ab309172 – Human ICAM1 SimpleStep ELISA® Kit

For the quantitative measurement of ICAM1 in human serum, plasma (heparin), plasma (EDTA), plasma (citrate), cell culture supernatant, and urine.
For research use only - not intended for diagnostic use.

For overview, typical data and additional information please visit: www.abcam.com/ab309172

Storage and Stability: Store kit at 2-8°C immediately upon receipt. Refer to list of materials supplied for storage conditions of individual components. Observe the storage conditions for individual prepared components in the Standard Preparation and Reagent preparation sections.

Materials Supplied

Item	Quantity	Storage Condition
Human ICAM1 Capture Antibody 10X	600 µL	+4°C
Human ICAM1 Detector Antibody 10X	600 µL	+4°C
Human ICAM1 Lyophilized Recombinant Protein	2 Vials	+4°C
Antibody Diluent 4BI	6 mL	+4°C
Sample Diluent NS	50 mL	+4°C
Wash Buffer PT 10X	20 mL	+4°C
TMB Development Solution	12 mL	+4°C
Stop Solution	12 mL	+4°C
SimpleStep Pre-Coated 96-Well Microplate	96 wells	+4°C
Plate Seal	1	+4°C

Materials Required, Not Supplied

These materials are not included in the kit, but will be required to successfully utilize this assay:

Microplate reader capable of measuring absorbance at 450 or 600 nm.
Deionized water.
Multi- and single-channel pipettes.
Tubes for standard dilution.
Plate shaker for all incubation steps.
Optional: Phenylmethylsulfonyl Fluoride (PMSF) (or other protease inhibitors).

Reagent Preparation

Equilibrate all reagents to room temperature (18-25°C) prior to use. The kit contains enough reagents for 96 wells. The sample volumes below are sufficient for 48 wells (6 x 8-well strips); adjust volumes as needed for the number of strips in your experiment.

Prepare only as much reagent as is needed on the day of the experiment. Capture and Detector Antibodies have only been tested for stability in the provided 10X formulations

1X Wash Buffer PT: Prepare 1X Wash Buffer PT by diluting Wash Buffer PT 10X with deionized water. To make 50 mL 1X Wash Buffer PT combine 5 mL Wash Buffer PT 10X with 45 mL deionized water. Mix thoroughly and gently.

Antibody Cocktail: Prepare Antibody Cocktail by diluting the capture and detector antibodies in Antibody Diluent 4BI. To make 3 mL of the Antibody Cocktail combine 300 µL 10X Capture Antibody and 300 µL 10X Detector Antibody with 2.4 mL Antibody Diluent 4BI. Mix thoroughly and gently.

Standard Preparation

Always prepare a fresh set of standards for every use. Discard working standard dilutions after use as they do not store well. The following section describes the preparation of a standard curve for duplicate measurements (recommended).

1. Reconstitute the ICAM1 standard sample by adding the volume of Sample Diluent NS indicated on the protein vial label. Hold at room temperature for 10 minutes. Mix thoroughly and gently. This is the 35.2 ng/mL **Stock Standard** Solution.
2. Label eight tubes, Standards 1– 8.
3. Add 375 µL of Sample Diluent NS into tube number 1 and 150 µL of Sample Diluent NS into numbers 2-8.
4. Use the **Stock Standard** to prepare the following dilution series. Standard #8 contains no protein and is the Blank control:

Standard #	Dilution Sample	Volume to Dilute (µL)	Volume of Diluent (µL)	Starting Conc. (pg/mL)	Final Conc. (pg/mL)
1	**Stock Standard**	25	375	35,200	2,200
2	Standard#1	150	150	2,200	1,100
3	Standard#2	150	150	1,100	550
4	Standard#3	150	150	550	275
5	Standard#4	150	150	275	137.5
6	Standard#5	150	150	137.5	68.75
7	Standard#6	150	150	68.75	34.38
8	Blank Control	0	150	N/A	N/A

Sample Preparation

Typical Sample Dynamic Range	
Sample Type	Range
Serum	1:3200 – 1:200
Plasma - Heparin	1:3200 – 1:200
Plasma - EDTA	1:3200 – 1:200
Plasma - Citrate	1:3200 – 1:200
PBMC Cell Culture Supernatant, Unstimulated	6.25 - 50%
PBMC Cell Culture Supernatant, PHA Stimulated	0.94 - 30%
Urine	12.5 - 50%

Serum Samples should be collected into a serum separator tube. After clot formation, centrifuge samples at 2,000 x g for 10 minutes and collect serum. Dilute samples at least 1:200 into Sample Diluent NS and assay. Store un-diluted serum at -20ºC or below. Avoid repeated freeze-thaw cycles.

