*recom*Line CMV IgG [Avidität]
*recom*Line CMV IgM

MIKROGEN DIAGNOSTIK

IVD

Instructions for use (English)

1 Purpose

The *recom*Line CMV IgG [Avidität], IgM is a test for the qualitative detection of IgG or IgM antibodies and for determining the avidity of IgG antibodies against the human Cytomegalovirus in human serum or plasma. For the determination of IgG antibody avidity, an avidity reagent can be ordered separately.

2 Intended use

The *recom*Line CMV IgG [Avidität], IgM is a line immunoassay based on recombinant cytomegalovirus (CMV) antigens. Unlike ELISA, the test principle of the line immunoassay allows the identification of specific antibodies against the various antigens of CMV (IE1, CM2, p150, p65, gB1 and gB2) due to separate lines of individual antigens on the strip. The detection of phase-specific IgG antibodies, IgM antibodies and the avidity makes it possible to differentiate between an acute and a previous infection. The *recom*Line CMV IgG [Avidität], IgM can be used as a confirmation test to clarify unclear screening results.

Infection with the human cytomegalovirus (CMV), also known as the human herpes virus 5 (HHV5), is usually harmless in patients with a healthy immune system, who may even develop no symptoms at all. Immune-suppressed patients and pregnant women, however, constitute a risk group. In an immune-suppressed patient, the CMV infection or reactivation may result in pneumonia, retinitis, inflammation of the digestive system or encephalitis. Worldwide, primary CMV infection is one of the most common congenital infections, with sometimes severe consequences for the health of foetuses and newborn babies. Even asymptomatic newborn babies quite frequently develop symptoms at a later stage. Depending on the stage of pregnancy at which the infection takes place, this may result in spontaneous abortion, growth retardation, chorioretinitis, microcephaly and other cerebral deformities, hepatomegaly, mental retardation and hearing damage.

3 Test principle

Highly purified recombinant CMV antigens are fixed on nitrocellulose membrane test strips.

1. The test strips are incubated with the diluted serum or plasma sample, and the specific antibodies bind to the pathogen antigens on the test strips.
2. Unbound antibodies are subsequently washed off.
3. In a second step, the strips are incubated with anti-human immunoglobulin antibodies (IgG or IgM respectively), which are coupled to horseradish peroxidase.
4. Unbound conjugate antibodies are subsequently washed off.
5. Specifically bound antibodies are detected with a staining reaction catalysed by the peroxidase. If an antigen/antibody reaction has taken place, a dark band will appear on the corresponding part of the strip.

There are control bands at the upper end of the test strips:

a) The reaction control next to the strip number must show a reaction to each serum / plasma sample.
b) The conjugate controls (IgG, IgM) are used for the inspection of the antibody class detected. If the test strip is used to detect IgG antibodies, the IgG conjugate control can be detected as a clearly coloured band. When IgM is detected, a clearly coloured IgM conjugate control band will appear.
c) "Cut-off control": The intensity of this band allows the reactivity of the individual antigen bands to be evaluated (see 9.2 Evaluation).

4 Reagents

4.1 Package contents

The reagents in one package are sufficient for 20 tests.
Each test kit contains:

WASHBUF A 10 X	**100 ml** washing buffer A, **10x** (**tenfold concentration)** Contains phosphate buffer, NaCl, KCl, detergent, preservative: MIT (0.1%) and oxypyrion (0.2%)
SUBS TMB	**40 ml** tetramethylbenzidine chromogenic substrate (**TMB, ready to use**)
MILKPOW	**5 g** skimmed milk powder
INSTRU	**1** Instructions for use
EVALFORM	**1** Evaluation form

4.1.1 *recomLine CMV IgG [Avidität]*

In addition to the components listed in 4.1, each test kit contains:

TESTSTR	**2** tubes, each containing **10** sequentially numbered test strips
CONJ IgG	**500 µl** anti-human IgG conjugate, **100x (hundredfold concentration, green sealing cap)** obtained from rabbits, contains NaN_3 (<0.1%), MIT (<0.1%) and chlorazetamide (<0.1%)

Determining the avidity

The avidity reagent (including instructions for use) can be provided on request as an additional reagent to determine the avidity of CMV IgG antibodies.

