# KRIBIOLISA™ Human Claudin 18.2 ELISA

REF : KBGT903

Ver 1.0

RUO

Enzyme Immunoassay for the Quantitative Detection of human Claudin 18.2 in human serum, plasma and biological fluids.

| | | | |
|---|---|---|---|
| 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 KBGT903 Σ 96 tests

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**Introduction:**

Monoclonal and bispecific antibodies targeting GPRC5D, Claudins (Claudin 6 and Claudin 18), SSTR2, and CXCR4 have shown successful results in CAR-T cell therapy at the preclinical and clinical stages.

Claudins family member Claudin18 (CLDN18) is a four-pass transmembrane protein with two extracellular loops and cytoplasmic N- and C-tails found in tight junctions. CLDN18 modulates paracellular permeability, polarity, and signaling. CLDN18 deficiency has been associated with atrophic gastritis, spasmolytic polypeptide-expressing metaplasia (SPEM), and asthma. Lung-specific CLDN18.2 modulates alveolar epithelial type II (AT2) cell proliferation and organ size. Restoration of CLDN18.1 expression in human lung cancer cells has been shown to suppress proliferation, inhibiting the IGF-1R/AKT axes. Not expressed in other healthy tissues, gastric mucosa-specific isoform CLDN18.2 expression manifests in primary gastric cancers. CLDN18.2 at the surface of epithelial tumor cells is a target in antibody and CAR-therapies currently in development.

KRISHGEN'S KRIBIOLISA™ Human CLAUDIN 18.2 uses CLAUDIN 18.2 as VLP (virus like particle) as their standards / calibrators. Virus-like particles (VLPs) are nanoscale particles formed by self-assembly of viral capsid proteins, approximately 100-300 nm in diameter, which lack the viral genetic material, can't replicate autonomously, and are safer during production. This ensures a high degree of accuracy and reproducibility in results obtained using the KRISHGEN ELISAs.

**Intended Use:**

The KRIBIOLISA™ Human Claudin 18.2 ELISA kit is specifically designed for the quantitative detection of Claudin 18.2 in human serum, plasma, tissue homogenates, cell lysates and biological fluids.

**Principle:**

The method employs indirect capture antibody sandwich ELISA technique. Monoclonal Anti-Claudin 18.2 is pre-coated onto the microwells. Samples and controls are pipetted into microwells and Claudin 18.2 present in the sample are bound by the antibodies. Then Anti-Human IgG:HRP Conjugate is pipetted and incubated to form a complex. After washing to remove any non-specific binding, the substrate solution (TMB) is added to microwells and color develops proportionally to the amount of Claudin 18.2 present in the sample. Color development is then stopped by addition of stop solution. Absorbance is measured at 450 nm. The presence or concentration of virus / antigen in samples is determined relative to supplied controls.

**Materials Provided:**

| Part | Description | Qty |
|---|---|---|
| Anti-Claudin 18.2 Coated Microtiter Plate | 96 well polystyrene microplate (12 strips of 8 wells) coated with monoclonal antibody to Claudin 18.2. | 1 x 96 wells |
| Claudin 18.2 Standard | Claudin 18.2 VLPs in a buffered protein base and preservative sodium azide < 0.01% (concentrated, lyophilized) | 1 vial |
| Anti Human IgG:HRP Conjugate | Anti Human IgG:HRP with protein stabilizer and preservatives 0.02% methylisothiazolone and 0.02% bromonitrodioxane. | 12 ml |
| (1X) Sample Diluent | Buffered protein base with preservative sodium azide < 0.01% | 2 x 50 ml |
| (1X) Standard Diluent | Buffered protein base with 1:2000 dilution human serum and preservative sodium azide < 0.01% | 10 ml |
| (20X) Wash Buffer | 20-fold concentrated solution of buffered surfactant with preservative thiomersol < 0.01%. May turn yellow over time. | 25 ml |
| TMB Substrate | Stabilized Chromogen | 12 ml |
| Stop Solution | 0.73M Phosphoric Acid | 12 ml |
| Instruction Manual | | 1 no |

**Materials to be provided by the End-User:**

1. Microplate Reader able to measure absorbance at 450 nm.
2. Adjustable pipettes to measure volumes ranging from 50 ul to 1000 ul.
3. Deionized (DI) water.
4. Wash bottle or automated microplate washer.
5. Tubes to prepare standard/sample dilutions.
6. Timer.
7. Absorbent paper.

**Storage Information:**

1. All components are to be stored 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.

**Health Hazard Warnings:**

1. Reagents that contain preservatives may be harmful if ingested, inhaled or absorbed through the skin. Refer to the MSDS online for details.
2. To reduce the likelihood of blood-borne transmission of infectious agents, handle all plasma in accordance with NCCLS regulations.

**Specimen Collection and Handling:**

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.

