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GENLISA™ SARS-CoV-2 (2019-nCoV) Spike RBD Antigen Quantitative ELISA

REF : KBVH015-34

Ver 1.0

RUO

Enzyme Immunoassay for the Quantitative Estimation of SARS-CoV-2 (2019-nCoV) Spike RBD Antigen in cell culture supernatant.

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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REF KBVH015-34 **Σ 96 tests**

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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.

The spike protein is a large type I transmembrane protein containing two subunits, S1 and S2. S1 mainly contains a receptor binding domain (RBD), which is responsible for recognizing the cell surface receptor. S2 contains basic elements needed for the membrane fusion. The S protein plays key parts in the induction of neutralizing-antibody and T-cell responses, as well as protective immunity.

Intended Use:

The GENLISA™ SARS-CoV-2 (2019-nCoV) Spike RBD Quantitative ELISA kit is used as an analytical tool for quantitative estimation of SARS-CoV-2 (2019-nCoV) Spike RBD Antigen in cell culture supernatant.

Principle:

The method employs sandwich ELISA technique. Monoclonal antibody specific for SARS-CoV-2 (2019-nCoV) Spike RBD is pre-coated onto microwells. Samples and standards are pipetted into microwells and SARS-CoV-2 (2019-nCoV) Spike RBD Antigen present in the sample is bound by the immobilized antibody. After incubation the wells are washed and followed by addition of HRP-conjugated Detection anti- SARS-CoV-2 (2019-nCoV) Spike RBD 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 SARS-CoV-2 (2019-nCoV) Spike RBD in the sample. Color development is then stopped by addition of stop solution. Absorbance is measured at 450 nm.

Materials Provided:

1. Anti-SARS-CoV-2 (2019-nCoV) Spike RBD Coated Microtiter Plate (12 x 8 wells) - 1 no
2. SARS-CoV-2 (2019-nCoV) Spike RBD Standard (1000ng/ml) Lyophilized – 2 vials
3. Anti-SARS-CoV-2 (2019-nCoV) Spike RBD antibody: HRP Conjugate - 12 ml
4. (1X) Sample Diluent - 20 ml
5. (1X) Standard Diluent – 10 ml
6. (20X) Wash Buffer - 25 ml
7. TMB Substrate - 12 ml
8. Stop Solution - 12 ml
9. 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.

Sample Preparation and Storage:

Cell Culture Supernatant: Centrifuge supernatant for 20 minutes at 1000×g at 2-8°C to remove insoluble impurity and cell debris. Collect the clear supernatant and carry out the assay immediately.

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**.
4. **Standards Preparation**: Reconstitute the concentrated Standard lyophilized vial with 1 ml of Standard Diluent to obtain a concentration of 1000 ng/ml. Keep the vial for 15 mins with gentle agitation before making further dilutions. Dilute 360 ul of original **Standard (1000 ng/ml)** with 140 ul of Standard Diluent to generate a **720 ng/ml Standard Solution**. Prepare further **Standards** by serially diluting the Standard Solution as per the below table. Use the Standard Diluent as the Zero Standard (Standard No.0).

Standard Concentration	Standard Vial	Dilution Particulars
1000 ng/ml	Original Standard	Original Standard provided in the Kit
720 ng/ml	Standard No.7	360 ul Original Standard (1000 ng/ml) + 140 ul Standard Diluent
360 ng/ml	Standard No.6	250 ul Standard No.7 + 250 ul Standard Diluent
180 ng/ml	Standard No.5	250 ul Standard No.6 + 250 ul Standard Diluent
90 ng/ml	Standard No.4	250 ul Standard No.5 + 250 ul Standard Diluent
60 ng/ml	Standard No.3	333.4 ul Standard No.4 + 166.6 ul Standard Diluent
30 ng/ml	Standard No.2	250 ul Standard No.3 + 250 ul Standard Diluent
15 ng/ml	Standard No.1	250 ul Standard No.2 + 250 ul Standard Diluent
0 ng/ml	Standard No. 0	Only Standard Diluent

Use the Standards as soon as possible upon reconstitution. Discard balance standard after use.

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 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 37ºC shaking at 180 rpm.