AVIDI Article no. 11010	Avidity reagent (solid) for 60 ml ready-to-use solution

4.1.2 *recomLine CMV IgM*

In addition to the components listed in 4.1 each test kit contains:

TESTSTR	**2** tubes, each containing **10** sequentially numbered test strips
CONJ IgM	**500 µl** anti-human IgM conjugate, **100x (hundredfold concentration, purple sealing cap)** obtained from rabbits, contains NaN_3 (<0.1%), MIT (<0.1%) and chlorazetamide (<0.1%)

4.2 Additional reagents, materials and devices required

- Incubation trays (can be purchased as needed from MIKROGEN)
- Deionised water (high quality)
- Plastic forceps
- Horizontal shaker
- Vortex mixer or other rotators
- Vacuum pump or similar device
- Volumetric cylinders, 50 ml and 1000 ml
- Micropipettes with disposable tips, 20 µl and 1000 µl
- 10 ml pipette or dispenser
- Timer
- Absorbent paper towels
- Disposable protective gloves
- Waste container for biohazardous materials

5 Shelf life and handling

- Store reagents at +2°C to +8°C before and after use, **do not freeze**.
- Before starting the test, adjust all components to room temperature (+18°C to +25°C) for at least 30 minutes. The test procedure is carried out at room temperature.
- Washing buffer, milk powder, dilution buffer, conjugate and TMB can be interchanged between the different *recom*Line and *recom*Blot test systems, if these components carry the same symbols. Consider the shelf life of these components.
- Mix the concentrated reagents and samples thoroughly before use. Avoid foaming.
- Only open the tube containing the test strip immediately before use to avoid condensation. Strips that are not required remain in the tube and continue to be stored at +2°C to +8°C (reseal tubes well, test strips may not be exposed to humidity before starting the test!).
- The strips are marked with the serial number, as well as the test code.
- The packages bear an expiration date. After this has been reached, no guarantee of quality can be offered.
- Protect kit components from direct sunlight throughout the entire test procedure. The substrate solution (TMB) is especially sensitive to light.
- The test should only be carried out by trained and authorised personnel.
- In the event of substantial changes to the product or the instructions for use by the user himself, the intended purpose may not coincide with that specified by MIKROGEN.
- Cross-contamination of patient samples or conjugates can lead to inaccurate test results. Carefully add patient samples, test strips and the conjugate solution. Make sure that incubation solutions do not flow over into other wells. Carefully remove liquids.
- The strips must be completely wetted and submerged throughout the entire procedure.
- Automation is possible; you will receive further information from MIKROGEN.

6 Warnings and precautions

- For i*n vitro* diagnostic use only
- All blood products must be treated as potentially infectious.
- The test strips were manufactured with inactivated whole cell lysates and / or recombinant produced bacterial, viral or parasitic antigens.
- After adding the patient or control material, the strips must be regarded as potentially infectious and be treated as such.
- Suitable disposable gloves must be worn throughout the entire test procedure.
- The reagents contain the antimicrobial agents and preservatives sodium azide, MIT (methylisothiazolone), oxypyrion and chloroacetamide and hydrogen peroxide. Avoid contact with the skin or mucous membrane. Sodium azide can form an explosive azide upon contact with heavy metals such as copper and lead azide.
- All aspirated liquids must be collected. All collecting containers must contain suitable disinfectants for the inactivation of human pathogens and have to be autoclaved. All reagents and materials contaminated with potentially infectious samples must be treated with disinfectants or disposed of according to your hygiene regulations. The concentrations and incubation periods of the manufacturer must be observed.
- Use incubation trays only once.
- Handle strips carefully using plastic forceps.
- Do not substitute or mix the reagents with reagents from other manufacturers.
- Read through the entire instructions for use before carrying out the test and follow them carefully. Deviation from the test protocol provided in the instructions for use can lead to erroneous results.

