

# MAGLUMI HSV-1/2 IgM (CLIA)



130212009M



100



**Shenzhen New Industries  
Biomedical Engineering Co., Ltd**  
4F, Wearnes Tech Bldg,  
Science & Industry Park,  
Nanshan, Shenzhen, 518057 CHINA  
Tel. + 86-755-86028224  
Fax. + 86-755-26654850



**Lotus Global Co., Ltd**  
15 Alexandra Road  
London  
NW8 0DP  
UK  
Tel. + 44-20-75868010  
Fax. + 44-20-79006187



## FOR PROFESSIONAL USE ONLY

Store at 2...8 °C



COMPLETELY READ THE INSTRUCTIONS BEFORE  
PROCEEDING



## SYMBOLS EXPLANATIONS



Authorized Representative in Europe



Manufacturer



Attention. See Instructions For Use



Contents of kit



In vitro diagnostic medical device  
(In vitro diagnostic use)



Lot number



Catalogue Code



Expiry date (Use by...)



Temperature limitation  
(store at 2...8 °C)



Number of tests



Keep away from sunlight



Keep upright

## INTENDED USE

The kit has been designed for the qualitative determination of HSV-1/2 IgM in human serum.

The method can be used for samples over the range of 0-30 AU/ml.

The test has to be performed on the MAGLUMI chemiluminescence immunoassay (CLIA) fully auto analyzer (Including MAGLUMI 1000, MAGLUMI 2000, MAGLUMI 2000 Plus and new developed models).

## SUMMARY AND EXPLANATION OF THE TEST

Herpes simplex virus (HSV) is an enveloped DNA-containing virus morphologically similar to the other members of the Herpetoviridae family. Two naturally occurring variants of HSV, with different biologic and epidemiologic characteristics, are recognized by restriction-endonuclease or antigenic analysis. Both types of virus cause infections in humans which range in severity from cold sores to encephalitis. HSV Type 1 (HSV-1) generally infects the mucous membrane of the eye, mouth and mucocutaneous junctions of the face, and is also one of the most common causes of severe sporadic encephalitis in adults.

HSV Type 2 (HSV-2) is usually associated with mucocutaneous genital lesions: genital herpes is now one of the most common sexually transmitted diseases. The association between the site of infection and the HSV type involved is not, however, exclusive.

Once infection occurs, HSV persists in a latent state in sensory ganglia from where it may re-emerge to cause periodic recurrence of infection induced by many stimuli, which may or may not result in clinical lesions. Immunocompromized patients are more likely to have frequent HSV recurrences. This suggests that serum antibody and virus-specific cell-mediated immunity contribute to recovery.

Pregnant women who develop genital herpes are two to three times more likely to have spontaneous abortions or deliver a premature infant than are pregnant non-infected women. Active virus excretion in genital secretions of pregnant women may result in severe neonatal HSV infection contracted when the infant passes through an infected genital tract. When HSV lesions are present during delivery, 40% to 60% of the neonates can be affected. Transmission of HSV infection to neonates is associated with high morbidity and mortality rates if untreated.

By five years of age, 35% of children have antibody to HSV-1 and 80% of adults by age 25 will have specific antibodies to HSV-1. Since HSV-1 and HSV-2 share common antigenic determinants, antibody directed against one viral type may crossreact with the other viral type. Recurrent infections often occur with both viral types despite the presence of circulating antiviral antibodies.

Rapid and accurate diagnosis of HSV infection is necessary to ensure early implementation of selective antiviral chemotherapy and to minimize spread of infection. The first humoral immune response to infection is the synthesis of specific anti-HSV IgM antibody which becomes detectable one week after infection. Normally this is a proof of recent or recurrent infection.

Specific IgG antibody generally appears two to three weeks after primary infection, but may fall in titre after a few months.

Patients with recurring disease often do not show an increase in titre. Detection of IgG allows assessment of the patient's immune status and provides serological evidence of prior exposure to HSV. This may aid in the diagnosis of recent (primary or recurrent) HSV infection in paired sera by the presence of seroconversion to HSV-1 or HSV-2 antibody.

