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Sunlong Medical™ Human DKK1 One-Step ELISA Kit

Catalog Number: One-EL505Hu
Size: 96 Test

Storage: 2-8℃/-20℃
Validity Period: 2-8℃: 6 months; -20℃: 12 months

Sensitivity: 27.9 pg/mL
Assay range: 78.1-5000 pg/mL (PT 4B1); 156.3-10000 pg/mL (PT 3)

For the quantitative detection of human DKK1 concentrations in serum, plasma, cell culture supernatant and cell

This package insert must be read entirely before using this product. For proper performance, follow the protocol provided with each individual kit.

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

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ASSAY PROCEDURE SUMMARY

1. Preset the layout of the microplate, including control group, standard group and sample group, 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.

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2. Add 50 µL standard or sample to appropriate wells. To avoid high background always add samples or standards to the well before the addition of antibody cocktail.

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3. Add 50 µL 1× Antibody Cocktail solution (refer to Reagent Preparation 7.2) to each well. Seal plate with cover seal and incubate at 37°C on a microplate thermostatic shaker set at 400 rpm for 1 hour (incubate at 37°C for 2 hours is recommended if thermostatic shaker is not available).

↓

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 1× 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.

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5. Add 100 µL TMB substrate solution to each well, protected from light. Incubate at 37°C on a microplate thermostatic shaker set at 400 rpm for 15 to 20 minutes. (Substrate Solution should remain colorless until added to the plate.)

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6. Add 100 µL Stop Solution to each well in the same order as addition of the TMB substrate. Note: Avoid skin and eye contact with the Stop solution.

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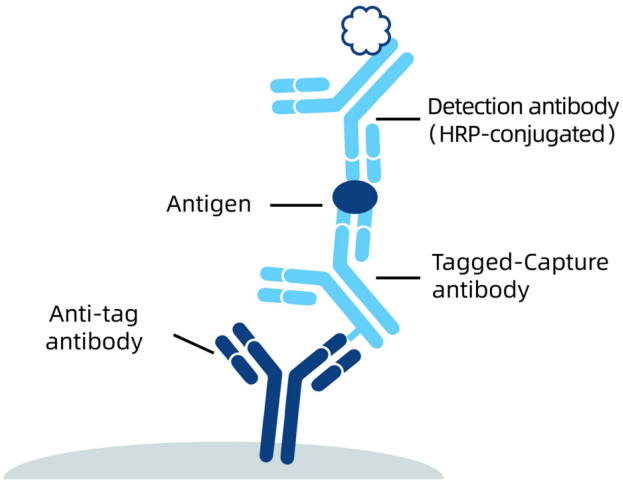
7. Read results immediately on a microplate reader at a wavelength of 450 nm. If possible, perform a double wavelength readout (450 nm and 630 nm).

DESCRIPTION

Dickkopf-1 (DKK1) is a well-characterized Wnt inhibitor and component of the Wnt/β-catenin signaling pathway, whose dysregulation is associated with multiple abnormal pathologies including osteoporosis, Alzheimer's disease, diabetes, and various cancers. The Wnt signaling pathway has fundamental roles in cell fate determination, cell proliferation, and survival; thus, its mis-regulation can lead to disease. Although DKK1 is involved in other signaling pathways, including the β-cateninindependent Wnt pathway and the DKK1/CKAP4 pathway, the inhibition of DKK1 to propagate Wnt/β-catenin signals has been validated as an effective way to treat related diseases.

PRINCIPLE OF THE ASSAY

An anti-tag antibody is pre-coated onto the bottom of wells. After adding antigen or samples, Tagged-Capture antibody and HRP-conjugated detection antibody, a sandwich complex is formed in the solution. TMB acts as a HRP substrate, and the solution color will change from colorless to blue. A stop solution containing sulfuric acid turns the 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.



LIMITATIONS OF THE PROCEDURE

- FOR RESEARCH USE ONLY. NOT FOR USE IN DIAGNOSTIC PROCEDURES.
- Do not use expired kit or reagents.
- Do not mix or substitute reagents or materials from other kit lots or other sources.
- If concentration of assayed factor in samples is higher than the highest standard, dilute the samples with the appropriate Sample Diluent and reanalyze.
- Any variation in testing personnel, sample preparation, standard dilution, pipetting technique, washing techniques, incubation time, temperature, kit age and equipment can cause variation in results.
- This assay is designed to eliminate interference by factors present in biological samples. Until all factors have been tested in the ELISA immunoassay, the possibility of interference cannot be excluded.

MATERIALS PROVIDED (96 Test)

Unopened kit should be stored at 2 - 8°C.

