

# Cytomegalovirus IgM (CMV IgM)

## ENZYME IMMUNOASSAY TEST KIT

### Enzyme Linked Immunosorbent Assay (ELISA) for Qualitative Detection of Cytomegalovirus IgM antibody in Human Serum

FOR IN VITRO DIAGNOSTIC USE ONLY

Store at 2°C to 8°C

#### INTENDED USE

**CMV IgM** is intended for the Qualitative detection of IgM antibodies to cytomegalovirus (CMV) infection in human serum based on capture principle. For in Vitro Diagnostic Use only.

#### INTRODUCTION

Cytomegalovirus is a herpes virus and a leading biological factor causing congenital abnormalities and complications among those who receive massive blood transfusions and immunosuppressive therapy. About half of pregnant women who contract a primary infection spread the disease to their fetus. When acquired in-utero, the infection may cause mental retardation, blindness, and/or deafness.

Serological tests for detecting the presence of antibody to CMV can provide valuable information regarding the history of previous infection, diagnosis of active or recent infection, as well as in screening blood for transfusions in newborns and immuno-compromised recipients. ELISA CMV IgM is an accurate serologic method to detect CMV IgM antibody for identification of CMV infection.

#### PRINCIPLE OF THE ASSAY

The Cytomegalovirus IgM assay is based on the principle of capture of these immunoglobulins by anti-human IgM monoclonal agglutinating sera coated on the solid phase. A subsequent incubation with cytomegalovirus antigen conjugated to horseradish peroxidase binds the IgM antibodies specific for the antigen and is revealed by the addition of the TMB substrate. When the enzymatic reaction is stopped by the addition of Stop Solution, a yellow colouring forms. The colour, which is proportional to the amount of specific antibodies present in the sample, can be read in an ELISA microplate reader. The results are read by a microwell reader compared in a parallel manner with calibrator and controls.

#### MATERIALS AND COMPONENTS

##### Materials provided with the test kit:

1. Coated Microwells: Purified anti-Human IgM agglutinating sera coated wells.
2. Sample Diluent: Ready to use.
3. Negative Control: Ready to use.
4. Positive Control: Ready to use.
5. Wash Buffer Concentrate (20X).
6. Enzyme Conjugate: Ready to use.
7. TMB Substrate: Ready to use.
8. Stop Solution: Ready to use.
9. Pack Insert.
10. Plate Sealer.
11. Protocol Sheet.
12. Microwell Holder.

##### Materials required but not provided

- 1) Precision pipettes: 10-100µl, 20-200µl, 100-1000µl
- 2) Disposable pipette tips
- 3) Distilled water
- 4) Disposable Gloves

- 5) ELISA reader
- 6) ELISA washer

#### STORAGE AND STABILITY

1. **CMV IgM** kit is stable at 2-8°C up to expiry date printed on the label.
2. Coated Microwells should be used within one month upon opening the pouch provided that once opened, the pouch must be resealed to protect from moisture. If the colour of the desiccant has changed from blue to pink at the time of opening the pouch, another coated Microwells pouch should be used.
3. Diluted Wash Buffer is stable for up to one week when stored at 2-8°C.

#### SPECIMEN COLLECTION & PREPARATION

1. Collect Blood specimen by venipuncture according to standard procedure.
2. Only serum should be used.
3. Avoid grossly hemolytic, lipemic or turbid samples.
4. Preferably use fresh samples. However specimens can be stored up to 48 hours at 2-8°C, for short duration.
5. For longer storage, specimens can be frozen at -20°C. Thawed samples must be mixed prior to testing.
6. Do not heat inactivate before use.
7. Specimen containing precipitate or particulate matter should be clarified by centrifugation prior to use.
8. Specimen should be free from particulate matter and microbial contamination.

