Version 31-05/24

User's Manual

Human Lymphocytic choriomeningitis virus Antibody ELISA Kit

REF **DEIAJX007**

Σ **96T**

RUO

This product is for research use only and is not intended for diagnostic use.

For illustrative purposes only. To perform the assay the instructions for use provided with the kit have to be used.

Creative Diagnostics

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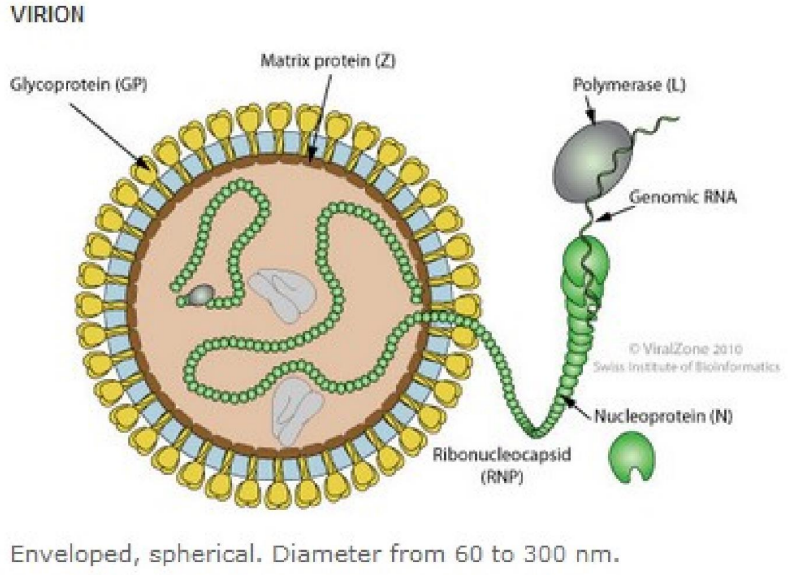
PRODUCT INFORMATION

Intended Use

The Human Anti-Lymphocytic Choriomeningitis Virus IgG ELISA Kit is an immunoassay suitable for detecting and quantifying IgG antibody activity specific for LCMV nuclear protein (NP) antigen in serum or plasma. Other biological fluids, including tissue culture medium, may be validated for use. The assay is for research use only (RUO) and is not intended nor validated for diagnosing LCM virus disease. Reagents contain no virus or viral antigens.

General Description

LCMV, an enveloped RNA arenavirus, is rare among laboratory animals, but is readily transmissible to lab workers. Infected mice generally do not present clinical signs. LCMV infection may be diagnosed by ELISA, measuring rapidly rising antibody titers (8-12 days after infection) to LCMV antigen. Mice infected with LCMV are not suitable for animal research due to suppression of cellular immunity, increased sensitivity to viruses and endotoxins, and inhibition of tumor induction or transplantation. Besides infecting animals, LCMV may also contaminate cell lines, transplantable tumors and other biological products; these should be tested by mouse antibody production (MAP), using ELISA to detect anti-LCMV after immunization.



Enveloped, spherical. Diameter from 60 to 300 nm.

RecombiVirus ELISAs are 2nd generation immunoassays using purified recombinant, antigenic proteins of animal viruses. The Creative Diagnostics Human LCMV IgG ELISA is designed with high sensitivity for the detection of antibodies derived from vaccination or natural LCMV infection.

Principles of Testing

The Human Anti-LCMV IgG ELISA kit is based on the binding of Human anti-LCMV IgG in samples to LCMV antigen immobilized on the microwells, and anti- LCMV IgG antibody is detected by anti-Human IgG-HRP conjugate. After a washing step, chromogenic substrate (TMB) is added and color (blue) is developed by, which is directly proportional to the amount of antiLCMV IgG present in the sample. Stopping Solution is

added to terminate the reaction (blue converts to yellow), and A450nm is then measured using an ELISA reader. The presence of Human IgG antibody in samples is determined relative to Anti-LCMV IgG Controls.

Reagents And Materials Provided

1. Wash Solution Concentrate (100x): 10ml.
2. Sample Diluent Concentrate (20x): 10ml.
3. Anti-Human IgGHRP Conjugate Concentrate (100x): 0.15ml.
4. LCMV Ag Microwell Strip Plate: 8-well strips (12).
5. Anti-LCMV Sensitivity Control: 0.65 ml.
6. Anti-LCMV Positive Control: 0.65 ml.
7. Low NSB Sample Diluent: 30 ml.
8. TMB Substrate: 12 ml.
9. Stop Solution: 12 ml.

