GENLISA™ Human Anti-SARS-CoV-2 (Covid-19) IgG Antibody to Spike S1 + S2 ECD Protein Quantitative TITRATION ELISA

REF : KBVH015-21

Ver 1.0

RUO

Enzyme Immunoassay for the Quantitative Estimation of IgG Antibodies to Spike S1+S2 ECD protein in Human serum

RUO	**For Research Use Only**	**REF**	**Catalog Number**
	**Store At**	**LOT**	**Batch Code**
	**Manufactured By**		**Biological Risk**
	**Expiry Date**		**Consult Operating Instructions**

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Introduction:

The GENLISA™ ELISA kits are used for assessing the specific biomarker in samples analytes which may be serum, plasma and cell culture supernatant as validated with the kit. The kit employs a sandwich ELISA technique which leads to a higher specificity and increased sensitivity compared to conventional competitive ELISA kits which employ only one antibody.

Intended Use:

The GENLISA™ SARS-CoV-2 (2019-nCoV) IgG Antibody to Spike S1 + S2 Protein Quantitative TITRATION ELISA (Human) kit is used as an analytical tool for quantitative estimation of Anti-SARS-CoV-2 (2019-nCoV) Spike S1 + S2 ECD protein in Human serum.

Principle:

The method employs indirect sandwich ELISA technique. SARS-CoV-2 S1+S2 ECD protein is pre-coated onto microwells. Samples and standards are pipetted into microwells and Antibodies to Human Anti-SARS-CoV-2 (2019-nCoV) present in the sample are bound by the protein antigen. After incubation the wells are washed and followed by addition of HRP-conjugated Detection IgG Antibody into each well and incubated to form a complex. After washing microwells in order to remove any non-specific binding, the substrate solution (TMB) is added to microwells and color develops proportionally to the amount of Anti-Human Anti-SARS-CoV-2 (2019-nCoV) in the sample. Color development is then stopped by addition of stop solution. Absorbance is measured at 450 nm.

Materials Provided:

1. Recombinant SARS-CoV-2 (Covid-19) Spike S1 + S2 ECD protein Coated Microtiter Plate (12 x 8 wells) - 1 no
2. Anti-SARS-CoV-2 Spike S1 + S2 ECD Antibody Standard (0.5 ml) - 0, 15, 30, 60, 90, 180, 360 and 720 ng/ml.
3. Rabbit Anti-Human IgG:HRP Conjugate - 12 ml
4. Sample Diluent - 80 ml
5. (20X) Wash Buffer - 25 ml
6. TMB Substrate - 12 ml
7. Stop Solution - 12 ml
8. Instruction Manual

Materials to be provided by the End-User:

1. Microtiter Plate Reader able to measure absorbance at 450 nm.
2. Adjustable pipettes and multichannel pipettor to measure volumes ranging from 25 ul to 1000 ul
3. Deionized (DI) water
4. Wash bottle or automated microplate washer
5. Graph paper or software for data analysis
6. Timer
7. Absorbent Paper

Handling/Storage:

1. Store main kit components at 2-8°C.
2. Before using, bring all components to room temperature (18-25°C). Upon assay completion return all components to appropriate storage conditions.
3. The Substrate is light-sensitive and should be protected from direct sunlight or UV sources.

Health Hazard Warnings:

1. Reagents that contain preservatives may be harmful if ingested, inhaled or absorbed through the skin.
2. For research use only

Sample Preparation and Storage:

Specimens should be clear and non-hemolyzed. Samples should be run at a number of dilutions to ensure accurate quantitation.

Blood is taken by venipuncture. Serum is separated after clotting by centrifugation. Repeated freezing and thawing should be avoided. If samples are to be used for several assays, initially aliquot samples and keep at -20°C.

Samples should be diluted 1:1000 (v/v) for optimal recovery, (for example 1 ul sample + 999 ul sample diluent) prior to assay. In cases where matrix interferences is under or over observed, the samples may be diluted with Sample Diluent accordingly.

The samples may be kept at 2 - 8°C for up to three days. For long-term storage please store at -20°C.

Note: *Grossly hemolyzed samples are not suitable for use in this assay*

Reagent Preparation (all reagents should be diluted immediately prior to use):

1. Label any aliquots made with the kit Lot No and Expiration date and store it at appropriate conditions mentioned.
2. Bring all reagents to Room temperature before use.
3. To make **Wash Buffer (1X)**; dilute **25 ml** of **20X Wash Buffer in 475 ml of DI water**.

Procedural Notes:

1. In order to achieve good assay reproducibility and sensitivity, proper washing of the plates to remove excess un-reacted reagents is essential.
2. Avoid assay of Samples containing sodium azide (NaN_3), as it could destroy the HRP activity resulting in under-estimation of the amount of Anti-SARS-CoV-2 (2019-nCoV).
3. It is recommended that the Standards and Samples be assayed in duplicates.
4. Maintain a repetitive timing sequence from well to well for all the steps to ensure that the incubation timings are same for each well.
5. If the Substrate has a distinct blue color prior to use it may have been contaminated and use of such substrate can lead to compromisation of the sensitivity of the assay.
6. The plates should be read within 30 minutes after adding the Stop Solution.
7. Make a work list in order to identify the location of Standards and Samples.

