ABclonal

Human VCAM-1 ELISA Kit

Catalog Number：RK00026

This ELISA kit used for quantitation of human vascular cell adhesion molecule 1 (VCAM-1) concentration in cell culture supernate, serum and plasma. For research use only, and it's highly recommended to read throughly of this manual before using the product.

Manufactured by

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Introduction

Human Vascular Cell Adhesion Molecule-1 (VCAM-1) is a 100-110 kDa, 715 amino acid (aa) type I transmembrane glycoprotein typically characterized by the presence of seven C2-type immunoglobulin (Ig) domains (1-3). Its extracellular region is 674 aa in length, followed by a 22 aa transmembrane segment and a 19 aa cytoplasmic tail (1, 2). In the extracellular region, there are multiple N-linked glycosylation sites (the predicted molecular weight is 80 kDa), and each C2 domain is closed by a disulfide bridge. There is considerable interspecies VCAM-1 homology, with mouse and rat VCAM-1 showing approximately 75% aa identity to human VCAM-1 (2-4). Notably, the short 19 aa cytoplasmic tail is absolutely conserved, mouse to human to rat (4). Cells expressing mouse VCAM-1 bind both mouse and human leukocytes, and this reflects their high degree of aa identity (4). A number of variants of VCAM-1 are known to occur, all of which are likely the result of alternate gene splicing. In particular, a human six Ig domain molecule is known (1), and in rabbits, an eight Ig domain form has been identified (2). There is also a three-C2 domain, 43 kDa GPI-linked form of VCAM-1 (5, 6). Although it binds known VCAM-1 ligands (or co-receptors), its function is unclear. Cells known to express VCAM-1 include neurons (7), endothelial cells (8), smooth muscle cells (9), fibroblasts (10) and macrophages (11).

Soluble VCAM-1 has been identified in culture supernates (12), blood (13-15), and cerebrospinal fluid (15, 16). In vitro, basal levels of VCAM-1 shedding by unstimulated NIH-3T3 cells appear to partially require metalloproteinase activity, while PMA-induced shedding is dependent upon the proteolytic activity of TACE/ADAM17 (12).

Functionally, VCAM-1 binds to both α4β1 (VLA-4) and α4β7 (LPAM-1) integrins

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(17, 18). These integrins (or VCAM-1 ligands) are expressed on a variety of cells, with VLA-4 found on all leukocytes with the exception of neutrophils (17, 19, 20). Because of this, VCAM-1/VCAM-1 ligand interactions are undoubtedly key events in the rate and timing of leukocyte extravasation (3). Other roles proposed for VCAM-1 include the regulation of osteoclastogenesis via a cell-to-cell contact mechanism (21) and the induction of sickle cell adherence to vascular endothelial cells during hypoxemia (22).

Principle Of The Assay

This assay employs the quantitative sandwich enzyme immunoassay technique. An antibody specific for VCAM-1 has been pre-coated onto a microplate. Standards and samples are pipetted into the wells and any VCAM-1 present is bound by the immobilized antibody. Following incubation unbound samples are removed during a wash step, and then a detection antibody specific for VCAM-1 is added to the wells and binds to the combination of capture antibody-VCAM-1 in sample. Following a wash to remove any unbound combination, and enzyme conjugate is added to the wells. Following incubation and wash steps, a substrate is added. A colored product TMB is formed in proportion to the amount of VCAM-1 present in the sample. The reaction is terminated by addition of acid and absorbance is measured. A standard curve is prepared from seven VCAM-1 standard dilutions and VCAM-1 sample concentration determined.

Materials Provided

Part	Size (96T)	Cat NO.	STORAGE OF OPENED/ RECONSTITUTED MATERIAL
Antibody Coated Plate	8×12	RM00132	Return unused wells to the foil pouch containing the desiccant pack and store at 2-8 °C.Reseal along entire edge of zip-seal.
Standard Lyophilized	2	RM00129	Aliquot and store at 2-8 °C in a manual defrost freezer.* Avoid repeated freeze-thaw cycles.
Concentrated Biotin Conjugate Antibody (30×)	1 ×400ul	RM00130	May be stored for up to 6 month at 2-8 °C.*
Streptavidin-HRP Concentrated (30x)	1 ×400ul	RM00131	
Standard/Sample Diluent (R1)	1 ×20mL	RM00023	May be stored for up to 6 month at 2-8 °C.*
Biotin-Conjugate Antibody Diluent (R2)	1 ×16mL	RM00024	
Streptavidin-HRP Diluent(R3)	1 ×16mL	RM00025	
Wash Buffer(20x)	1 × 30mL	RM00026	
TMB Substrate	1 ×12 mL	RM00027	
Stop Solution	1 ×12 mL	RM00028	

Plate Sealers	4 strips
Specification	1

Sample Collection And Storage

1. **Cell Culture Supernates:**

   Centrifuge 1000x g for 10 min and detect; or aliquot and store samples at -20°C to -70°C (Stored at 2-8°C if tested within 24 hours). Avoid freeze/thaw cycles.If cell culture supernate samples require larger dilutions, perform an intermediate dilution with culture media and the final dilution with the Standard/Sample Diluent(R1).