7 Sampling and preparation of reagents

7.1 Samples

The sample can be serum or plasma (citrate, EDTA, heparin, CPD), which needs to be separated from the blood clot as soon as possible after sampling to avoid haemolysis. Avoid microbial contamination of the samples. Insoluble substances must be removed from the sample before incubation. The use of heat-inactivated, icteric, haemolytic, lipaemic or turbid samples is not recommended.

Caution!
If analysis cannot take place immediately, the sample material may be stored for up to 2 weeks at +2°C to +8°C. Prolonged storage of the samples is possible at −20°C or lower temperatures. Repeated freezing and thawing of samples is not recommended due to the risk of inaccurate results. Avoid more than 3 cycles of freezing and thawing.

7.2 Preparation of solutions

7.2.1 *Preparation of ready-to-use wash buffer A*

This buffer is required for serum and conjugate dilution as well as washing stages.
The volume of wash buffer A for the corresponding number of tests must be determined before dilution.
The skimmed milk powder is first dissolved in washing buffer A-concentrate, afterwards deionised water is added to bring the solution up to the final volume (dilution: 1 + 9).
The quantities required for a defined number of test strips have to be calculated according to the following formula (device-specific dead volume is not considered):

Reagent	Formula	Example: 5 strips
Skimmed milk powder [g]	= number of strips x 0.1	0.5 g
Wash buffer A concentrate [ml]	= number of strips x 2	10 ml
Deionised water [ml]	= number of strips x 18	90 ml
Ready-to-use wash buffer A [ml]	= number of strips x 20	100 ml

Ready-to-use washing buffer A can be stored for four weeks at +2°C to +8°C. The ready-to-use wash buffer A is odourless and slightly turbid.

7.2.2 *Preparation of conjugate solutions*

The conjugate solution must be prepared just before use. It is not possible to store the ready-to-use conjugate solution.
One part of the conjugate concentrate is diluted with 100 parts of the ready to use wash buffer A (1 + 100).

The quantities required for a defined number of test strips are to be calculated according to the following formula:

Reagent	Formula	Example: 5 strips
Conjugate concentrate [µl]	= number of strips x 20	100 µl
Ready-to-use wash buffer A [ml]	= number of strips x 2	10 ml

The conjugate quantities are calculated without dead volume. Depending on handling (manual or on a device), please mix additional conjugate for 1 to 3 strips.

8 Test procedure

No.	Execution	Note
1	Subject all reagents for at least 30 minutes to 18-25 °C (room temperature) before beginning the test.	The test procedure is carried out at room temperature.
2	Prepare test strips Immerse strips in **2 ml** ready-to-use **washing buffer A** (see 7.2.1).	Do not touch the strips with bare hands - use the forceps. The strip number points upward. For each strip one well of the incubation tray is required (see 4.2). The strips must be completely immersed.
3 a) b)	Incubation of samples **20 µl** of undiluted sample (human serum or plasma) are pipetted into each incubation well containing one test strip (dilution 1 + 100). Incubate for **1 hour** with gentle shaking	Pipette the sample at one end of the immersed strip in the wash buffer A and mix as quickly as possible by carefully shaking the tray. Cover the incubation tray with plastic cover and place in the shaker.
4 a) b) c)	Washing Carefully remove the plastic cover from the incubation trays. Gently siphon serum dilution from the individual wells. **2 ml** ready-to-use **washing buffer A** (see 7.2.1) are pipetted into each well, washed for 5 minutes while shaking gently, after which washing buffer A is aspirated.	Washing steps 8.4a - 8.4c are to be carried out three times in total Avoid cross-contamination. The manufacturer's instructions must be observed during automatic processing.
5	Incubation with conjugate **Add 2 ml** ready-to-use **conjugate solution** (see 7.2.2) and incubate for **45 minutes,** while shaking gently.	Cover the incubation tray with plastic cover and place in the shaker.
6	Washing (see under 8.4)	Washing steps are to be carried out a total of three times (see 8.4a - 8.4c).
7	Substrate reaction Add **1.5 ml** of the **substrate solution** and incubate for **8 minutes,** while shaking gently.	
8	Stopping the reaction **Briefly** wash with **deionised water** at least three times.	
9	Drying the strips Dry strips for **2 hours** between 2 layers of absorptive paper before evaluation.	Carefully remove strips from water using plastic forceps. Store strip away from light.
Caution! **Incubation solutions must not flow into other wells. Splashing should be avoided, especially when opening and closing the lid.**		

9 Results

Caution:
Please do not use automated interpretation without consideration of the information on interpretation given below.

