



## Technical Manual

### Rat 4-1BB PharmaGenie ELISA Kit

- **Catalogue Code: SBRS1603**
- **Sandwich Principle**
- **Research Use Only**

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## Key Features and Sample Types

### Aliases:

4-1BB homolog

### Gene ID:

### Uniprot:

Q4W8J3

### Detection Method:

Sandwich-based (Quantitative)

### Range:

1.5 ng/ml - 300 ng/ml

### Sensitivity:

1.5 ng/ml

### Sample Types:

Cell Culture Supernatants, Plasma, Serum

### Reactivity:

Rat

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## Storage & Expiry

The entire kit may be stored at -20°C for up to 6 months from the date of shipment. Avoid repeated freeze-thaw cycles. For extended storage, it is recommended to store at -80°C. For prepared reagent storage, see table below.

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## Introduction

### How do our ELISA kits work?

The Assay Genie Rat 4-1BB (TNFRSF9/CD137) ELISA (Enzyme-Linked Immunosorbent Assay) kit is an in vitro enzyme-linked immunosorbent assay for the quantitative measurement of Rat 4-1BB in serum, plasma (collect plasma using EDTA and heparin as an anticoagulant. Citrate is not recommended as anticoagulants for use in this assay) and cell culture supernatants. This assay employs an antibody specific for Rat 4-1BB coated on a 96-well plate. Standards and samples are pipetted into the wells and 4-1BB present in a sample is bound to the wells by the immobilized antibody. The wells are washed and biotinylated anti-Rat 4-1BB antibody is added. After washing away unbound biotinylated antibody, HRP-conjugated streptavidin is pipetted to the wells. The wells are again washed, a TMB substrate solution is added to the wells and color develops in proportion to the amount of 4-1BB bound. The Stop Solution changes the color from blue to yellow, and the intensity of the color is measured at 450 nm.

## Kit Contents

Each kit contains reagents for 96 assays including:

No.	Component	96-Well Kit	Storage
1	Microplate coated with anti-Rat 4-1BB	8 x 12	1 month at 4°C*
2	Wash Buffer Concentrate (20X)	25ml	1 month at 4°C*
3	Standard Protein	2 vials	1 week at -80°C
4	Detection Antibody 4-1BB	2 vials	5 days at 4°C
5	HRP-Streptavidin Concentrate (200X)	200µl	Do not store and reuse.
6	TMB One-Step Substrate Reagent	12ml	N/A
7	Stop Solution	8ml	N/A
8	Assay Diluent D (5X concentrated buffer)	15 ml	1 month at 4°C
9	Assay Diluent B (5X concentrated buffer)	15 ml	1 month at 4°C

\*Return unused wells to the pouch containing desiccant pack, reseal along entire edge.

### Additional materials required:

1. Microplate reader capable of measuring absorbance at 450 nm.
2. Precision pipettes to deliver 2 µl to 1 ml volumes.
3. Adjustable 1-25 ml pipettes for reagent preparation.
4. 100 ml and 1 liter graduated cylinders.
5. Absorbent paper.
6. Distilled or deionized water.
7. Log-log graph paper or computer and software for ELISA data analysis.
8. Tubes to prepare the positive control or sample dilutions.

