, if only the M line develops, the test indicates the presence of anti-CMV IgM. The result is anti-CMV IgM positive or reactive.

2.3 In addition to the presence of C line, if both the G and M lines develop, the test indicates the presence of anti-CMV IgG and IgM. The result is anti-CMV IgG and IgM positive or reactive.

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

3. **INVALID:** If no C line develops, the assay is invalid regardless of any color development on the test lines (G and M) as indicated below. Repeat the assay with a new device.



PERFORMANCE CHARACTERISTICS

1. **Accuracy of IgG Detection**

A total of 258 clinical specimens were collected and tested on the *OnSite* CMV IgG/IgM Rapid Test and by commercial ELISA. Comparison for all subjects showed 93.4% overall agreement for the IgG test line.

2. **Accuracy of IgM Detection**

A total of 212 clinical specimens were collected and tested on the *OnSite* CMV IgG/IgM Rapid Test and by commercial ELISA. Comparison for all subjects showed 93.9% overall agreement for the IgG test line.

3. **Cross-Reactivity**

No false positive anti-CMV IgG and IgM results were observed on 3-14 specimens from the following disease states or special conditions, respectively:

Dengue	HAV	HBV	HCV	HIV
HSV-1	HSV-2	hCG	*H. pylori*	Malaria
Rubella	TB	Toxo	*T. pallidum*	ANA
HAMA	RF (up to 1500 IU/mL)			

4. **Interference**

Common substances (such as pain and fever medication and blood components) may affect the performance of the *OnSite* CMV IgG/IgM Rapid Test. This was studied by spiking these substances into IgM positive, strong-level IgG positive, medium-level IgG positive, weak-level IgG positive, and IgM and IgG negative specimens, respectively. The results demonstrate that at the concentrations tested, the substances studied do not affect the performance of the *OnSite* CMV IgG/IgM Rapid Test.

List of potentially interfering substances and concentrations tested:

1. Albumin	60 g/L	6. Hemoglobin	2 g/L
2. Bilirubin	20 mg/dL	7. Heparin	3,000 U/L
3. Creatinine	442 µmol/L	8. Human IgG	1,000 mg/dL
4. EDTA	3.4 µmol/L	9. Salicylic acid	4.34 mmol/L
5. Glucose	55 mmol/L	10. Sodium citrate	3.8%

LIMITATIONS OF TEST

1. The Assay Procedure and the Interpretation of Assay Result sections must be followed closely when testing for the presence of IgG and IgM antibodies to CMV in serum, plasma or whole blood from individual subjects. Failure to follow the procedure may lead to inaccurate test results.
2. The *OnSite* CMV IgG/IgM Rapid Test is limited to the qualitative detection of antibodies to CMV in serum, plasma or whole blood. The intensities of the test lines do not have linear correlation with the antibody titers in the specimen.
3. A negative or non-reactive result for an individual subject indicates absence of detectable anti-CMV antibodies. However, a negative test result does not preclude the possibility of exposure to or infection with CMV.
4. A negative or non-reactive result can occur if the quantity of the anti-CMV IgG or IgM present in the specimen is below the detection limits of the assay or the antibodies that are detected are not present during the stage of the disease in which a sample is collected.
5. The *OnSite* CMV IgG/IgM Rapid Test has not been validated on specimens from neonates.
6. Infection may progress rapidly. If the symptoms persist, while the result from *OnSite* CMV IgG/IgM Rapid Test is negative or non-reactive, it is recommended to test with an alternative test method.
7. Some specimens containing unusually high titers of heterophile antibodies or rheumatoid factor (> 1500 IU/mL) may affect expected results.
8. The results obtained with this test should only be interpreted in conjunction with other diagnostic procedures and clinical findings.

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Index of Symbols

Consult instructions for use	For *in vitro* diagnostic use only	Use by
Catalog #	Lot Number	Tests per kit
Store between 2-30°C	Do not reuse	
Manufacturer	Date of manufacture	

CTK Biotech, Inc.
13855 Stowe Drive
Poway, CA 92064, USA
Tel: 858-457-8698
Fax: 858-535-1739
E-mail: info@ctkbiotech.com

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English version

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