2. **Serum:**

   Use a serum separator tube and allow samples to clot for 30 minutes before centrifugation for 10 minutes at 1000x g, and detect; or aliquot and store samples at -20°C to -70°C (Stored at 2-8°C if tested within 24 hours). Avoid freeze/thaw cycles.

3. **Plasma**

   Collect plasma using EDTA or heparin as an anticoagulant. Centrifuge for 15 minutes at 1000x g within 30 minutes of collection, and detect; or aliquot and store samples at -20°C to -70°C (Stored at 2-8°C if tested within 24 hours). Avoid freeze / thaw cycles.

4. **Avoid hemolytic and hyperlipidemia sample for Serum and Plasma.**

5. **Dilution:**

   Dilute samples at the appropriate multiple (recommend to do pre-test to determine the dilution factor).

Precautions

1. **FOR RESEARCH USE ONLY. NOT FOR USE IN DIAGNOSTIC PROCEDURES.**

2. Any variation in diluent, operator, pipetting technique, washing technique, incubation time or temperature, and kit age can cause variation in binding.

3. Variations in sample collection, processing, and storage may cause sample value differences.

4. Reagents may be harmful, if ingested, rinse it with an excess amount of tap water.

5. Stop Solution contains strong acid. Wear eye, hand, and face protection.

6. Apart from the standard of kits, other components should not be refrigerated.

7. Please perform simple centrifugation to collect the liquid before use.

8. Do not mix or substitute reagents with those from other lots or other sources.

9. Adequate mixing is very important for good result. Use a mini-vortexer at the lowest frequency.

10. Mix the sample and all components in the kits adequately, and use clean plastic container to prepare all of the diluent.

11. Both the sample and standard should be assayed in duplicate, and the sequence of the regents should be added consistently.

12. Reuse of dissolved standard is not recommended.

13. The kit should not be used beyond the expiration date on the kit label.

14. The kit should be away from light when it is stored or incubated.

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15. To reduce the likelihood of blood-borne transmission of infectious agents, handle all serum, plasma and other biological fluids in accordance with NCCLS regulations.

16. To avoid cross contamination, please use disposable pipette tips.

17. Please prepare all the kit components according to the Specification. If the kits will be used several times, please seal the rest strips and preserve with desiccants. Do use up within 2 months.

18. The 48T kit is also suitable for the specification.
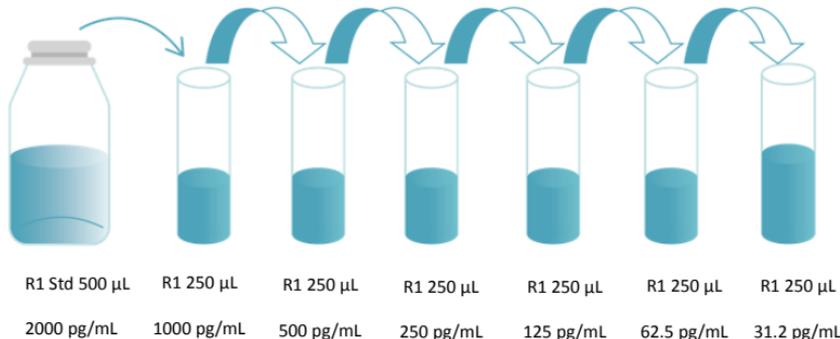
Experiment Materials

1. Microplate reader(measuring absorbance at 450 nm, with the correction wavelength set at 570 nm or 630 nm).

2. Pipettes and pipette tips：0.5-10, 2-20, 20-200, 200-1000 μL.

3. Microplate washer, Squirt bottle.

4. Micro-oscillator.

5. Deionized or double distilled water, graduated cylinder.

6. Polypropylene Test tubes for dilution.

7. Incubator.

Reagent Preparation

1. **Bring all reagents to room temperature before use. If crystals have formed in the concentrate, Bring the reagent to room temperature and mix gently until the crystals have completely dissolved.**

2. **Standard:** Add Standard/Sample Diluent(R1) 0.5mL into freeze-dried standard, sit for a minimum of 15 minutes with gentle agitation prior to making dilutions (2000pg/mL), Prepare EP tubes containing Standard/Sample Diluent(R1), and produce a dilution series according to the picture shown below (recommended concentration for standard curve: 2000, 1000, 500, 250, 125, 62.5, 31.2, 0pg/mL). Redissolved standard solution (2000pg/mL), aliquot and store at -20°C— -70°C.

