

## Human Adiponectin Sandwich ELISA Kit Datasheet

Please read it entirely before use

**Catalogue Number:** KE00290

**Size:** 96T

**Sensitivity:** 1.9 pg/mL

**Range:** 62.5-4000 pg/mL

**Usage:** For the quantitative detection of human Adiponectin concentrations in serum, plasma, cell culture supernatant and cell lysate.

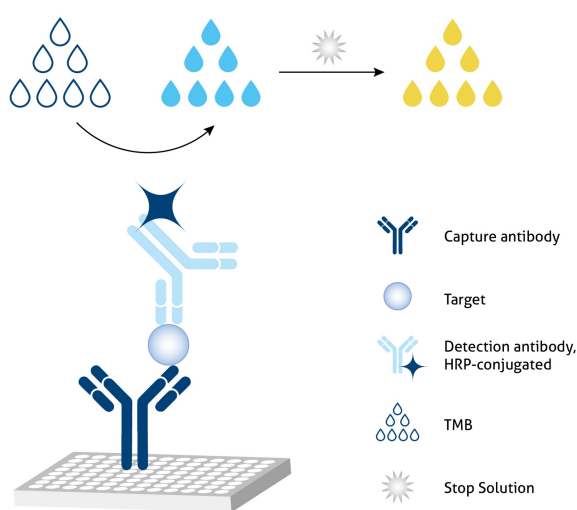
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## 1. Background

Adiponectin (AdipoQ), an adipocyte-derived hormone, is one of the most abundant adipokines in the blood circulation. Human adiponectin exists in three multimer forms, high-molecular-weight (HMW), middle-molecular-weight (MMW), and low-molecular-weight (LMW). Adiponectin modulates a number of metabolic processes, including improving insulin sensitivity and anti-inflammatory activity. The role of Adiponectin in reproduction is not yet fully understood, but the expression of Adiponectin in reproductive tissues has been observed in various animals and humans, including chicken testis, bovine ovary, and human placenta. Adiponectin exerts its effects by activating a range of different signaling molecules via binding to two transmembrane Adiponectin receptors, AdipoR1 and AdipoR2. AdipoR1 is expressed primarily in the skeletal muscle, whereas AdipoR2 is predominantly expressed in the liver. Adiponectin May play a role in cell growth, angiogenesis and tissue remodeling by binding and sequestering various growth factors.

## 2. Principle



### Sandwich ELISA structure (Detection antibody labeled with HRP)

A capture antibody is pre-coated onto the bottom of wells which binds to analyte of interest. A detection antibody labeled with HRP also binds to the analyte. TMB acts as the HRP substrate and the solution color will change from colorless to blue. A stop solution containing sulfuric acid turns solution yellow. The color intensity is proportional to the quantity of bound protein which is measurable at 450 nm with the correction wavelength set at 630 nm.

## 3. Required Materials

- 3.1 A microplate reader capable of measuring absorbance at 450 nm with the correction wavelength set at 630 nm.
- 3.2 Calibrated, adjustable precision pipettes and disposable plastic tips. A manifold multi-channel pipette is recommended for large assays.
- 3.3 Plate washer: automated or manual.
- 3.4 Absorbent paper towels.
- 3.5 Glass or plastic tubes to prepare standard and sample dilutions.
- 3.6 Beakers and graduated cylinders.
- 3.7 Log-log or semi-log graph paper or computer and software for ELISA data analysis. A four-parameter logistic (4-PL) curve-fit is recommended.