**Sample Preparation and Storage:**

Blood is taken by venipuncture. Serum is separated after clotting by centrifugation. Plasma can be used, too. Lipaemic, hemolytic or contaminated samples should not be run. Repeated freezing and thawing should be avoided. If samples are to be used for several assays, initially aliquot samples and keep at - 20°C.
**Tissue Homogenates-** As hemolysis blood has relation to the assay results, it is necessary to remove residual blood by washing tissue with pre-coating PBS buffer (0.01M, pH=7.4). Mince tissue after weighing it and get it homogenized in PBS (the volume depends on the weight of the tissue Normal 9 ml PBS would be appropriate to 1 gram tissue pieces. Some protease inhibitors are recommended to add into the PBS) with a glass homogenizer or ice. To further break the cells, you can sonicate the suspension with an ultrasonic cell disruptor or subject it to freeze-thaw cycles. The homogenates are then centrifuged for 5 minutes at 5000xg to get the supernatant. The total protein concentration was determined by BCA kit and the total protein concentration of each pore sample should not exceed 0.3 mg,
**Cell Culture Supernatant-** Centrifuge supernatant for 20 minutes at 1000xg at 2-8°C to remove insoluble impurity and cell debris. Collect the clear supernatant and carry out the assay immediately.
**Cell Culture Lysate-** Commercial RIPA kits are recommended to follow the instructions provided. Generally 0.5 ml RIPA lysis buffer would be appropriate to 2x10(6) cells, DNA must be removed. The total protein concentration was determined by BCA kit and the total protein concentration of each pore sample should not exceed 0.3 mg.
**Cell Culture Supernatant -** If necessary, centrifuge to remove debris prior to analysis. Samples can be stored at -20°C or -80ºC. Avoid repeated freeze-thaw cycles.

**Preparation Before Use:**

Allow samples to reach room temperature prior to assay. Take care to agitate patient samples gently in order to ensure homogeneity.

**Serum and Plasma Test Sample Preparation** - Samples have to be diluted **1:1000 (v/v)**, e.g. for **1:1000 (1 ul sample + 999 ul Sample Diluent)** prior to assay. The samples may be kept at 2 - 8°C for up to three days. Long-term storage requires -20°C.

**Tissue Homogenate and Cell Culture Sample Prepararion -** The user should estimate the concentration of target protein in the test sample, and select a proper dilution factor to make the diluted target protein concentration fall in the optimal detection range of the kit. Dilute the sample with the provided diluent, and several trials may be necessary. The test sample must be well mixed with the diluent. If samples are expected to have very high concentrations of the analyte, dilute the samples with PBS (pH 7.4) first and then further dilute with the Sample Diluent.

**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 (1X) Wash Buffer; dilute 25 ml of (20X) Wash Buffer in 475 ml of DI water.
4. **Standards Preparation**: Thaw the original concentrated Standard vial. Please check the table for the standard range calculations. Use the Standard Diluent as the Zero Standard (Standard No.0).

| Standard Concentration | Standard Vial | Dilution Particulars |
|---|---|---|
| 5000 ng/ml | Original Standard | Original Standard provided in the Kit + 1 ml of Standard Diluent(1X) |
| 2500 ng/ml | Standard No.6 | 500 ul Reconstituted Standard (5000 ng/ml)+500 ul Standard Diluent (1X) |
| 1250 ng/ml | Standard No.5 | 500 ul Standard No.6 + 500 ul Standard Diluent (1X) |
| 625 ng/ml | Standard No.4 | 500ul Standard No.5+ 500 ul Standard Diluent (1X) |
| 312.5 ng/ml | Standard No.3 | 500 ul Standard No.4 + 500 ul Standard Diluent (1X) |
| 156.25 ng/ml | Standard No.2 | 500 ul Standard No.3 + 500 ul Standard Diluent (1X) |
| 78.125 ng/ml | Standard No.1 | 500 ul Standard No.2 + 500 ul Standard Diluent (1X) |
| 0 ng/ml | Standard No.0 | Only Standard Diluent (1X) |

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. If the CLAUDIN 18.2 concentration of the undiluted sample is less than the diluted sample, this may be indicative of the Hook Effect. To overcome Hook Effect samples to be assayed should be sufficiently diluted with our recommended diluent.
3. Avoid assay of Samples containing Sodium Azide ($NaN_3$), as it could destroy the HRP activity resulting in under-estimation of the amount of the CLAUDIN 18.2.
4. It is recommended that all the Standards and Samples be assayed in duplicates.
5. Maintain a repetitive timing sequence from well to well for all the steps to ensure that the incubation timings are same for each well.
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. It is strongly recommended that all Standards and Samples be run in duplicates. A standard curve is required for each assay. All steps must be performed at 37°C

2. Pipette **100 ul** of **prepared Standards** or **diluted Samples** into the respective wells

3. Cover the plate and incubate for 60 minutes at 37°C

4. 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.

5. Pipette **100 ul** of **Anti-Human IgG:HRP Conjugate** into the respective wells.

6. Cover the plate and incubate for 60 minutes at 37°C.

7. Aspirate and wash plate 4 times with **Wash Buffer (1X)** same as in step 4.

8. Add **100 ul** of **TMB Substrate** in each well.

9. Incubate the plate at 37°C for 30 minutes in dark. DO NOT SHAKE or else it may result in higher backgrounds and worse precision. Positive wells should turn bluish in color.