Plasma Collect plasma using citrate, EDTA or heparin. Centrifuge samples at 2,000 x g for 10 minutes. Dilute samples at least 1:200 into Sample Diluent NS and assay. Store un-diluted plasma samples at -20ºC or below for up to 3 months. Avoid repeated freeze-thaw cycles.

Cell Culture Supernatants Centrifuge cell culture media at 2,000 x g for 10 minutes to remove debris. Collect supernatants. Dilute samples at least 1:2 into Sample Diluent NS and assay. Store un-diluted samples at -20ºC or below. Avoid repeated freeze-thaw cycles.

Urine Centrifuge urine at 2,000 x g for 10 minutes to remove debris. Dilute samples at least 1:2 into Sample Diluent NS and assay. Store un-diluted urine samples at -20ºC or below. Avoid repeated freeze-thaw cycles.

Plate Preparation

The 96 well plate strips included with this kit are supplied ready to use. It is not necessary to rinse the plate prior to adding reagents.

Unused plate strips should be immediately returned to the foil pouch containing the desiccant pack, resealed and stored at 4°C.

For each assay performed, a minimum of two wells must be used as the zero control.

For statistical reasons, we recommend each sample should be assayed with a minimum of two replicates (duplicates).

Differences in well absorbance or "edge effects" have not been observed with this assay.

Assay Procedure

Equilibrate all materials and prepared reagents to room temperature prior to use.
We recommend that you assay all standards, controls and samples in duplicate

1. Prepare all reagents, working standards, and samples as directed in the previous sections.
2. Remove excess microplate strips from the plate frame, return them to the foil pouch containing the desiccant pack, reseal and return to 4ºC storage.
3. Add 50 μL of all sample or standard to appropriate wells.
4. Add 50 μL of the Antibody Cocktail to each well.
5. Seal the plate and incubate for 1 hour at room temperature on a plate shaker set to 400 rpm.
6. Wash each well with 3 x 350 μL 1X Wash Buffer PT. Wash by aspirating or decanting from wells then dispensing 350 μL 1X Wash Buffer PT into each well. Wash Buffer PT should remain in wells for at least 10 seconds. Complete removal of liquid at each step is essential for good performance. After the last wash invert the plate and tap gently against clean paper towels to remove excess liquid.
7. Add 100 μL of TMB Development Solution to each well and incubate for 10 minutes in the dark on a plate shaker set to 400 rpm.
   Given variability in laboratory environmental conditions, optimal incubation time may vary between 5 and 20 minutes.
   <u>Note</u>: The addition of Stop Solution will change the color from blue to yellow and enhance the signal intensity about 3X. To avoid signal saturation, proceed to the next step before the high concentration of the standard reaches a blue color of O.D.600 equal to 1.0.
8. Add 100 μL of Stop Solution to each well. Shake plate on a plate shaker for 1 minute to mix. Record the OD at 450 nm. This is an endpoint reading.
9. Alternative to 8: Instead of the endpoint reading at 450 nm, record the development of TMB Substrate kinetically. Immediately after addition of TMB Development Solution begin recording the blue color development with elapsed time in the microplate reader prepared with the following settings:

Mode	Kinetic
Wavelength:	600 nm
Time:	up to 20 min
Interval:	20 sec - 1 min
Shaking:	Shake between readings

Note that an endpoint reading can also be recorded at the completion of the kinetic read by adding 100 μL Stop Solution to each well and recording the OD at 450 nm.

Download our ELISA guide for technical hints, results, calculation, and troubleshooting tips: www.abcam.com/protocols/the-complete-elisa-guide

For technical support contact information, visit: www.abcam.com/contactus

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Additional information

ASSAY SPECIFICITY
This kit is designed for the quantification of human ICAM1.

The standard protein in this kit is the extracellular domain of human ICAM1.

Native signal was detected in serum, plasma (heparin), plasma (EDTA), plasma (citrate), cell culture supernatant and urine.

Spiked protein experiments were used to validate the urine sample type.

Milk, CSF, cell extract, tissue extract samples have not been tested with this kit.

For the measurement of ICAM1 in cell extract sample type, use Human ICAM1 ELISA kit ab309183.

SPECIES REACTIVITY
2200 pg/mL of recombinant Mouse ICAM1 was tested for reactivity. No reactivity was observed.

Other species reactivity was determined by measuring 1:200 diluted serum samples of various species, interpolating the protein concentrations from the human standard curve, and expressing the interpolated concentrations as a percentage of the protein concentration in human serum assayed at the same dilution.

Reactivity < 3% was determined for the following species: Monkey, Mouse, Rat, Cow

Other species reactivity not determined.