## 4. Kit Components and Storage

Microplate - antibody coated 96-well microplate (8 well × 12 strips)	1 plate	<b>Unopened Kit:</b> Store at 2-8°C for 6 months or -20°C for 12 months. <b>Opened Kit:</b> All reagents stored at 2-8°C for 7 days. <b>Please use a new standard for each assay.</b>
Protein standard - 8000 pg/bottle; lyophilized	2 bottles	
Detection antibody, HRP-conjugated (100×) - 120 µL/vial*	1 vial	
Sample Diluent PT 4B1 - 30 mL/bottle. For human serum, plasma and cell culture supernatant samples	2 bottles	
Sample Diluent PT 3 - 30 mL/bottle. For cell lysate samples	1 bottle	
Detection Diluent - 30 mL/bottle	1 bottle	
Wash Buffer Concentrate (20×) - 30 mL/bottle	1 bottle	
Extraction Reagent - 30 mL/bottle	1 bottle	
Tetramethylbenzidine Substrate (TMB) - 12 mL/bottle	1 bottle	
Stop Solution - 12 mL/bottle	1 bottle	
Plate Cover Seals	4 pieces	

\* Centrifugation immediately before use

## 5. Safety Notes

- 5.1 Avoid any skin and eye contact with Stop Solution and TMB. In case of contact, wash thoroughly with water.
- 5.2 Do not use the kit after the expiration date.
- 5.3 Do not mix or substitute reagents or materials from other kit lots or other sources.
- 5.4 Be sure to wear protective equipment such as gloves, masks and goggles during the experiment.
- 5.5 When using an automated plate washer, adding a 30 second soak period following the addition of Wash Buffer to improve assay precision

## 6. Sample Collection and Storage

6.1 Serum: Allow blood samples to clot for 30 minutes, followed by centrifugation for 15 minutes at 1000xg. Clear serum can be assayed immediately or aliquoted and stored at -20°C. Avoid repeated freeze-thaw cycles.

6.2 Plasma: Use EDTA, heparin, or citrate as an anticoagulant for plasma collection. Centrifuge for 15 minutes at 1000xg within 30 minutes of collection. The plasma can be assayed immediately or aliquoted and stored at -20°C. Avoid repeated freeze-thaw cycles.

6.3 Cell Culture Supernatant: Remove particulates by centrifugation for 5 minutes at 500xg and assay immediately or aliquot and store samples at  $\leq -20^{\circ}\text{C}$ . Avoid repeated freeze-thaw cycles.

6.4 Cell Lysate:

1) Collect cells and wash by centrifuging at 500 x g for 5 minutes before resuspension in pre-cooled PBS buffer. Perform this step three times.

2) Count cells and then discard the supernatant.

3) Add protease inhibitor cocktail to the Extraction Reagent to a final concentration immediately prior to performing cell lysis.

4) Add 1 mL of Extraction reagent (containing protease inhibitor cocktail) Per  $1 \times 10^7$  cells, Incubate cell suspension on ice for 30 minutes, use ultrasound to treat the samples.

5) Centrifuge cell lysate at 10,000 x g for 5 minutes at 4°C.

6) Measure the concentration of total protein in cell lysate using BCA assay. Where possible, keep samples on ice to avoid protein degradation.

## 7. Regent Preparation

**7.1 Wash Buffer (1X):** If crystals have formed in the concentrate, warm to room temperature and mix gently until the crystals have completely dissolved. Add 30 mL of Wash Buffer Concentrate(20X) to 570 mL deionized or distilled water to prepare 1X Wash Buffer.

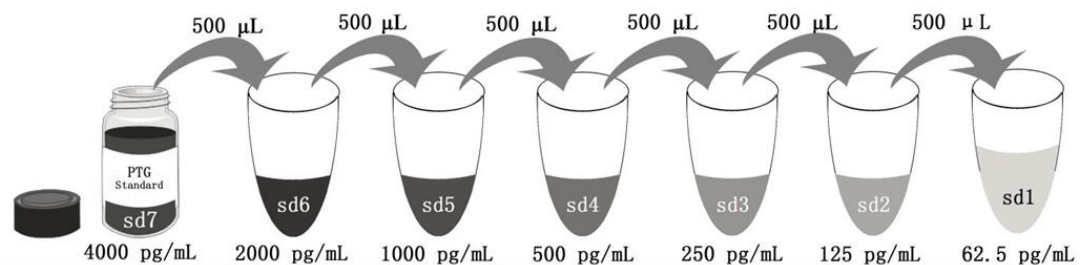
**7.2 Detection Antibody, HRP-conjugated(1X):** Dilute 100X Detection Antibody, HRP-conjugated 1:100 using Detection Diluent prior to assay. Suggested 1:100 dilution: 10  $\mu$ L 100X Detection Antibody, HRP-conjugated + 990  $\mu$ L Detection Diluent (Centrifuge the 100 X Detection Antibody solution, HRP-conjugated for a few seconds prior to use)