Assay Procedure:

1. Pipette **100 ul** of **Standards** and **Samples** to the respective wells.

2. Seal the plate and incubate for 1 hour at Room Temperature (18-25ºC).

3. Wash plate 4 times with **Wash Buffer (1X)** and blot residual buffer by firmly tapping plate upside down on absorbent paper. Wipe of any liquid from the bottom outside of the microtiter wells as any residue can interfere in the reading step. All the washes should be performed similarly.

4. Add **100 ul** of **Rabbit Anti-Human IgG:HRP Conjugate** to each well.

5. Seal the plate and incubate for 1 hour at Room Temperature (18-25°C).

6. Wash plate 4 times with **Wash Buffer (1X)** and blot residual buffer by firmly tapping plate upside down on absorbent paper. Wipe of any liquid from the bottom outside of the microtiter wells as any residue can interfere in the reading step. All the washes should be performed similarly.

7. Pipette **100 ul** of **TMB Substrate solution** in all wells.

8. Incubate in the dark for 15 minutes at Room Temperature.

9. Stop reaction by adding **100 ul** of **Stop Solution** to each well.

10. Read absorbance at 450 nm within 30 minutes of stopping reaction.

Calculation of Results:

Determine the Mean Absorbance for each set of duplicate Standards and Samples. Using standard graph paper, plot the average value (absorbance 450nm) of each standard on the Y-axis versus the corresponding concentration of the standards on the X-axis. Draw the best fit curve through the standard points.

To determine the unknown Human Anti-SARS-CoV-2 Spike S1 + S2 IgG concentrations, find the unknown's Mean Absorbance value on the Y-axis and draw a horizontal line to the standard curve. At the point of intersection, draw a vertical line to the X-axis and read the concentration. If samples were diluted, multiply by the appropriate dilution factor.

Software which is able to generate a polynomial regression (2^{nd} order) or a cubic spline curve-fit is best recommended for automated results.

Note:
It is recommended to repeat the assay at a different dilution factor in the following cases:
- If the sample absorbance value is below the first standard.

Quality Control:

It is recommended that for each laboratory assay appropriate quality control samples in each run to be used to ensure that all reagents and procedures are correct.

Performance Characteristics of the Kit:

Sensitivity:
Limit Of Detection: There is no standard reference Human SARS-CoV-2 Spike S1+S2 ECD protein material available; accordingly, absolute analytical sensitivity cannot be calculated. Based on the kit working standards the LOD is 12 ng/ml

Specificity:
Mutations in the SARS-CoV-2 genome have been identified as the virus has spread, but no serologically unique strains have been described relative to the originally isolated virus (this research is limited at present). The kit antibodies are specific to Spike S1+S2 ECD protein of the SARS-CoV-2 virus.

Traceability:
There are no reference standards for SARS-Cov-2 Antibody. The results are reported in ng/ml and the method has been standardized in our laboratory at KRISHGEN BIOSYSTEMS.

Linearity:
Standards provided in the kit were used for measuring the linearity range of Human IgG Antibodies to SARS-CoV-2 S1+S2 ECD protein present in serum.

Precision:

Precision is defined as the percent coefficient of variation (%CV) i.e. standard deviation divided by the mean and multiplied by 100. Assay precision was determined by both intra (n=5 assays) and inter assay (n=5 assays) reproducibility on two pools. While actual precision may vary from laboratory to laboratory and technician to technician, it is recommended that all operators achieve precision below these design goals before reporting results.

Pool	Intra Assay %CV	Inter Assay %CV
Low	<15%	<15%
Medium	<12%	<12%
High	<12%	<12%

Recovery:

Human sera was measured with two replicates and two runs (n = 5). The Human sera and plasma were pooled patient and single donor spiked samples. Samples were measured using one lot of reagent. All data met our acceptance criteria for % CV and 95% (CI) Confidence Intervals for % CV.

Matrix	Recovery Range %
Serum (n=5)	80 - 120

Note: Serum was diluted using Sample Diluent provided with the kit

Safety Precautions:

- **This kit is For Research Use Only**. Follow the working instructions carefully.
- The expiration dates stated on the kit are to be observed. The same relates to the stability stated for reagents
- Do not use or mix reagents from different lots.
- Do not use reagents from other manufacturers.
- Avoid time shift during pipetting of reagents.
- All reagents should be kept in the original shipping container.
- Some of the reagents contain small amount of sodium azide (< 0.1 % w/w) as preservative. They must not be swallowed or allowed to come into contact with skin or mucosa.
- Source materials maybe derived from Human body fluids or organs used in the preparation of this kit were tested and found negative for HBsAg and HIV as well as for HCV antibodies. However, no known test guarantees the absence of such viral agents. Therefore, handle all components and all patient samples as if potentially hazardous.

LIMITED WARRANTY

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