## PRINCIPLE OF THE TEST

Indirect immunoluminometric assay;

Mouse anti-human IgM is used to label ABEI, and use purified HSV-1/2 antigen to coat nano magnetic microbeads. Sample, Calibrator or Control with Buffer, and nano magnetic microbeads coated with HSV-1/2 antigen are mixed thoroughly and incubated at 37°C and cycle washing for 1 time. Then add ABEI Label, incubation and form a sandwich, then washing for the 2nd time. Subsequently, the starter reagents are added and a flash chemiluminescent reaction is initiated. The light signal is measured by a photomultiplier as RLU within 3 seconds and is proportional to the concentration of HSV-1/2 IgM present in controls or samples.



## KIT COMPONENTS

### Material Supplies

| Reagent Integral for 100 determinations   |        |
|---|--------|
| <b>Nano magnetic microbeads:</b> TRIS buffer, 1.2%(W/V), 0.2%NaN <sub>3</sub> , coated with HSV-1/2 antigen | 2.5ml  |
| <b>Calibrator Low:</b> bovine serum, 0.2%NaN <sub>3</sub> .   | 2.5ml  |
| <b>Calibrator High:</b> bovine serum, 0.2%NaN <sub>3</sub>  | 2.5ml  |
| <b>Buffer:</b> Goat anti-Human IgA 1.2%(W/V), Goat anti-Human IgG, 0.2%NaN <sub>3</sub> , BSA               | 12.5ml |
| <b>ABEI Label:</b> Mouse anti-human IgM labeled ABEI containing BSA, 0.2%NaN <sub>3</sub> .                 | 22.5ml |
| <b>Diluent:</b> Goat anti-Human IgA 1.2%(W/V), Goat anti-Human IgG, 0.2%NaN <sub>3</sub> , BSA              | 25ml   |
| All reagents are provided ready-to-use.   |        |

| Reagent Vials in kit box   |       |
|--|-------|
| <b>Internal Quality Control:</b> containing BSA, 0.2%NaN <sub>3</sub> . (target value refer to Quality Control Information date sheet) | 2.0ml |

### Accessories Required But Not Provided

|                          |                 |
|--------------------------|-----------------|
| MAGLUMI Reaction Module  | REF: 630003     |
| MAGLUMI Starter 1+2      | REF: 130299004M |
| MAGLUMI Wash Concentrate | REF: 130299005M |
| MAGLUMI Light Check      | REF: 130299006M |

Please prepare 0.9% sodium chloride solution in case of insufficient diluents.



### Preparation of the Reagent Integral

Before the sealing is removed, gentle and careful horizontal shaking of the Reagent Integral is essential (avoid foam formation!) Remove the sealing and turn the small wheel of the magnetic microbeads compartment to and fro, until the colour of the suspension has changed into brown. Place the Integral into the reagent area and let it stand there for 30 min. During this time, the magnetic microbeads are automatically agitated and completely resuspended.

**Do not interchange integral component from different reagents or lots!**

### Storage and Stability

- Sealed: Stored at 2-8°C until the expiry date.
- Opened: Stable for 4 weeks. To ensure the best kit performance, it is recommended to place opened kits in the refrigerator if it's not going to be used on board during the next 12 hours.



- Keep upright for storage.



- Keep away from direct sunlight.

## CALIBRATION AND TRACEABILITY

### 1) Traceability

To perform an accurate calibration, we have provided the test calibrators standardized against the SNIBE internal reference substance.

Calibrators in the Reagent Kit are from Fitzgerald.

### 2) 2-Point Recalibration

Via the measurement of calibrators, the predefined master curve is adjusted (recalibrated) to a new, instrument-specific measurement level with each calibration.

### 3) Frequency of Recalibration

- After each exchange of lot (Reagent Integral or Starter Reagents).
- Every 4 weeks and/or each time a new Integral is used (recommendation).
- After each servicing of the MAGLUMI Fully Auto analyzer.
- If controls are beyond the expected range.

## SPECIMEN COLLECTION AND PREPARATION

Sample material: serum

Collect 5.0ml venous blood into Blood Collection Tube (Tube without anticoagulant or coagulant, Anticoagulation tube with EDTA-K<sub>2</sub> or EDTA-Na<sub>4</sub> can be used. Anticoagulation tube with heparin sodium is not recommended). Centrifuge and gain serum.