9.1 Validation – Quality Control

An analysis of the test can be carried out if the following criteria have been fulfilled:

1. The reaction control band (upper line) is visible as a distinctively coloured, dark band.
2. Antibody class (second band): the IgG or IgM conjugate control band must have a distinct colour.
3. Cut-off control (third band): weak yet visible colouring.

9.2 Evaluation

The first step of determining the infection status is to evaluate the various antigens (see Tables 2 and 3). The time of infection can then be determined by means of the IgG strip. Therefore, reaction patterns of IgG antigens (see Table 4) and results of avidity testing, if carried out in parallel, (see Tables 5 and 6) are evaluated.
The evaluation of test strips can be done visually and computer-assisted, using the test strip analysis software *recom*Scan.
The *recom*Scan software is designed to support the evaluation of test strips. Further information and related instructions for the computer-assisted analysis is available on request from MIKROGEN. The following instructions relate to visual analysis.

9.2.1 *Assessment of band intensity*

1. Note the date, batch and tube number as well as the detected antibody class on the attached evaluation sheet.
2. Enter the sample identification numbers in the evaluation sheet.
3. Now stick the corresponding test strip onto the appropriate fields on the evaluation form using a glue stick. Align the test strips with the reaction control bands along the marked line. Then use transparent adhesive tape to stick the test strips down to the left of the marked line (do not put tape over the reaction control bands!). Sticking the whole test strip using glue or tape can lead to changes in colour.
4. Now identify the bands of the developed test strips by referring to the printed control strip of the evaluation sheet and enter them in the evaluation form. To do this, carry out an evaluation of the intensity of the occurring bands separately for the corresponding immunoglobulin classes in accordance with Table 1.

Table 1: Assessment of band intensity in relation to the cut-off band

Stain intensity of the bands	Assessment
No visible colouring	-
Very low intensity (lower than cut-off band)	+/-
Low intensity (equivalent to cut-off band)	+
Strong intensity (stronger than cut-off band)	++
Very strong intensity	+++

+, ++ and +++ are to be rated positive (p); - and +/- are to be rated negative (n)

9.3 Interpretation of test results

The test result is determined by adding the point values of positive rated antibody-antigen reactivities (≥ cut-off band) according to Table 2. The resulting sum is entered in the column marked with the sigma sign.
The positive, inconclusive or negative evaluation of the sample can then be determined on the basis of Table 3 and entered into the evaluation sheet in the "Evaluation" column.

Table 2: Point assessment of the antigens

Antigen	Points IgG	Points IgM
IE1	1	1
CM2	5	3
p150	6	4
p65	1	2
gB1	1	1
gB2	1	1

Table 3: Test interpretation

Sum of points	Assessment IgG
≤ 1	negative
2-5	borderline
≥ 6	positive

Sum of points	Assessment IgM
≤ 2	negative
3	borderline
≥ 4	positive

Table 4: Determination of the infection time - typical IgG reaction pattern

IE1	CM2	p150	p65	gB1	gB2	Time of infection
n	n	**p**	n/p	n	n	**(a)** positive; no statement about time of infection possible
n	n	**p**	**p**	n/p	n	**(a)** positive; no statement about time of infection possible
n/p*	**p**	n	n/p*	n/p*	n	**(b)** suspicion of primary infection < 6-8 weeks **
n/p*	n/p*	**p**	n/p	n/p	n	**(c)** AV? [**avidity test recommended**]
n/p*	n/p*	**p**	n/p*	n/p	**p**	**(d)** Suspicion of infection > 6-8 weeks [**avidity test recommended**]
n/p	**p**	n	n/p	n/p	**p**	**(d)** Suspicion of infection > 6-8 weeks [**avidity test recommended**] (atypical)
n	n	**p**	n	n/p *	n/p *	**(e)** Suspicion of previous infection > 24 weeks **