10. Pipette out **100 ul** of **Stop Solution**. Wells should turn from blue to yellow in color.

11. Read the absorbance at 450 nm with a microplate reader.

**Calculation of Results:**

Determine the Mean Absorbance for each set of duplicate or triplicate Standards and Samples. Using Semi-Log graph paper, plot the average value (absorbance 450 nm) 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 Claudin 18.2 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 Claudin 18.2 Concentration. If samples were diluted, multiply by the appropriate dilution factor.

Software which is able to generate a cubic spline curve-fit or a 4-PL ($2^{nd}$ order) 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.
- If the absorbance value is equivalent or higher than the 2,500 ng/ml 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:**

This kit has been validated as per EMA/FDA guidelines in line with ICH Code for Harmonization of Biological Assays.

**Sensitivity:**
**Limit Of Quantification:** It is defined as the lowest detectable concentration corresponding to a signal of Mean of '0' standard plus 2* SD.
10 replicates of '0' standards were evaluated and the LOD was found to be ~50 ng/ml

**Specificity:**
The antibodies used in the kit are polyclonal antibodies specific for CLAUDIN 18.2. The standards / calibrators used in the kit are VLPs to offer higher degree of accuracy and reproducibility.

**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 with low (78.125 ng/ml), medium (625 ng/ml) and high (2,500 ng/ml) concentrations. 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 | <10% | <12% |
| Medium | <5% | <8% |
| High | <5% | <8% |

**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.
- 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.

## SCHEMATIC ASSAY PROCEDURE

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

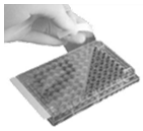
Components (2-8ºC) → 30 mins RT Before Use → 

Thaw at Room Temperature (18-24ºC) → USE NOW

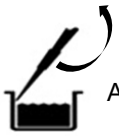
2. Avoid repeated cool-thaw of the components as there will be a loss of activity and this can affect the results.

Kit Components → AVOID → COOL (2-8ºC) → THAW (22±4ºC) → THAW (22±4ºC) → COOL (2-8ºC) → AVOID → NO CHANGE IN RESULTS

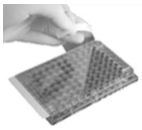
3.  Pipette **100 ul prepared Standards** / **diluted Samples** into each well.

4. Cover plate  and incubate for 

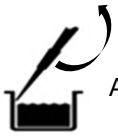
at 37°C.

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

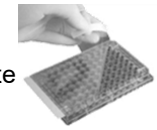
6.  Pipette **100 ul Detection HRP conjugate** into each well.

7. Cover plate  and incubate for 

at 37°C.

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

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

10. Cover plate  and incubate for 

at 37°C.

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

12. Read absorbance at 450nm with a  microplate reader within 

of stopping reaction.

## Typical Example of a Work List

| Well # | Contents | Absorbance at 450nm | Mean Absorbance | ng/ml Anti-Haemophilus influenzae B equivalent |
|---|---|---|---|---|
| 1A<br>2A | zero std<br>zero std | | | |
| 1B<br>2B | 78.125 ng/ml<br>78.125 ng/ml | | | |
| 1C<br>2C | 156.25 ng/ml<br>156.25 ng/ml | | | |
| 1D<br>2D | 312.50 ng/ml<br>312.50 ng/ml | | | |
| 1E<br>2E | 625 ng/ml<br>625 ng/ml | | | |
| 1F<br>2F | 1250 ng/ml<br>1250 ng/ml | | | |
| 1G<br>2G | 2500 ng/ml<br>2500 ng/ml | | | |
| 1H<br>2H | sample<br>sample | | | |
| 1I<br>2I | sample<br>sample | | | |

## LIMITED WARRANTY

Krishgen Biosystems does not warrant against damages or defects arising in shipping or handling, or out of accident or improper or abnormal use of the Products; against defects in products or components not manufactured by Krishgen Biosystems, or against damages resulting from such non-Krishgen Biosystems made products or components. Krishgen Biosystems passes on to customer the warranty it received (if any) from the maker thereof of such non Krishgen made products or components. This warranty also does not apply to Products to which changes or modifications have been made or attempted by persons other than pursuant to written authorization by Krishgen Biosystems.

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## SYMBOLS KEY

| | |
|---|---|
| MTP | **Anti-Claudin 18.2 Coated Microtiter Plate (12x8 wells)** |
| STD | **CLAUDIN 18.2 Standard** |
| HRP CONJ | **Conjugate Horseradish Peroxidase** |
| 1X SAMP DIL | **(1X) Sample Diluent** |
| 1X STD DIL | **(1X) Standard Diluent** |
| 20X WASH BUF | **(20X) Wash Buffer** |
| SUB TMB | **TMB Substrate** |
| SOLN STOP | **Stop Solution** |
|  | **Consult Instructions for Use** |
| REF | **Catalog Number** |
|  | **Expiration Date** |
|  | **Storage Temperature** |