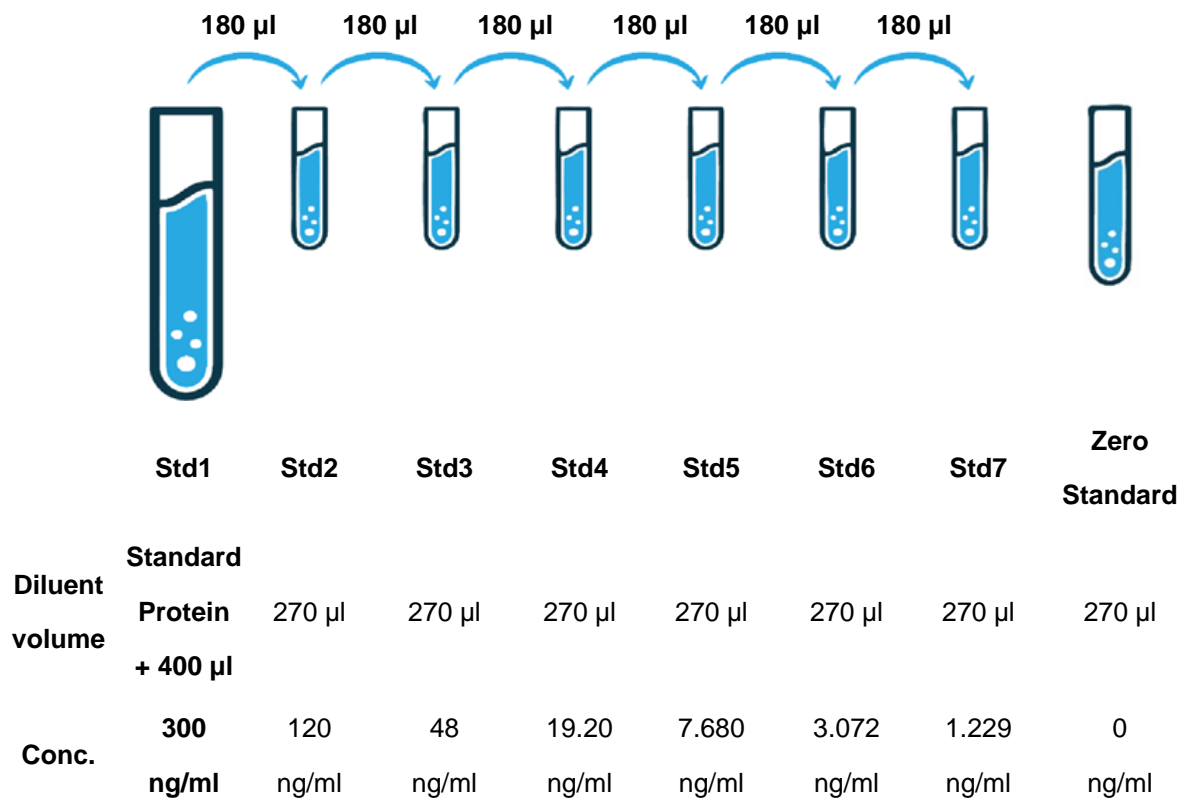
## Reagent Preparation

1. Bring all reagents and samples to room temperature (18 - 25°C) before use.
2. Assay Diluent D and Assay Diluent B should be diluted 5-fold with deionized or distilled water before use.
3. Sample dilution: 1X Assay Diluent D should be used for dilution of serum, plasma, and cell culture supernatant samples. The suggested dilution for normal serum/plasma is 2 fold.

**Note:** Levels of 4-1BB may vary between different samples. Optimal dilution factors for each sample must be determined by the investigator.

4. Preparation of standard: Briefly spin a vial of Standard Protein. Add 400 µl 1X Assay Diluent D (Assay Diluent D should be diluted 5-fold with deionized or distilled water before use) into Standard Protein vial to prepare a 300 ng/ml standard solution. Dissolve the powder thoroughly by a gentle mix. Pipette 270 µl 1X Assay Diluent D into each tube. Use the 300 ng/ml standard solution to produce a dilution series (shown below). Mix each tube thoroughly before the next transfer. 1X Assay Diluent D serves as the zero standard (0 ng/ml).

### DILUTION SERIES



5. If the Wash Concentrate (20X) contains visible crystals, warm to room temperature and mix gently until dissolved. Dilute 20 ml of Wash Buffer Concentrate into deionized or distilled water to yield 400 ml of 1X Wash Buffer.
6. Briefly spin the Detection Antibody vial before use. Add 100  $\mu$ l of 1X Assay Diluent B into the vial to prepare a detection antibody concentrate. Pipette up and down to mix gently (the concentrate can be stored at 4°C for 5 days). The detection antibody concentrate should be diluted 80-fold with 1X Assay Diluent B and used in step 5 of the Assay Procedure.
7. Briefly spin the HRP-Streptavidin concentrate vial and pipette up and down to mix gently before use, as precipitates may form during storage. HRP-Streptavidin concentrate should be diluted 150 with 1X Assay Diluent B.