n=negative; p=positive; n/p= negative or positive
* At least one of the marked antigens must react ≥ cut-off (p) (b-e)
** Avidity tests carried out in parallel may result in a wider or narrower time frame in the evaluation (see 9.4.2) (e.g. for primary infections: infection <14 weeks; for previous infections: infection >12 weeks). In these cases, the IgG reaction pattern makes a more accurate statement possible.

To determine the CMV immune status IgG and IgM results always should be evaluated together. Reaction patterns differing from this typical antibody combinations are possible. This must be taken into account when interpreting the test results.

The mere detection of CMV-IgM is not evidence of a primary infection, as IgM antibodies may persist for a long period and, in some cases, a positive IgM reactivity may also be due to co-infection with other pathogens (EBV or Parvovirus B19) or the presence of an auto-immune disease.

9.4 Extended diagnosis by determination of avidity

As the infection progresses, IgG antibodies are known to increase in avidity as they mature. Antibodies formed during the early phase of the infection usually have a low avidity, whilst antibodies to previous infections usually have a high avidity. Low-avidity antibodies can be washed off the binding section of the strip using a so-called avidity reagent, while high-avidity antibodies cannot be dissolved. By working on two IgG strips in parallel, one of which has been treated with an avidity reagent and the other not, a distinction can be made between IgG antibodies with low avidity (acute infection) or IgG antibodies with high avidity (previous infection).

9.4.1 *Test principle and test execution*

It is possible to determine the avidity of CMV IgG antibodies with the aid of the avidity reagent, article no.11010. The instructions for performing the test are given in the instructions for use of the avidity reagent.

9.4.2 *Evaluation and interpretation of avidity in recomLine CMV IgG [Avidität]*

Only the affinity progression of antibodies against IE1, CM2, p150 and gB2 is observed during further diagnosis (avidity antigens). (The affinity progression of antibodies to p65 and gB1 is very variable and thus is unsuitable to determine the time of infection.)

- Only carry out the avidity test when the overall IgG results are positive.
- Bands on the IgG strip with a reactivity lower than the cut-off are not taken into account when determining the avidity.
- Compare the intensities of the corresponding bands on the two test strips (IgG strip and avidity strip) incubated with the same patient sample. Evaluate the change in the band intensity as described below.
- If the band intensity of the avidity antigens (IE1, CM2, p150 and gB2) decreases by 40% or less, the corresponding antibodies are regarded as having a high avidity.
- A decrease in the band intensity of the avidity antigens (IE1, CM2, p150 and gB2) by 50%-100% should be regarded as low avidity.
- A decrease in the band intensity of between 50% and 60% is regarded as intermediate.
- If the antibodies to p150 and at least one other avidity antigen (IE1, CM2 and gB2) have a high avidity level, then there is a high probability that an infection occurred at least 12 weeks ago.
- If there are no high-avidity antibodies against p150 and at least one other avidity antigen, but two of the four avidity antigens (IE1, CM2, p150, gB2) show low avidity, it is probable that the patient was first infected within the last 14 weeks.
- Concerning the affinity progression of antibodies, it is important to take into account that this is an ongoing process. The parallel occurrence of low-avidity and high-avidity sera during a period of 12 to 14 weeks after infection is not inconsistent, it may be a manifestation of individually differing affinity progression. While for one patient the affinity progression may be complete after approximately 12 weeks, one may find low-avidity sera for a period of up to 14 weeks in other patients.
- In general, it is not possible to make absolute rules for avidity evaluation. In some cases, it must be taken into account that low avidity cannot be excluded even for past infections, as the affinity progression may have been delayed. The interpretation of the avidity must always take place within the context of all other investigation results.
- If the serological results are inconclusive or questionable, further sampling and testing should be carried out 2 to 3 weeks after.