#### PRECAUTIONS

- (1) Bring all reagents and specimen to room temperature before use.
- (2) Do not pipette any material by mouth.
- (3) Do not eat, drink or smoke in the area where testing is done.
- (4) Use protective clothing and wear gloves when handling samples.
- (5) Use absorbent sheet to cover the working area.
- (6) Immediately clean up any spills with sodium hypochlorite.
- (7) All specimens and controls should be considered potentially infectious and discarded appropriately.
- (8) Neutralize acid containing waste before adding hypochlorite.
- (9) Do not use kit after the expiry date.
- (10) Do not mix components of one kit with another.
- (11) Always use new tip for each specimen and reagent.
- (12) Do not allow liquid from one well to mix with other wells.
- (13) Do not let the strips dry in between the steps.

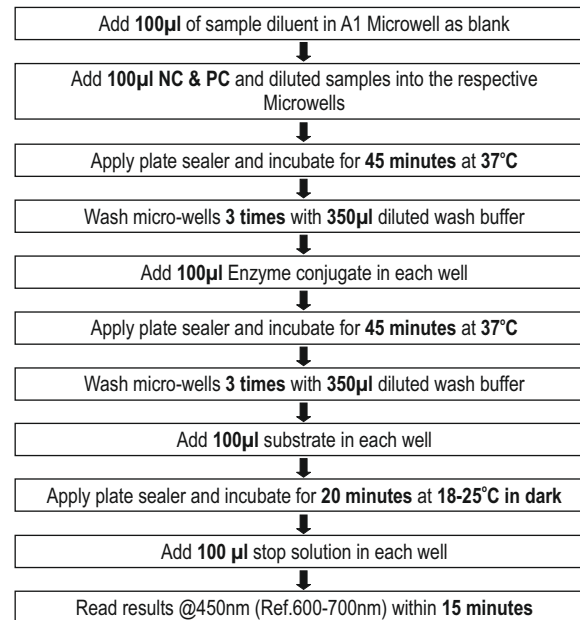
#### REAGENT PREPARATION

1. All reagents should be brought to room temperature (18-25°C) and mixed by gently inverting or swirling prior to use. Do not induce foaming.
2. Dilute wash buffer 20 times (for example add 5ml concentrated buffer to 95ml of distilled or deionized water).

#### TEST PROCEDURE

1. Place the desired number of coated strips into the holder.
2. Prepare 1:40 dilutions by adding 5µl of the test samples to 200µl of sample diluent. (**Please do not dilute Positive Control and Negative Control, they are ready for use**). Mix well.
3. Dispense 100µl of diluted serum samples, negative control and positive control into the appropriate wells. For the reagent blank, dispense 100µl of sample diluent in A1 well position. Tap the holder to remove air bubbles from the liquid and mix well. Incubate for **45 minutes at 37°C**.
4. After incubation, empty the microtitre wells and wash the plate **3 times** with 350µl of diluted wash buffer. Strike the microtitre plate sharply onto the absorbent paper towel to remove all residual droplets.
5. Dispense 100µl of enzyme conjugate to each well and incubate for **45 minutes at 37°C**.
6. After incubation, empty the microtitre wells and wash the plate **3 times**

- with 350µl of diluted wash buffer. Strike the microtitre plate sharply onto the absorbent paper towel to remove all residual droplets.
7. Dispense 100µl of TMB Substrate to each well. Incubate at room temperature (18-25°C), in the dark, for **20 minutes**.
8. Stop the reaction by adding 100 µl of Stop Solution to each well. Gently mix for 10 seconds until the blue color completely changes to yellow.
9. Read the optical density at 450/630 nm with a microtiter plate reader within **15 minutes**.



#### RUN CRITERIA

The test run may be considered valid provided the following criteria are met:

1. The O.D. value of the reagent blank against air from a microwell reader should be less than 0.2.
2. The CMV IgM Index for Negative and Positive Control should show negative and positive results.