Std 250 µL   250 µL   250 µL   250 µL   250 µL   250 µL

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R1 Std 500 µL	R1 250 µL	R1 250 µL	R1 250 µL	R1 250 µL	R1 250 µL	R1 250 µL
2000 pg/mL	1000 pg/mL	500 pg/mL	250 pg/mL	125 pg/mL	62.5 pg/mL	31.2 pg/mL

3. **Concentrated Biotin Conjugate Antibody (30x)** : Dilute 1:30 with the Biotin-Conjugate Antibody Diluent (R2) before use, and the diluted solution should be used within 30 min.

Dilution Method

Strip	Concentrated Biotin-Conjugate antibody (30x)	Biotin-Conjugate Antibody Diluent (R2)
2	66uL	1914uL
4	132uL	3828uL
6	198uL	5742uL
8	264uL	7656uL
10	330uL	9570uL
12	396uL	11484uL

4. **Streptavidin-HRP Concentrated (30x):** Dilute 1:30 with the Streptavidin-HRP Diluent(R3) before use, and the diluted solution should be used within 30 min.

Dilution Method

Strip	Concentrated Streptavidin-HRP (30x)	Streptavidin-HRP Diluent(R3)
2	66uL	1914uL
4	132uL	3828uL
6	198uL	5742uL
8	264uL	7656uL
10	330uL	9570uL
12	396uL	11484uL

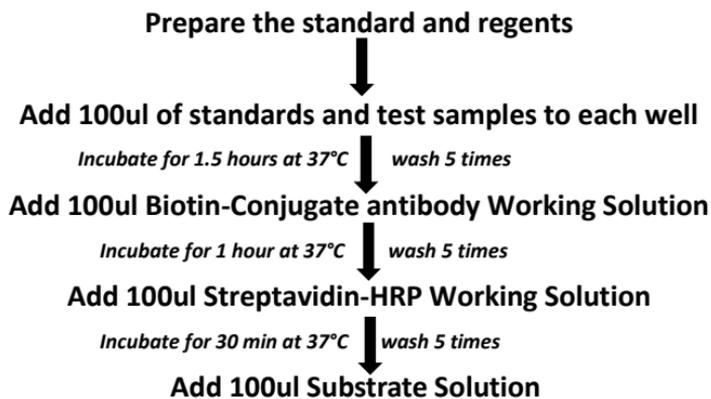5. **Wash buffer**: Dilute 1:20 with double distilled or deionized water before use.

Wash Method

Aspirate each well and wash, repeating the process two times for a total of three washes.Wash by filling each well with **Wash Buffer**(300ul) using a squirt bottle,manifold dispenser,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.

Assay Procedure

1. Remove excess microplate strips from the plate frame, return them to the foil pouch containing the desiccant pack, and reseal.

2. Add 100 μL Standard/sample Diluent (R1) in blank well.

3. Add 100 μL different concentration of standard and sample in other wells, cover with the adhesive strip provided. Incubate for 1.5 hours at 37°C.

4. Add wash buffer 300 μL/well, aspirate each well after holding 40 seconds, repeating the process four times for a total of five washes.

5. Prepare the Concentrated Biotin Conjugate Antibody (30X) Working Solution 15 minutes early before use.

6. Add Biotin-Conjugate antibody Working Solution in each wells (100μL/well), cover with new adhesive strip provided. Incubate for 1 hour at 37°C.

7. Prepare the Streptavidin-HRP Concentrated (30X) Working Solution 15minutes early before use.

8. Repeat the aspiration/wash as in step 4.

9. Add Streptavidin-HRP Working Solution in each wells (100 µL/well), cover with new adhesive strip provided. Incubate for 30 minutes at 37°C.

10. Warm-up the Microplate reader.

11. Repeat the aspiration/wash as in step 4.

12. Add TMB Substrate (100µL/well). Incubate for 15-20 minutes at 37°C .Protect from light.

13. Add Stop Solution (100µL/well), determine the optical density of each well within 5 minutes, using a Microplate reader set to 450 nm. If wavelength correction is available, set to 570 nm or 630 nm. If wavelength correction is not available, subtract readings at 570 nm or 630 nm from the readings at 450 nm. This subtraction will correct for optical imperfections in the plate. Readings made directly at 450 nm without correction may be higher and less accurate.

Assay Procedure Summary

Prepare the standard and regents

Add 100ul of standards and test samples to each well

Incubate for 1.5 hours at 37°C   *wash 5 times*

Add 100ul Biotin-Conjugate antibody Working Solution

Incubate for 1 hour at 37°C   *wash 5 times*

Add 100ul Streptavidin-HRP Working Solution

Incubate for 30 min at 37°C   *wash 5 times*

Add 100ul Substrate Solution

Incubate for 15-20 min at 37°C under dark condition.