Store at 2-8°C: 24 hours, for longer storage periods: freeze to below -20°C

Avoid repeated freezing and thawing cycles, stored samples should be thoroughly mixed prior to use (Vortex mixer).

Please ask local representative of SNIBE for more details if you have any doubt.

### Vacuum Tubes

- Blank tubes are recommended type for collecting samples.
- Please ask SNIBE for advice if special additive must be used in sample collecting.

### Specimen Conditions

- Do not use specimens with the following conditions:
  - heat-inactivated specimens;
  - Cadaver specimens or body fluids other than human serum;
  - Obvious microbial contamination.
- Use caution when handling patient specimens to prevent cross contamination. Use of disposable pipettes or pipette tips is recommended.
- Inspect all samples for bubbles. Remove bubbles with an applicator stick prior to analysis. Use a new applicator stick for each sample to prevent cross contamination.
- Serum specimens should be free of fibrin, red blood cells or other particulate matter.
- Ensure that complete clot formation in serum specimens has taken place prior to centrifugation. Some specimens, especially those from patients receiving anticoagulant or thrombolytic therapy, may exhibit increased clotting time. If the specimen is centrifuged before a complete clot forms, the presence of fibrin may cause erroneous results.

### Preparation for Analysis

- Patient specimens with a cloudy or turbid appearance must be centrifuged prior to testing. Following centrifugation, avoid the lipid layer (if present) when pipetting the specimen into a sample cup or secondary tube.
- Specimens must be mixed **thoroughly** after thawing by **low**

speed vortexing or by gently inverting, and centrifuged prior to use to remove red blood cells or particulate matter to ensure consistency in the results. Multiple freeze-thaw cycles of specimens should be avoided.

- All samples (patient specimens or controls) should be tested within 3 hours of being placed on board the MAGLUMI System. Refer to the SNIBE service for a more detailed discussion of onboard sample storage constraints.

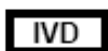
#### Storage

- If testing will be delayed for more than 8 hours, remove serum from the serum separator, red blood cells or clot. Specimens removed from the separator gel, cells or clot may be stored up to 24 hours at 2-8°C.
- Specimens can be stored up to 30 days frozen at -20°C or colder.

#### Shipping

- Before shipping specimens, it is recommended that specimens be removed from the serum or plasma separator, red blood cells or clot. When shipped, specimens must be packaged and labeled in compliance with applicable state, federal and international regulations covering the transport of clinical specimens and infectious substances. Specimens must be shipped frozen (dry ice). Do not exceed the storage time limitations identified in this section of the package insert.

### WARNING AND PRECAUTIONS FOR USERS



- For use in *IN-VITRO* diagnostic procedures only.
- Package insert instructions must be carefully followed. Reliability of assay results cannot be guaranteed if there are any deviations from the instructions in this package insert.

#### Safety Precautions

**CAUTION:** This product requires the handling of human specimens.

- The calibrators in this kit are prepared from bovine serum products. However, because no test method can offer complete assurance that HIV, Hepatitis B Virus or other infectious agents are absent; these reagents should be considered a potential biohazard and handled with the same precautions as applied to any serum or plasma specimen.
- All samples, biological reagents and materials used in the assay must be considered potentially able to transmit infectious agents. They should therefore be disposed of in accordance with the prevailing regulations and guidelines of the agencies holding jurisdiction over the laboratory, and the regulations of each country. Disposable materials must be incinerated; liquid waste must be decontaminated with sodium hypochlorite at a final concentration of 5% for at least half an hour. Any materials to be reused must be autoclaved using an overkill approach (USP 24, 2000, p.2143). A minimum of one hour at 121 °C is usually considered adequate, though the users must check the effectiveness of their decontamination cycle by initially validating it and routinely using biological indicators.
- It is recommended that all human sourced materials be considered potentially infectious and handled in accordance with the OSHA Standard on Bloodborne Pathogens<sup>13</sup>. Biosafety Level 214 or other appropriate biosafety practices should be used for materials that contain or are suspected of containing infectious agents.
- This product contains Sodium Azide; this material and its container must be disposed of in a safe way.
- Safety data sheets are available on request.