Materials Required But Not Supplied

1. Pipettors and pipettes that deliver 100ul and 1-10ml. A multi-channel pipettor is recommended.
2. Disposable glass or plastic 5-15ml tubes for diluting samples and Anti-Human IgG HRP Concentrate.
3. Graduated cylinder to dilute Wash Concentrate: 0.2 to 1L.
4. Stock bottle to store diluted Wash Solution: 0.2 to 1L.
5. Distilled or deionized water to dilute reagent concentrates.
6. Microwell plate reader at 450 nm wavelength.

Storage

2-8°C until the expiration date printed on the box label.

Specimen Collection And Preparation

Sample Collection and Handling

Serum and other biological fluids may be used as samples with proper dilution to avoid solution matrix interference. For serum, collect blood by venipuncture, allow clotting, and separate the serum by centrifugation at room temperature. For other samples, clarify the sample by centrifugation and/or filtration prior to dilution in Sample Diluent. If samples will not be assayed immediately, store refrigerated for up to a few weeks, or frozen for long-term storage.

Antibody Stability

Initial dilution of serum into Working Sample Diluent (WSD) is recommended to stabilize antibody activity. This enhances reproducible sampling, and stabilizes the antibody activity for years, stored refrigerated or frozen. Further dilution into Low NSB Sample Diluent (LNSD), which provides the lowest assay background, should be at least 10 times the initial dilution and performed the same day as the assay.

Example:

Initial (1/5): 10 ul serum + 40 ul WSD [or 0.1ml + 0.4ml]

Further (1/100): 10 ul initial (1/5) + 190 ul LNSD

Plate Preparation

Bring all reagents to room temperature (18-30°C) equilibration (at least 30 minutes).

1. Determine the number of wells for the assay run. Duplicates are recommended, including 4 Control wells and 2 wells for each sample and internal control to be assayed.
2. Remove the appropriate number of microwell strips from the pouch and return unused strips to the pouch. Reseal the pouch and store refrigerated.

Reagent Preparation

1. Wash Solution Concentrate (100x): Dilute the entire volume 10ml + 990ml with distilled or deionized water into a clean stock bottle. Label as Working Wash Solution and store at ambient temperature until kit is used entirely.
2. Sample Diluent Concentrate (20x): Dilute the entire volume, 10ml + 190ml with distilled or deionized water into a clean stock bottle. Label as Working Sample Diluent and store at 2-8°C until the kit lot expires or is used up.
3. Anti-Human IgGHRP Conjugate Concentrate (100x):Peroxidase conjugated anti-Human IgG in buffer with detergents and antimicrobial as stabilizers. Dilute fresh as needed; 10ul of concentrate to 1ml of Working Sample Diluent is sufficient for 1 8-well strip. Use within the working day and discard. Return 100X to 2-8°C storage.

Assay Procedure

ALL STEPS ARE PERFORMED AT ROOM TEMPERATURE. After each reagent addition, gently tap the plate to mix the well contents prior to beginning incubation.

Assay Design

Review Calculation of Results and Limits of the Assay before proceeding:

1. Select the proper sample dilutions accounting for expected potency of positives and minimizing non-specific binding (NSB) and other matrix effects; for example, net signal for non-immune samples should be lower than the Sensitivity Control. This is usually 1/100 or greater dilution for human sera with normal levels of IgG and IgM.
2. Run a Sample Diluent Blank. This signal is an indicator of proper assay performance, especially of washing efficacy, and is used for net OD calculations, if required. Blank OD should be <0.3.
3. Run the Positive and Sensitivity Controls, which validate that the assay was performed to specifications: the Positive Control should give a high signal (>1.5 OD); the Sensitivity Control should give a low signal which can be used to discriminate at the Positive/Negative threshold (see Interpretation of Results).

1. 1st Incubation [100ul – 60 min; 4 washes]

Add 100ul of sample diluent (blank) calibrators, samples and controls each to pre-determined wells.

Tap the plate gently to mix reagents and incubate for 60 minutes.