Add 100ul Stop Solution

Detect the optical density within 5 minutes under 450nm.

Correction Wavelength set at 570nm or 630nm

Calculation Of Results

1. Average the duplicate readings for each standard, control and sample, and subtract the average zero standard optical density (O.D.).
2. Create a standard curve by reducing the data using computer software capable of generating a log/log curve-fit. As an alternative, construct a standard curve by plotting the mean absorbance for each standard on the y-axis against the concentration on the x-axis and draw a best fit curve through the points on a log/log graph. The data may be linearized by plotting the log of the VCAM-1 concentrations versus the log of the O.D. on a linear scale, and the best fit line can be determined by regression analysis.
3. If samples have been diluted,the concentration read from the standard curve must be multiplied by the dilution factor.

Typical Data
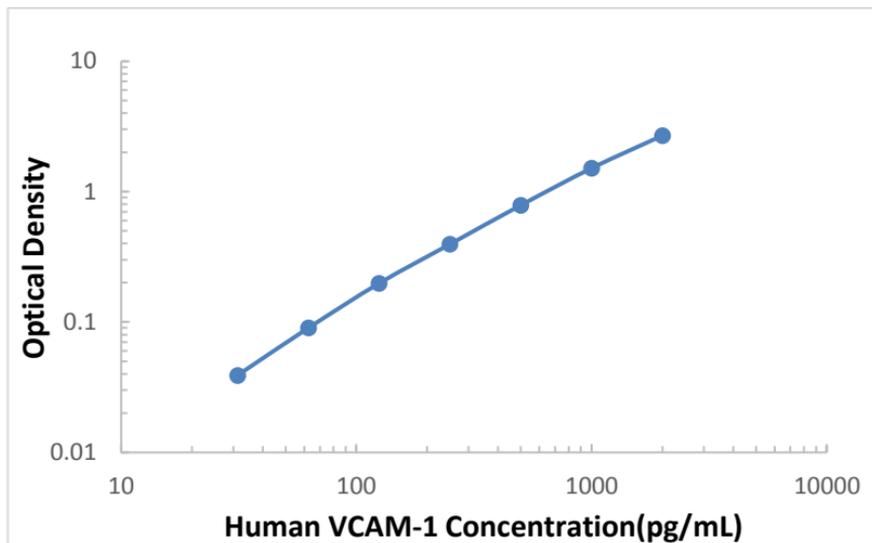
The standard curves are provided for demonstration only. A standard curve should be generated for each set of VCAM-1 assayed.

Sensitivity

The minimum detectable dose (MDD) of VCAM-1 is typically less than 15.6pg/mL. The MDD was determined by adding two standard deviations to the mean optical density value of twenty zero standard replicates and calculating the corresponding concentration.

Specificity

This assay recognizes both recombinant and natural mouse VCAM-1. The factors listed below were prepared at 50ng/ml and assayed for cross-reactivity. No significant cross-reactivity was observed with the following:

Recombinant human

ALCAM

BCAM

CAD-8

DNAM-1

MCAM

Desmoglein-1

ECAD

Ecalectin

E-Selectin

ICAM-1

ICAM-2

ICAM-3

ICAM-5

JAM-1

JAM-2

JAM-3

LAMP

NCAD

ABclonal

Precision
Intra-plate Precision

Three samples of known concentration were tested 20 times on one plate to evaluate the Intra-plate precision.

Sample	1	2	3
Repeat Times	20	20	20
Average Value (pg/mL)	185	921	1846
Standard Deviation (SD)	13.1	32.2	70
Variable Coefficient CV (%)	4.1	3.5	3.8

Inter-plate Precision

Three samples of known concentration were tested 20 times separate assays to evaluate the Inter-plate precision.Assay were using two lots of components.

Sample	1	2	3
Repeat Times	20	20	20
Average Value (pg/mL)	192	941	1889
Standard Deviation (SD)	14.4	76.2	128.4
Variable Coefficient CV (%)	7.5	8.1	6.8

Recovery

Spike 3 different concentration of human VCAM-1 into healthy human serum and plasma, calculate the recovery.

Sample Form	Average Recover (%)	Range (%)
Serum	98	90-105
Plasma	103	91-114

Linearity

Spike high concentration of human VCAM-1 into 4 healthy human serum, dilute in the range of standard curve kinetics and evaluate the linearity.

Dilution	Average Value (%)	Range (%)
1:2	100	93-106
1:4	105	94-116
1:8	99	90-108
1:16	103	92-113

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