#### Handling Precautions

- Do not use reagent kits beyond the expiration date.
- Do not mix reagents from different reagent kits.
- Prior to loading the Reagent Kit on the system for the first time, the microbeads requires mixing to re-suspend microbeads that have settled during shipment.
- For microbeads mixing instructions, refer to the KIT COMPONENTS, Preparation of the Reagent Integral section of this package insert.
- To avoid contamination, wear clean gloves when operating with a reagent kit and sample.
- Over time, residual liquids may dry on the kit surface, please pay attention the silicon film still exists on the surface of the kit.
- For a detailed discussion of handling precautions during system operation, refer to the SNIBE service information.

### TEST PROCEDURE

To ensure proper test performance, strictly adhere to the operating instructions of the MAGLUMI Fully Auto analyzer. Each test parameter is identified via a RFID tag on the Reagent Integral. For further information please refer to the MAGLUMI Chemiluminescence Analyzer Operating Instructions.

|               |  |
|---------------|--|
| Auto dilution | 1:11                                   |
| 20µl          | Sample                                 |
| +200µl        | Diluent                                |
| 20µl          | Diluted Sample, calibrator or controls |
| +100µl        | Buffer                                 |
| +20µl         | Nano magnetic microbeads               |
| 10 min        | Incubation                             |
| 400µl         | Cycle washing                          |
| +200µl        | ABEI Label                             |
| 10 min        | Incubation                             |
| 400µl         | Cycle washing                          |
| 3 s           | Measurement                            |

\*In case of lacking diluent, user can prepare 0.9% sodium chloride solution as additional diluent.

#### DILUTION

Samples with concentrations above the measuring range can be diluted. After manual dilution, multiply the result by the dilution factor. After dilution by the analyzers, the analyzer software automatically takes the dilution into account when calculating the sample concentration.

Availability of sample dilution by analyzer please refers to the MAGLUMI analyzer user software program. Dilution settings please follow MALGUMI analyzer operating instructions.

#### QUALITY CONTROL

- Observe quality control guidelines for medical laboratories
- Use suitable controls for in-house quality control. Controls should be run at least once every 24 hours when the test is in use, once per reagent kit and after every calibration. The control intervals should be adapted to each laboratory's individual requirements. Values obtained should fall within the defined ranges. Each laboratory should establish guidelines for corrective measures to be taken if values fall outside the range.

### LIMITATIONS OF THE PROCEDURE

#### 1) Limitations

Use HSV-1/2 IgM value as a kind of auxiliary material for other testing data when in diagnosis. Assay results should be utilized in conjunction with other clinical and laboratory data to assist the clinician in making individual patient management decisions. A skillful technique and strict adherence to the instructions are necessary to obtain reliable results. Bacterial contamination of samples or repeated freeze-thaw cycles may affect the test results.

Assay results should be utilized in conjunction with other clinical and laboratory data to assist the clinician in making individual patient management decisions.

## 2) Interfering Substances

No interference with test results is seen by concentrations of bilirubin < 0.06 mg/ml, haemoglobin < 16 mg/dl or triglycerides < 12.5 mg/ml.

## 3) HAMA

Patient samples containing human anti-mouse antibodies (HAMA) may give falsely elevated or decreased values. Although HAMA-neutralizing agents are added, extremely high HAMA serum concentrations may occasionally influence results.

## RESULTS

### 1) Calculation of Results

1. The analyzer automatically calculates the HSV-1/2 IgM concentration in each sample by means of a calibration curve which is generated by a 2-point calibration master curve procedure. The results are expressed in AU/ml. For further information please refer to the MAGLUMI Chemiluminescence Analyzer Operating Instructions.

### 2. Test results need NOT to multiply dilution rate!

### 2) Interpretation of Results

Results obtained with the MAGLUMI HSV-1/2 IgM assay can be interpreted as follows:

Non-reactive: A result less than 2 AU/ml (< 2 AU/ml) is considered to be negative.

Reactive: A result greater than or equal to 2 AU/ml ( $\geq 2$  AU/ml) considered to be positive.

Since there is no HSV-1/2 IgM international standard material yet, different IVD manufacturer have different traceability chain. Therefore results from assays of other manufacturers cannot be used interchangeably.