**7.3 Sample Dilution:** Different samples should be diluted with corresponding Sample Diluent, samples may require further dilution if the readout values are higher than the highest standard OD reading. Variations in sample collection, processing and storage may affect the results of the measurement.

Recommended Dilution for different sample types: 1:4,000 or 1:8,000 is recommended for human serum and plasma; 1:2 is recommended for cell culture supernatant and cell lysate.

### 7.4 Standard Serial Dilution:

For serum, plasma and cell culture supernatant, add 2 mL Sample Diluent PT 4B1 in protein standard; For cell lysate, add 2 mL Sample Diluent PT 3 in protein standard.



Add # $\mu$ L of Standard diluted in the previous step	—	500 $\mu$ L	500 $\mu$ L	500 $\mu$ L	500 $\mu$ L	500 $\mu$ L	500 $\mu$ L
# $\mu$ L of Sample Diluent PT 4B1 or PT 3	2000 $\mu$ L	500 $\mu$ L	500 $\mu$ L	500 $\mu$ L	500 $\mu$ L	500 $\mu$ L	500 $\mu$ L
	"sd7"	"sd6"	"sd5"	"sd4"	"sd3"	"sd2"	"sd1"

## 8. Assay Procedure Summary

Bring all reagents to room temperature before use (Detection antibody, HRP-conjugated can be used immediately). To avoid cross-contamination, change pipette tips between additions of each standard level, between sample additions, and between reagent additions. Also, use separate reservoirs for each reagent.

8.1 Take out the required number of microplate strips and return excess strips to the foil pouch containing the drying reagent pack and reseal; store at 4°C immediately. Microplate strips should be used in one week.

8.2 Preset the layout of the microplate, including control group, standard group and sample group, add 100 µL of each standard and sample to the appropriate wells. (Make sure sample addition is uninterrupted and completed within 5 to 10 minutes, it is recommended to assay all standards, controls, and samples in duplicate).

8.3 Seal plate with cover seal, pressing it firmly onto top of microwells. Incubate the plate for 120 minutes at 37°C.

### 8.4 Wash

1) Gently remove the cover seal. Discard the liquid from wells by aspirating or decanting. Remove any residual solution by tapping the plate a few times on fresh paper towels.

2) Wash 4 times with 1X Wash Buffer, using at least 350-400 µL per well. Following the last wash, firmly tap plates on fresh towels 10 times to remove residual Wash Buffer. Avoid getting any towel fibers in the wells or wells drying out completely.

8.5 Add 100 µL of 1X Detection antibody, HRP-conjugated solution (refer to Reagent Preparation 7.2) to each well. Seal plate with cover seal and incubate for 40 minutes at 37°C.

8.6 Repeat wash step in 8.4.

8.7 Signal development: Add 100 µL of TMB substrate solution to each well, protected from light. Incubate for 15 to 20 minutes. Substrate Solution should remain colorless until added to the plate.

8.8 Quenching color development: Add 100 µL of Stop Solution to each well in the same order as addition of the TMB substrate. Mix by tapping the side of the plate gently. NB: Avoid skin and eye contact with the Stop solution.