Table 5: Assessment of avidity

"High" avidity:	**The band intensity of the avidity antigen does not decrease or only to a minor extent.** This means that after determining the avidity, a band intensity of 60%-100% will be visible on the avidity strip compared to the band intensity of the regular IgG strip.
"Low" avidity:	**The band intensity of the avidity antigen decreases by at least 50%.** This means that after determining the avidity, a band intensity of 0%-50% will be visible on the avidity strip compared to the band intensity of the regular IgG strip.
"Intermediate" avidity:	The avidity should be regarded as intermediate if it cannot be clearly placed in the "high" or "low" category.

Table 6: Determination of the time of infection using avidity testing. Evaluation of the avidity of IE1, CM2, p150 and gB2 bands.

	p150	IE1	CM2	gB2	Interpretation of avidity
(I)	p150- high-avidity antibodies as well as high-avidity antibodies against at least one other avidity antigen				Suspected infection > 12 weeks
(II)	Case (I) requirements not met, as well as low-avidity antibodies against at least two avidity antigens				Suspected infection < 14 weeks
(III)	Case (I) and Case (II) criteria not fulfilled. (An "intermediate" avidity evaluation of individual avidity antigens or an inadequate amount of positively reacting avidity antigens on the corresponding (regular) IgG strip)				No additional information

Compared to the evaluation of the IgG reaction sample, avidity tests carried out in parallel may result in a wider or narrower period in the evaluation (e.g. for primary infections: infection <14 weeks; for previous infections: infection >12 weeks). In these cases, the IgG reaction pattern allows a more accurate statement (see 9.3).

10 Limitations of the method - restrictions

- Serological test results must always be considered in the context of other medical assessments of the patient. The therapy indicated by serological results must always be determined within the context of the clinical data.
- Due to the low predictive value of a positive IgM result, which may be due to persistent IgM, recurring infection, response to other infections (EBV, Parvovirus B19) or auto-immune diseases, an IgM result may not be regarded in isolation, but should be evaluated in combination with the IgG avidity.
- A negative test result cannot exclude an infection with the human cytomegalovirus. Antibodies in amounts that are not yet detectable may be present during the early phase of the infection. If there is a suspected infection with CMV, a further sample should be taken and tested after 1 to 2 weeks.
- For patients with inconclusive results, it is recommended to determine the IgG, IgM and avidity, where this has not already taken place. If the results remain inconclusive, the patients should be retested after 2 to 3 weeks.
- False positive IgM reactivities were observed in patients with fresh EBV infections. Where the medical history is unclear, it is recommended to exclude EBV infection by differential diagnosis.
- There are no adequate data for a safe serum diagnosis in newborn babies.
- Dark test strips: Some patient samples may generate a dark, consistent or mottled colouring of the entire nitrocellulose strip (e.g. the sera of patients with lactic protein allergy). Various factors in each patient serum are responsible for this. The evaluation of these strips is only possible to a limited extent. Thus, "inverse" bands (white bands on dark background), for example, should be evaluated as negative. The respective serum should always be examined using other serological methods.

11 Test performance

11.1 Diagnostic sensitivity

	Positive previous results in two reference tests	
*recom*Line CMV	IgG (n=327)	IgM (n=72**)
negative	0	0
inconclusive	0	2
positive	327	70
Sensitivity	100%	100%*

* including borderline results
** samples for which a primary CMV infection is suspected

11.2 Diagnostic specificity

	Negative previous results in two reference tests	
*recom*Line CMV	IgG (n=124)	IgM (n=97*)
negative	122	94
inconclusive	2	1
positive	0	2
Specificity	98.4%	96.9%

* CMV seronegative (IgG and IgM)

11.3 Seroprevalence

	Blood donor (n=200)	
*recom*Line CMV	IgG	IgM
negative	114	185
inconclusive	0	3
positive	86	12
Prevalence	43.0%	7.5%*

* including borderline results

11.4 Delimitation of the infection time according to IgG avidity

A total of 97 patient samples with a defined infection status (previous serological diagnostic results) were evaluated to determine the time of infection. 51 samples were characterised as primary infections (infections occurring within the previous 12 weeks), 46 samples as past infections (infections that occurred more than 12 weeks ago).