## PERFORMANCE CHARACTERISTICS

### 1) Precision

Intra-assay coefficient of variation was evaluated on 3 different levels of control serum repeatedly measured 20 times in the same run, calculating the coefficient of variation.

#### Intra-assay precision

| Control | Mean(AU/ml) | SD(AU/ml) | CV%  |
|---------|-------------|-----------|------|
| Level 1 | 1.58        | 0.09      | 5.85 |
| Level 2 | 6.91        | 0.38      | 5.47 |
| Level 3 | 19.81       | 0.86      | 4.35 |

Inter-assay coefficient of variation was evaluated on three batches of kits. Repeatedly measured 3 different levels of control serum 21 times, calculating the coefficient of variation.

#### Inter-assay precision

| Control | Mean(AU/ml) | SD(AU/ml) | CV%  |
|---------|-------------|-----------|------|
| Level 1 | 1.47        | 0.13      | 8.75 |
| Level 2 | 7.01        | 0.60      | 8.58 |
| Level 3 | 19.79       | 1.71      | 8.64 |

### 2) Analytical Sensitivity

The sensitivity is defined as the concentration of HSV-1/2 IgM equivalent to the mean RLU of 20 replicates of the zero standard plus two standard deviations corresponding to the concentration from the standard curve. The sensitivity is typically less than 0.25 AU/ml.

### 3) Specificity

The specificity of the HSV-1/2 IgM assay system was assessed by measuring the apparent response of the assay to various potentially cross reactive analytes.

When CMV IgG, CMV IgM, Rubella IgG, Rubella IgM, Toxo IgG,

Toxo IgM, HSV-1/2 IgG separately reach a concentration of 30 AU/ml, measured Toxo IgG is negative. No cross reaction with the IgG or IgM antibody of HAV, HBV, HCV, HIV, syphilis, EBV. The ELISA diagnosed RF or ANA positive, which is non HSV infected sample, this reagent's determination results show negative.

### 4) Recovery

Consider calibrator high of known concentration as a sample, dilute it by 1:2 ratio with diluents, and measure its diluted concentration for 10 times. Then calculate the recovery of measured concentration and expected concentration. The recovery should be within 90% -110%.

| Expected  | Mean Measuring | Recovery |
|-----------|----------------|----------|
| 9.8 AU/ml | 9.4 AU/ml      | 96%      |

### 5) Linearity

Use HSV-1/2 IgM calibrator to prepare the six-point standard curve, measuring all points' RLU except point A, and then do four-parameter linear fitting in double logarithm coordinate, the absolute linear correlation coefficient (r) should be bigger than 0.9800.

| Calibrator Point | Concentration AU/ml | Absolute linear correlation coefficient (r) |
|------------------|---------------------|---|
| A                | 0.0                 |   |
| B                | 1.0                 | r=0.9847                                    |
| C                | 3.0                 |   |
| D                | 8.0                 |   |
| E                | 15.0                |   |
| F                | 30.0                |   |

## REFERENCES

- Ryan KJ, Ray CG (editors) (2004). Sherris Medical Microbiology (4<sup>th</sup> edition.). McGraw Hill. pp. 555–62. ISBN 0-8385-8529-9.
- Gupta R, Warren T, Wald A (2007). "Genital herpes". Lancet 370 (9605): 2127–37.
- Koelle DM, Corey L (2008). "Herpes simplex: insights on pathogenesis and possible vaccines". Annual Review of Medicine 59: 381–95.
- Corey L, Wald A (2009). "Maternal and Neonatal HSV Infections". New England Journal of Medicine 361 (14): 1376–85.
- Kimberlin DW (2007). "Herpes simplex virus infections of the newborn". Semin. Perinatol. 31 (1): 19–25.
- Mettenleiter TC, Klupp BG, Granzow H (2006). "Herpesvirus assembly: a tale of two membranes". Curr. Opin. Microbiol. 9 (4): 423–9.
- McGeoch DJ, Rixon FJ, Davison AJ (2006). "Topics in herpesvirus genomics and evolution". Virus Res. 117 (1): 90–104.
- Rajcáni J, Andrea V, Ingeborg R (2004). "Peculiarities of herpes simplex virus (HSV) transcription: an overview". Virus Genes 28 (3): 293–310.