8.9 Read results: Immediately after adding Stop solution read the absorbance on a microplate reader at a wavelength of 450 nm. If possible, perform a double wavelength readout (450 nm and 630 nm).

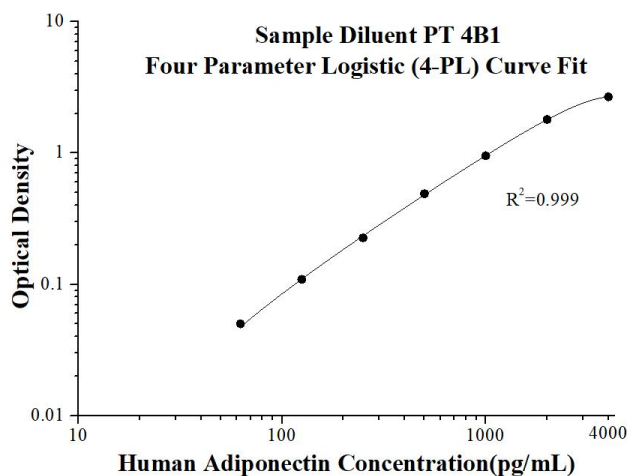
8.10 Data analysis: Calculate the average of the duplicate readings (OD value) for each standard and sample, and subtract the average of the zero standard absorbance. Construct a standard curve by plotting the mean absorbance for each standard on the y-axis against the concentration on the x-axis, use four-parameter logistic curve-fit (4-PL) analysis to do this. If the samples have been diluted, the OD readout from the standard curve must be multiplied by the dilution factor used.

Step	Reagent	Volume	Incubation	Wash	Notes
1	Standard and Samples	100 µL	120 min	4 times	Cover Wells incubate at 37°C
2	Diluent Detection antibody, HRP-conjugated Solution	100 µL	40 min	4 times	Cover Wells incubate at 37°C
3	TMB Substrate	100 µL	15-20 min	Do not wash	Incubate in the dark at 37°C
4	Stop Solution	100 µL	0 min	Do not wash	-
5	Read plate at 450 nm and 630 nm immediately after adding Stop solution. DO NOT exceed 5 minutes.				

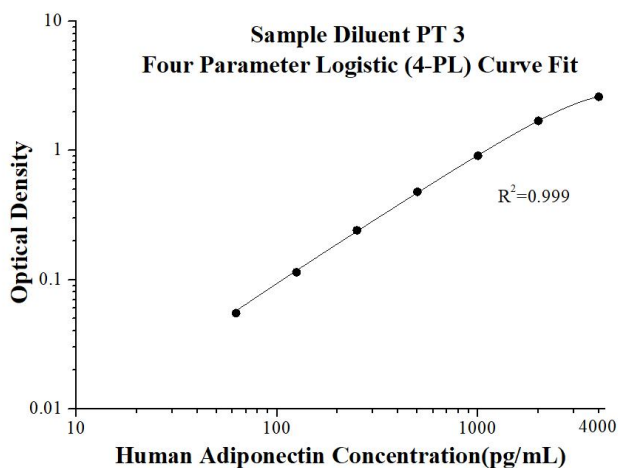
## 9. Validation Data

### 9.1 Standard curve

These standard curves are provided for demonstration only. A standard curve should be generated for each set of samples assayed.



(pg/mL)	O.D	Average	Corrected
0	0.024 0.025	0.024	-
62.5	0.076 0.073	0.075	0.050
125	0.134 0.134	0.134	0.109
250	0.256 0.246	0.251	0.226
500	0.521 0.508	0.514	0.490
1000	0.985 0.969	0.977	0.953
2000	1.810 1.836	1.823	1.799
4000	2.709 2.697	2.703	2.679



(pg/mL)	O.D	Average	Corrected
0	0.039 0.041	0.040	-
62.5	0.093 0.097	0.095	0.055
125	0.149 0.159	0.154	0.114
250	0.276 0.285	0.281	0.241
500	0.508 0.530	0.519	0.479
1000	0.918 0.984	0.951	0.911
2000	1.726 1.753	1.740	1.700
4000	2.645 2.647	2.646	2.606



## 9.2 Precision

**Intra-assay Precision** (Precision within an assay) Three samples of known concentration were tested 20 times on one plate to assess intra-assay precision.