Wash wells 4 times and pat dry on fresh paper towels. As an alternative, an automatic plate washer may be used. Improper washes may lead to falsely elevated signals and poor reproducibility.

2. 2nd Incubation [100ul – 30 min; 5 washes]

Add 100ul of diluted Anti-Human IgG HRP to each well.

Incubate for 30 minutes.

Wash wells 5 times as in step 2.

3. Substrate Incubation [100ul – 15 min]

Add 100ul TMB Substrate to each well. The liquid in the wells will begin to turn blue.

Incubate for 15 minutes in the dark, e.g., place in a drawer or closet.

Note: If your microplate reader does not register optical density (OD) above 2.0, incubate for less time, or read OD at 405-410 nm (results are valid).

4. Stop Step [Stop: 100ul]

Add 100ul of Stop Solution to each well.

Tap gently to mix. The enzyme reaction will stop; liquid in the wells will turn yellow.

5. Absorbance Reading

Use any commercially available microplate reader capable of reading at 450nm wavelength. Use a program suitable for obtaining OD readings, and data calculations if available.

Read absorbance of the entire plate at 450nm using a single wavelength within 30 minutes after Stop Solution addition. If available, program to subtract OD at 630nm to normalize well background.

Calculation

1. On a log scale of inverse of Sample Dilution as the x-axis, plot the OD values of the two dilutions of each positive sample having ODs above and below the OD value of the Index (arbitrary or selected Calibrator).
2. From a point-to-point line drawn between the two sample ODs, read the dilution value (x-axis) corresponding to the OD of the selected Index

= IgG Antibody Activity Units

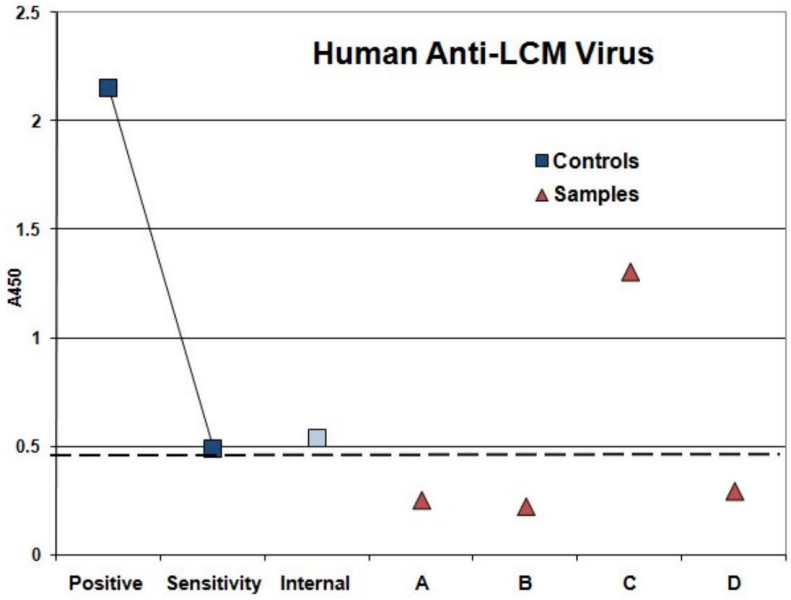
Interpretation Of Results

A. Antibody Activity Threshold Index

Compare Samples to Sensitivity Control or Internal Control

= Positive/Negative Cut-off.

Example:



Results

The sensitivity of the assay to detect anti-LCMV IgG, from either natural infection or immunization, is controlled so that the Sensitivity Control represents a threshold OD for most true positives in human serum diluted in the Low NSB Sample Diluent at 1:100 or greater. Visual inspection of the data in the above graph shows the following:

Positive Control – clearly positive, shows the OD range of the assay; high value indicates optimal sensitivity of the assay.

Sensitivity Control – a 'Cut-off' line has been drawn to indicate a threshold distinguishing between Positive/Negative. The is not a clear-cut threshold, rather a low OD area that could represent either low positives or high background negatives.

Internal Control – a true positive from an infected individual that represents the lab's experience in distinguishing low positive from negative samples (not provided). This should be run in each assay to supplement the Sensitivity Control for Positive/Negative discrimination purposes.

Samples A,B,C,D – 3 samples (A, B, D) are negative: below the threshold; 1 sample (C) is positive: clearly above the threshold.