CALCULATION
- Calculate the average absorbance value for the blank control (zero) standards. Subtract the average blank control standard absorbance value from all other absorbance values.
- Create a standard curve by plotting the average blank control subtracted absorbance value for each standard concentration (y-axis) against the target protein concentration (x-axis) of the standard. Use graphing software to draw the best smooth curve through these points to construct the standard curve.
  Δ Note: Most microplate reader software or graphing software will plot these values and fit a curve to the data. A four parameter curve fit (4PL) is often the best choice; however, other algorithms (e.g. linear, semi-log, log/log, 4 parameter logistic) can also be tested to determine if it provides a better curve fit to the standard values.
- Determine the concentration of the target protein in the sample by interpolating the blank control subtracted absorbance values against the standard curve. Multiply the resulting value by the appropriate sample dilution factor, if used, to obtain the concentration of target protein in the sample.
- Samples generating absorbance values greater than that of the highest standard should be further diluted and reanalyzed. Similarly, samples which measure at an absorbance values less than that of the lowest standard should be retested in a less dilute form.

TYPICAL DATA
Typical standard curve – data provided for demonstration purposes only. A new standard curve must be generated for each assay performed

Concentration (pg/mL)	O.D 450 nm		Mean O.D
	1	2	
0	0.065	0.070	0.067
34.375	0.117	0.118	0.117
68.75	0.162	0.164	0.163
137.5	0.273	0.256	0.264
275	0.473	0.468	0.471
550	0.874	0.802	0.838
1,100	1.610	1.511	1.560
2,200	3.021	3.114	3.067

Table 1. Example of human ICAM1 standard curve in Sample Diluent NS. The ICAM1 standard curve was prepared as described in the Standard Preparation section. The table shows raw data values.

TYPICAL SAMPLE VALUES
Sensitivity:
The calculated minimal detectable dose (MDD) is 14.06 pg/mL. The MDD was determined by calculating the mean of zero standard replicates (n=18) and adding 2 standard deviations then extrapolating the corresponding concentration.

Recovery
Three concentrations of ICAM1 were spiked in duplicate to the indicated biological matrix to evaluate signal recovery in the working range of the assay.

Sample Type	Average % Recovery	Range (%)
1:400 Serum	91	81 - 100
1:400 Plasma - Heparin	94	87 - 101
1:400 Plasma - Citrate	83	76 - 92
1:400 Plasma - EDTA	89	85 - 95
50% Urine	95	89- 101
50% PBMC Cell Culture Supernatant, Unstimulated*	90	89 - 91

*Media is RPMI 1640 containing 10% fetal calf serum.

Linearity of Dilution

Linearity of dilution is determined based on interpolated values from the standard curve. Linearity of dilution defines a sample concentration interval in which interpolated target concentrations are directly proportional to sample dilution.

Native ICAM1 was measured in the following biological samples in a 2-fold dilution series. Sample dilutions are made in Sample Diluent NS

Dilution Factor	Interpolated value	1:200 Human Serum	1:200 Human Plasma (Citrate)	1:200 Human Plasma (EDTA)	1:200 Human Plasma (Heparin)	50% PBMC SN, Unstim.	30% PBMC SN, Stim.
Undiluted	pg/mL	1202	1128	1010	940	343	1344
	% Expected value	100	100	100	100	100	100
2	pg/mL	627.0	605	480	462	190	674
	% Expected value	104	107	95	98	111	100
4	pg/mL	338.1	333.3	275.5	275.3	85.1	329.8
	% Expected value	112	118	109	117	99	98
8	pg/mL	163.7	159.3	130.3	130.3	52.1	196.8
	% Expected value	109	113	103	111	122	117
16	pg/mL	74.3	82.7	59.6	58.6	ND	86.9
	% Expected value	99	117	94	100	ND	103

ND – Not Detected – below product dynamic range

Recombinant ICAM1 was spiked in in the following biological samples in a 2-fold dilution series. Sample dilutions are made in Sample Diluent NS.

Dilution Factor	Interpolated value	50% Human Urine
Undiluted	pg/mL	1558
	% Expected value	100
2	pg/mL	839
	% Expected value	108
4	pg/mL	428.0
	% Expected value	110
8	pg/mL	210.8
	% Expected value	108
16	pg/mL	112.0
	% Expected value	115

Precision

Mean coefficient of variations of interpolated values of ICAM1 from two concentrations of normal human serum within the working range of the assay.

	Intra-assay	Inter-assay
N=	8	3
CV (%)	6.5	3.1

Download our ELISA guide for technical hints, results, calculation, and troubleshooting tips:
www.abcam.com/protocols/the-complete-elisa-guide
For technical support contact information, visit: www.abcam.com/contactus