**Inter-assay Precision** (Precision between assays) Three samples of known concentration were tested in 24 separate assays to assess inter-assay precision.

Intra-assay Precision					Inter-assay Precision				
Sample	n	Mean (pg/mL)	SD	CV%	Sample	n	Mean (pg/mL)	SD	CV%
1	20	1,942.2	78.6	4.0	1	24	1,981.1	131.0	6.6
2	20	468.8	20.8	4.4	2	24	477.8	23.5	4.9
3	20	126.4	6.5	5.2	3	24	125.9	8.8	7.0

## 9.3 Recovery

The recovery of human Adiponectin spiked to three different levels throughout the range of the assay in various matrices was evaluated.

Sample Type		Average% of Expected	Range (%)
Human serum	1:8,000	106	94-129
	1:16,000	103	96-116
Cell culture supernatant	1:2	116	110-127
	1:4	115	107-130
Cell lysate	1:2	86	71-107
	1:4	92	75-104

## 9.4 Sample values

**Human serum** - Human serum samples were evaluated for the presence of human Adiponectin in this assay.

Sample Type	Mean (ug/mL)	Range (ug/mL)
Human serum (n=16)	5.5	1.7-10.5

**Cell culture supernatant** - Human peripheral blood leukocytes(PBL) were cultured in RPMI and supplemented with 10% fetal bovine serum, 2mM L-glutamine, 100 U/mL penicillin, and 100 ug/mL streptomycin sulfate overnight. Aliquots of the cell culture supernatant were removed and assayed for levels of total human Adiponectin. No detectable levels were observed.

### Cell lysate

	Adiponectin (pg/mL)	Total protein (mg/mL)
HepG2	313.9	2.4
3T3-L1	225.8	3.4

## 9.5 Sensitivity

The minimum detectable dose of human Adiponectin is 1.9 pg/mL. This was determined by adding two standard deviations to the concentration corresponding to the mean O.D. of 20 zero standard replicates.

## 9.6 Linearity

To assess the linearity of the assay, cell culture supernatant samples and cell lysate samples were spiked with high concentrations of human Adiponectin and diluted with the appropriate **Sample Diluent** to produce samples with values within the dynamic range of the assay. Human serum samples were diluted with the appropriate **Sample Diluent** to produce samples with values within the dynamic range of the assay.

(Human serum was initially diluted 1:1,000.)

		Human serum (Sample Diluent PT 4B1)	Cell culture supernatant (Sample Diluent PT 4B1)	Cell lysate (Sample Diluent PT 3)
1:2	Average% of Expected	100	116	89
	Range (%)	-	113-118	83-100
1:4	Average% of Expected	96	104	88
	Range (%)	93-100	100-109	80-97
1:8	Average% of Expected	102	110	101
	Range (%)	97-112	106-114	97-107
1:16	Average% of Expected	104	106	96
	Range (%)	97-115	106-107	84-109

## 9.7 Specificity

This assay recognizes natural and recombinant human Adiponectin.

The following factors prepared at 50 ng/mL were assayed and exhibited no cross-reactivity or interference.

Recombinant human:

4-1BB

CD30 Ligand

CD27

APRIL

## 10. References

1. Y. Arita. et al. (1999). *Biochem Biophys Res Commun.* 257: 79-83.
2. T. Kadowaki. et al. (2005). *Endocr Rev.*26: 439-451.
3. H. Tilg. et al. (2005). *Expert Opin Ther Targets.* 9: 245-251.
4. T. Yamauchi. et al.(2003). *Nature.* 423: 762-769.