The Sensitivity Control can be used to calculate a Threshold Index that numerically discriminates Positive/Negative, as follows:

Divide each Sample net OD by the Sensitivity Control net OD. Values above 1.0 are a measure of Positive Antibody Activity; below 1.0 are Negative for antibody.

B. Positive Index

Experimental sample values may be expressed relative to the values of Control or Non-immune samples, by calculation of a Positive Index. One typical method is as follows:

1. Calculate the net OD mean + 2 SD of the Control/Nonimmune samples = Positive Index.
2. Divide each sample net OD by the Positive Index. Values above 1.0 are a measure of Positive Antibody Activity; below 1.0 are Negative for antibody.

A sample value would be Positive if significantly above the value of the pre-immune serum sample or a

suitably determined nonimmune panel or pool of samples, tested at the same sample dilution.

This calculation also quantifies the positive Antibody Activity level, assigning a higher value to samples with higher Antibody Activity, and vice versa.

Example:

Sample	Assay Net OD		Calculated Antibody Activity	
	Control	Exptl	Control	Exptl
1	0.248	**P** 2.212	0.79	**7.04**
2	0.290	**S** 0.452	0.92	**1.44**
3	0.186	**I** 0.541	0.59	**1.72**
4	0.276	**U** 0.212	0.88	0.68
5	0.161	**U** 0.122	0.51	0.39
6	0.173	**N** 1.491	0.55	**4.75**
7	0.153	**N** 0.694	0.48	**2.21**
8	0.211	**N** 1.487	0.67	**4.74**
9	0.145	**N** 0.546	0.46	**1.74**
10	0.110	**U** 0.263	0.35	0.84
Mean	0.195			
SD	0.0595			
Mean +2 SD	**0.314**	= **Positive Index**		

Results

Experimental Samples are represented as follows:

P – Positive Control

S – Sensitivity Control

I – Internal Control; lab's threshold positive serum

U – Uninfected human sample

N – Naturally infected human samples.

C. Titers from Sample Dilution Curves

The titer of elevated antibody activity calculated from a dilution curve of each sample is recommended as the most accurate quantitative method. Best precision can be obtained using the following guidelines:

1. Use an OD value Index in the mid-range of the assay (2.0 – 0.5 OD); this provides the best sensitivity and reproducibility for comparing experimental groups and replicates. An arbitrary 1.0 OD is commonly used.
2. Prepare serial dilutions of each sample to provide a series that will produce signals higher and lower than the selected index. With accurate diluting, duplicates may not be required if at least 4 dilutions are run per sample.
3. A 5-fold dilution scheme is useful to efficiently cover a wide range which produces ODs both above and below 1.0 OD. The dilution scheme can be tightened to 3-fold or 2-fold for more precise comparative data.

4. The Positive and Sensitivity Control values can be used to normalize inter-assay values.

Note:

The sensitivity of the assay may be increased to perhaps convert a borderline sample to a positive by using a lower dilution of the sample, e.g., 1/50. The values of negatives may increase, so an alternative threshold should be established using known negatives to develop a Positive Index, or by using known Internal Controls as discriminator for a Threshold Control (instead of the kit Sensitivity Control)

Sensitivity

The LCMV antigen coating level, HRP conjugate concentration, and Low NSB Sample Diluent are optimized to differentiate antiLCMV IgG from background (non-antibody) signal with Human serum samples diluted 1:100.

Specificity

Purified recombinant LCMV nuclear protein is used as antigen; thus the assay is specific for antibodies directed to LCMV NP. The Antibody-HRP conjugate reacts specifically with Human IgG class antibodies; IgA, IgM and IgE antibody would not be measured above background signals.

Precautions

Controls, Sample Diluent, and Antibody HRP contain bromonitrodioxane (BND: 0.05%, w/v). Stop Solution contains dilute sulfuric acid. Follow good laboratory practices, and avoid ingestion or contact of any reagent with skin, eyes or mucous membranes. All reagents may be disposed of down a drain with copious amounts of water.

Limitations

The assay detects and quantifies IgG antibodies directed to the major capsid protein VP1. It may be possible for an individual to have Lymphocytic Choriomeningitis Virus infection without producing antibodies specific to VP1.

Anti-LCMV antibody levels of an infected individual may be below detection threshold related to the time course of the infection, e.g., too early for positive titer development.