*For example: Briefly spin the vial (HRP-Streptavidin Concentrate) and pipette up and down to mix gently. Add 80  $\mu$ l of HRP-Streptavidin concentrate into a tube with 12 ml 1x Assay Diluent B to prepare a 150-fold diluted HRP-Streptavidin solution (don't store the diluted solution for next day use). Mix well.*

## Assay Procedure

1. Bring all reagents and samples to room temperature (18 - 25°C) before use. It is recommended that all standards and samples be run at least in duplicate.
2. Label removable 8-well strips as appropriate for your experiment.
3. Add 100  $\mu$ l of each standard (see Reagent Preparation step 3) and sample into appropriate wells. Cover wells and incubate for 2.5 hours at room temperature with gentle shaking.
4. Discard the solution and wash 4 times with 1X Wash Solution. Wash by filling each well with Wash Buffer (300  $\mu$ l) using a multi-channel Pipette or autowasher. Complete removal of liquid at each step is essential to good performance. After the last wash, remove any remaining Wash Buffer by aspirating or decanting. Invert the plate and blot it against clean paper towels.
5. Add 100  $\mu$ l of 1X prepared biotinylated antibody (Reagent Preparation step 6) to each well. Incubate for 1 hour at room temperature with gentle shaking.

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6. Discard the solution. Repeat the wash as in step 4.
  7. Add 100  $\mu$ l of prepared Streptavidin solution (see Reagent Preparation step 7) to each well. Incubate for 45 minutes at room temperature with gentle shaking.
  8. Discard the solution. Repeat the wash as in step 4.
  9. Add 100  $\mu$ l of TMB One-Step Substrate Reagent to each well. Incubate for 30 minutes at room temperature in the dark with gentle shaking.
  10. Add 50  $\mu$ l of Stop Solution to each well. Read at 450 nm immediately.

## Assay Procedure Summary

1. Prepare all reagents, samples and standards as instructed.
2. Add 100  $\mu$ l standard or sample to each well. Incubate 2.5 hours at room temperature.
3. Add 100  $\mu$ l prepared biotin antibody to each well. Incubate 1 hour at room temperature.
4. Add 100  $\mu$ l prepared Streptavidin solution. Incubate 45 minutes at room temperature.
5. Add 100  $\mu$ l TMB One-Step Substrate Reagent to each well. Incubate 30 minutes at room temperature.
6. Add 50  $\mu$ l Stop Solution to each well. Read at 450 nm immediately.

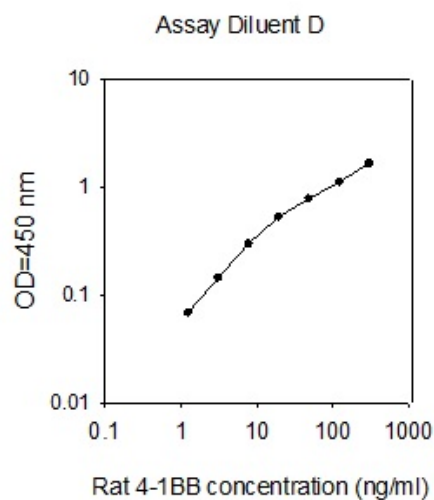


## Calculation of Results

Calculate the mean absorbance for each set of duplicate standards, controls and samples, and subtract the average zero standard optical density. Plot the standard curve on log-log graph paper or using Sigma plot software, with standard concentration on the x-axis and absorbance on the y-axis. Draw the best-fit straight line through the standard points.

### Typical Data

These standard curves are for demonstration only. A standard curve must be run with each assay.