#### CALCULATION OF RESULTS

1. Calculate the average value of the absorbance of the negative control.
2. Calculate the cutoff value using the following formula:  
Cut Off OD = 2 x Mean OD of Negative Control.
3. Calculate the CMV IgM Index using the following formula:  
CMV IgM Index= Sample OD/ Cut Off OD.

#### INTERPRETATION OF THE RESULT

IgM Index Value	Result
IgM Index value <0.90	Negative
IgM Index value 0.91-1.3	Grey zone
IgM Index value >1.3	Positive

#### PERFORMANCE CHARACTERISTICS

The precision of the assay was evaluated by testing three different sera of eight replicates over 3 days.

The intra-assay and inter-assay C.V. are summarized below:

	Negative	Low positive	Positive
Intra-assay	5.8%	3.0%	2.1%
Inter-assay	7.7%	4.7%	3.6%

#### IMPORTANT NOTE

1. This assay is a temperature sensitive assay. The best temperature condition for this assay is 37°C.
2. The wash procedure is critical. Insufficient washing will result in poor precision and falsely elevated absorbance readings.
3. It is recommended to use the multi channel pipettes to avoid time effect. A full plate of 96 wells may be used if automated pipetting is available.
4. Duplication of NC, PC & samples is not mandatory but may provide information on reproducibility & application errors.












#### LIMITATIONS OF THE ASSAY


1. To prevent false negative and false positive IgM test results, caused by the presence of specific IgG and rheumatoid factor (RF) in some specimens, reagents provided in this kit have been formulated to resolve these interferences. However, in specimens with extremely high RF and high autoimmune antibodies, the possibility of these interferences cannot be ruled out entirely.
2. As with other serological tests, the results obtained with the CMV IgM ELISA serve only as an aid to diagnosis and should be interpreted in relation to other clinical and diagnostic findings.
3. IgM responses may vary in different individuals. It has been reported that 10-30 % of infants may fail to develop IgM antibody responses despite congenital CMV infection. Furthermore, up to 27 % of adults with primary CMV infection may not demonstrate an IgM response. Thus, the absence of CMV-specific IgM does not necessarily exclude the possibility of CMV infection.
4. The presence or absence of CMV IgG or IgM in pregnant women is of limited value in predicting congenital CMV infection. However, the presence of specific IgM in the circulation of the newborn is indicative of infection. Since serum samples obtained too early in infection may not contain detectable IgM antibody, a subsequent sample should be obtained 7 to 14 days later and test. In the case of cord blood, care should be taken to avoid contamination by maternal blood, and it is prudent to confirm positive IgM antibody results by testing a follow-up specimen from the newborn.

#### BIBLIOGRAPHY

1. Voller, A., J.E. Bidwell, et al. Manual of clinical immunology. Chapter 69. Rose, N. and Friedman, H. eds. Am. Soc. Microbiol. p.506, 1985.
2. Cremer, N.E. Antibodies in serodiagnosis of viral infection. p. 73. In Lennett E.H. ed. Laboratory diagnosis of viral infection. MerceL Dekker, Inc., New York, 1985.
3. Starr, S.E. and H.M. Friedman. "Human CMV." Chapter 65. In Manual of Clin. Microbiol., 4th ed., Lennett, E.H. et al ed. Am. Soc. Microbiol. pp. 771-719, 1985.
4. Data on file: Orchid Biomedical Systems (P) Ltd.

#### SYMBOL KEYS

 Temperature Limitation	 Consult Instructions for use
 Manufacturer	 In vitro Diagnostic Medical Device
 Use by	 Catalogue Number
 Date of Manufacture	 Batch Number / Lot Number
 This side up	 Contains sufficient for <math>\leq n</math> tests
 Do not reuse	

 **Orchid Biomedical Systems (P) Ltd.\***

M 46-47, Phase III B, Verna Industrial Estate, Verna, Goa - 403 722, INDIA.  
Email id: sales@orchidbiomedical.com

\*A Revvity Inc. Company