11.4.1 *Primary infections (< 12 weeks)*

Results of IgG test strip	Interpretation IgG test strip	Interpretation of avidity strip	Primary infection (< 12 weeks)	
positive	Suspected primary infection < 6-8 weeks	-	10	88.2%
positive	Avidity? (AV?)	Suspected infection < 14 weeks	29	
positive	Suspected infection > 6-8 weeks	Suspected infection < 14 weeks	6	
positive	Avidity? (AV?)	-	1	11.8%
positive	-	-	1	
borderline	-	-	1	
negative	-	-	3	
			51	100%

45 of 51 samples (88.2%) could be classified as CMV primary infection. 6 samples (11.8%) could not be classified. Of these, 4 have not yet shown any adequately clear IgG immune response. In the *recom*Line CMV IgM, 5 of the 6 samples could be identified as fresh infections due to their IgM positivity. No sample was wrongly classified as a previous CMV infection.

11.4.2 *Previous infections (> 12 weeks)*

Results of IgG test strip	Interpretation IgG test strip	Interpretation of avidity strip	Previous infection (> 12 weeks)	
positive	Suspected previous infections > 24 weeks	-	13	89.1%
positive	Suspected infection > 6-8 weeks	Suspected infection > 12 weeks	21	
positive	Avidity? (AV?)	Suspected infection > 12 weeks	7	
positive	Avidity? (AV?)	-	4	10.9%
positive	-	-	1	
			46	100%

41 of 46 samples (89.1%) could be classified as a previous CMV infection and 5 samples could not be classified. No sample was wrongly classified as a primary infection.

11.5 Analytical specificity

The analytical specificity describes the capacity of the tests to accurately determine the analyte even in the presence of potential interference factors in the sample matrix or in case of cross-reactions with potentially interfering antibodies.

a) Interferences: Control studies regarding potential interference factors have shown that the test performance is not influenced by anticoagulants (CPD, sodium citrate, EDTA, heparin), haemolysis (up to 1,000 mg/dl haemoglobin), lipaemia, bilirubinaemia (up to 20 mg/dl bilirubin) or three freezing and thawing cycles of the sample.
b) Cross-reactions: Potential cross-reactions of antibodies against related pathogens (EBV, VZV) were investigated in control studies. In addition, conditions that can be traced back to atypical activity of the immune system (antinuclear auto-antibodies, rheumatic factor) were tested. A potential falsification of the IgM detection test may be caused by an acute EBV infection or by ANA/ENA-positive samples.

12 Literature

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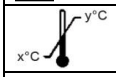
We will gladly send you further information about CMV diagnosis on request.

13 Explanation of symbols

Σ	Content is sufficient for <n> applications Number of applications
WASHBUF A 10 X	Washing buffer A (**ten-fold concentration**)
SUBS TMB	Tetramethylbenzidine chromogenic substance
MILKPOW	Skimmed milk powder
EVALFORM	Evaluation form
INSTRU	Instructions for use
TESTSTR	Test strips
CONJ IgG	Anti-human IgG conjugate
CONJ IgM	Anti-human IgM conjugate
AVIDI	Avidity reagent
ADD	Additional reagent, available on request
	See instructions for use
CONT	Content, includes
IVD	In-vitro diagnostic substance
LOT	Batch/version number
	Do not freeze
REF	Order number
	Use by Expiry date
	Store at x°C to y°C
	Manufacturer

14 Manufacturer and version information

***recom*Line CMV IgG [Avidität]** ***recom*Line CMV IgM**	Article no. **5572** Article no. **5573**
Instructions for use valid from	GARLCM003EN 2023-05

MIKROGEN GmbH
Anna-Sigmund-Str. 10
82061 Neuried
Germany
Tel. +49 89 54801-0
Fax +49 89 54801-100
E-mail mikrogen@mikrogen.de
Internet www.mikrogen.de

CE 0483

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