### Sensitivity

The minimum detectable dose of Rat 4-1BB was determined to be 1.5 ng/ml.

Minimum detectable dose is defined as the analyte concentration resulting in an absorbance that is 2 standard deviations higher than that of the blank (diluent buffer).

## Spike and Recovery

Recovery was determined by spiking various levels of Rat 4-1BB into the sample types listed below. Mean recoveries are as follows:

Sample Type	Average % Recovery	Range (%)
Cell Culture Supernatants	84	74-96
Plasma	98	71-129
Serum	110	86-131

## Linearity

Sample Type	Cell Culture Supernatants	Plasma	Serum
1:2 Average % of Expected	140	123	117
Range (%)	133-146	107-138	115-120
1:4 Average % of Expected	143	135	120
Range (%)	138-148	128-142	116-124

## Reproducibility

Intra-Assay CV%: <10%

Inter-Assay CV%: <12%

## Specificity

This ELISA kit shows no cross-reactivity with the following cytokines tested: Rat Activin A, Adiponectin (ACRP30), CD80 (B7-1), CD48 (SLAMF2), CTACK (CCL27), Decorin, Eotaxin-1 (CCL11), EphA5, Erythropoietin, FGF-BP, Flt-3 Ligand, Galectin-1, Galectin-3, Gas 1, GFR alpha-1 (GDNF R), gp130, HGF, IL-1 R6 (IL-1 Rrp2), IL-1 ra (IL-1 F3), IL-2 R alpha, IL-3, IL-7, IL-17F, IL-22, JAM-A (CD321/F11R), MIP-1 alpha (CCL3), Neuropilin-1, Neuropilin-2, Nope, Notch-1, Notch-2, P-Cadherin, Prolactin, RANTES (CCL5), SCF, TIM1 (KIM-1), TIMP-2, TREM-1, TWEAK R (TNFRSF12).

## Troubleshooting

Problem	Causes	Solutions
Poor standard curve	<ul style="list-style-type: none"> <li>• Inaccurate pipetting</li> <li>• Improper standard dilution</li> </ul>	<ul style="list-style-type: none"> <li>• Check pipettes</li> <li>• Briefly centrifuge Standard Protein and dissolve the powder thoroughly by gently mixing</li> </ul>
Low signal	<ul style="list-style-type: none"> <li>• Improper preparation of standard and/or biotinylated antibody</li> <li>• Too brief incubation times</li> <li>• Inadequate reagent volumes or improper dilution</li> </ul>	<ul style="list-style-type: none"> <li>• Briefly spin down vials before opening. Dissolve the powder thoroughly.</li> <li>• Ensure sufficient incubation time. Assay procedure step 3 may be done overnight at 4°C with gently shaking (note: may increase overall signals including background)</li> <li>• Check pipettes and ensure correct preparation</li> </ul>
Large CV	<ul style="list-style-type: none"> <li>• Inaccurate pipetting</li> <li>• Air bubbles in wells</li> </ul>	<ul style="list-style-type: none"> <li>• Check pipettes</li> <li>• Remove bubbles in wells</li> </ul>
High background	<ul style="list-style-type: none"> <li>• Plate is insufficiently washed</li> <li>• Contaminated wash buffer</li> </ul>	<ul style="list-style-type: none"> <li>• Review the manual for proper wash. If using a plate washer, ensure that all ports are unobstructed.</li> <li>• Make fresh wash buffer</li> </ul>
Low sensitivity	<ul style="list-style-type: none"> <li>• Improper storage of the ELISA kit</li> <li>• Stop solution</li> </ul>	<ul style="list-style-type: none"> <li>• Store your standard at &lt;-70°C after reconstitution, others at 4°C. Keep substrate solution protected from light.</li> <li>• Add stop solution to each well before reading plate</li> </ul>

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### **Assay Genie 100% money-back guarantee!**

If you are not satisfied with the quality of our products and our technical team cannot resolve your problem, we will give you 100% of your money back.

#### **Contact Details**



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