3. Aspirate and 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 **SARS-CoV-2 RBD Antibody:HRP Conjugate** to each well.

5. Seal the plate and incubate for 1 hour at 37°C shaking at 180 rpm.

6. Wash plate 4 times with **Wash Buffer (1X)** as in step 3.

7. Pipette **100 ul** of **TMB Substrate solution**.

8. Incubate in the dark for 30 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 SARS-CoV-2 Spike RBD Antigen 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.

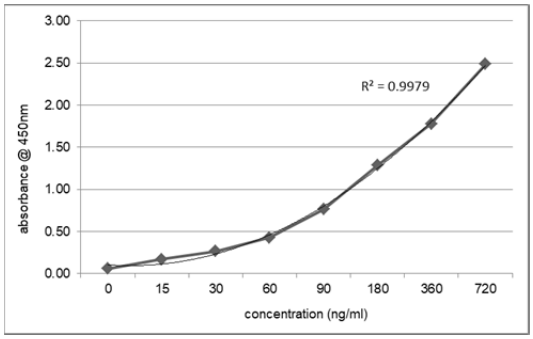
Software which is able to generate a polynomial regression (2^{nd} order) or a cubic spline curve-fit is best recommended for automated results.

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.

Typical Data

Standards provided (ng/ml)	Abs 1	Abs 1	Mean Abs
0	0.071	0.052	0.061
15	0.156	0.189	0.173
30	0.280	0.254	0.267
60	0.441	0.414	0.427
90	0.793	0.732	0.762
180	1.303	1.268	1.286
360	1.924	1.634	1.779
720	2.573	2.404	2.489

Typical Graph



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.

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.
- Since the kit contains potentially hazardous materials, the following precautions should be observed

- Do not smoke, eat or drink while handling kit material
- Always use protective gloves
- Never pipette material by mouth
- Wipe up spills promptly, washing the affected surface thoroughly with a decontaminant.

- In any case GLP should be applied with all general and individual regulations to the use of this kit.

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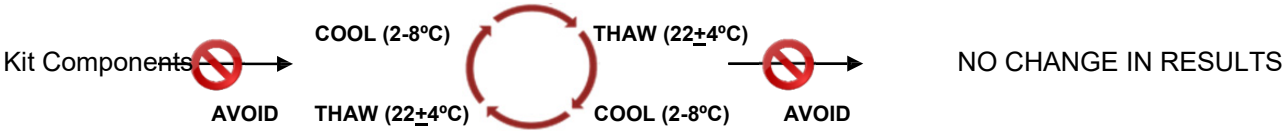
SCHEMATIC ASSAY PROCEDURE

1. Remove all components, 30 minutes before adding into the assay plate.

2. Avoid repeated cool-thaw of the components as there will be a loss of activity and this can affect the results.



3. Pipette **100 ul Standards** and **Samples** into the respective wells.

4. Cover plate and **incubate** for 60 min at 37 ºC shaking at 180 rpm.

5. Aspirate and wash wells 4 times with **Wash Buffer (1X).**

6. Pipette **100 ul SARS-CoV-2 RBD Antibody:HRP Conjugate** into each well.

7. Cover plate and **incubate** for 60 min at 37 ºC shaking at 180 rpm.

8. Aspirate and wash wells 4 times with **(1X) Wash Buffer**.

9. Pipette **100 ul TMB Substrate** into each well.

10. Cover plate and **incubate** for 30 min at Room Temperature.

11. Pipette **100 ul Stop Solution** into each well.

12. Read absorbance at 450nm with a microplate reader within 30 min of stopping reaction.

Typical Example of a Work List

Well #	Contents	Absorbance at 450nm	Mean Absorbance	Results
1A 2A	0 Standard 0 Standard			
1B 2B	15 ng/ml 15 ng/ml			
1C 2C	30 ng/ml 30 ng/ml			
1D 2D	60 ng/ml 60 ng/ml			
1E 2E	90 ng/ml 90 ng/ml			
1F 2F	180 ng/ml 180 ng/ml			
1G 2G	360 ng/ml 360 ng/ml			
1H 2H	720 ng/ml 720 ng/ml			
3A 4A	*Sample*			
3B 4B	*Sample*			

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