- **Microplate:** 96 well microplate precoated an anti-tag antibody (8 well × 12 strips) (1 plate)
- **Protein standard:** 10000 pg/bottle; lyophilized (2 bottles)
- **Capture Antibody (100×):** 60 uL/vial* (1 vial)
- **Detection antibody, HRP-Conjugated (100×):** 60 uL/vial* (1 vial)

- **Sample Diluent PT 3:** 30 mL/bottle; For human serum and plasma. (1 bottle)
- **Sample Diluent PT 4B1:** 30 mL/bottle; For cell culture supernatant and cell lysate. (1 bottle)
- **Detection Diluent PT PB1:** 15 mL/bottle (1 bottle)
- **Wash Buffer Concentrate (20×):** 30 mL/bottle (1 bottle)
- **Extraction Reagent:** 15 mL/bottle (1 bottle)
- **Tetramethylbenzidine Substrate (TMB):** 12 mL/bottle (1 bottle)
- **Stop Solution:** 12 mL/bottle (1 bottle)
- Plate Cover Seals (4 pieces)

STORAGE

Store kit reagents between 2 and 8℃. Immediately after use remaining reagents should be returned to cold storage (2 to 8℃). Expiration date of the kit and reagents is stated on the labels.

Expiration date of the kit components can only be guaranteed if the components are stored properly.

	Condition
Unopened kit	Store at 2 - 8℃ for 6 months or -20℃ for 12 months. (See expiration date on the label.)
Opened kit	All reagents stored at 2 - 8℃ for 7 days. Please use a new standard for each assay.

OTHER SUPPLIES REQUIRED

- A microplate reader capable of measuring absorbance at 450 nm with the correction wavelength set at 630 nm.
- Calibrated, adjustable precision pipettes and disposable plastic tips. A manifold multi-channel pipette is recommended for large assays.
- Plate washer: automated or manual.
- Absorbent paper towels.
- Glass or plastic tubes to prepare standard and sample dilutions.
- Beakers and graduated cylinders.
- 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.
- Microplate thermostatic shaker.

PRECAUTION

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

TECHNICAL HINTS

- Bring all reagents to room temperature before use.
- 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.
- When using an automated plate washer, adding a 30 second soak period before washing step and/or rotating the plate between wash steps may improve assay precision.
- To ensure accurate results, proper adhesion of plate sealers during incubation steps is necessary.

- Substrate Solution should remain colorless until added to the plate. Keep Substrate Solution protected from light. Substrate Solution should change from colorless to gradations of blue.
- Stop Solution should be added to the plate in the same order as the Substrate Solution.
- The color developed in the wells will turn from blue to yellow upon addition of the Stop Solution. Wells that are green in color indicate that the Stop Solution has not mixed thoroughly with the Substrate Solution.
- It is recommended that all samples and standards be assayed in duplicate.

SAMPLE COLLECTION AND STORAGE

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℃. Avoid repeated freeze-thaw cycles.

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℃. Avoid repeated freeze-thaw cycles.

Cell Culture Supernatant

Remove particulates by centrifugation for 5 minutes at 500xg and assay immediately or aliquot and store samples at ≤ -20℃. Avoid repeated freeze-thaw cycles.

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 x 107 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℃. 6) Measure the concentration of total protein in cell lysate using BCA assay. Where possible, keep samples on ice to avoid protein degradation.

REAGENT PREPARATION

Bring all reagents and samples to room temperature before use. If crystals have formed in the Wash Buffer Concentrate, warm to room temperature and mix gently until the crystals have completely dissolved.

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.

Antibody Cocktail (1X)

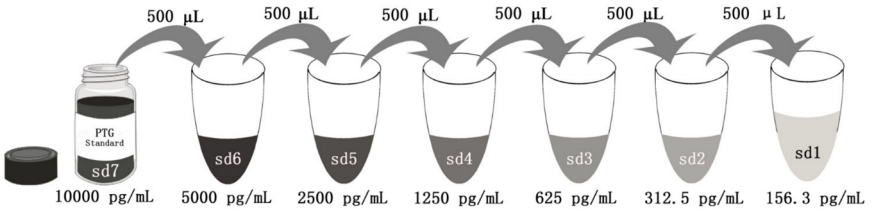
Dilute 100X capture antibody and 100X HRP-conjugated detection antibody using Detection Diluent prior to assay. Suggested 1:100 dilution: 50 uL 100X capture antibody + 50 uL 100X Detection Antibody, HRP-conjugated + 4,900 uL Detection Diluent. Mix gently but thoroughly.

Sample Dilution

Different samples should be diluted with corresponding Sample Diluent. The minimum required dilution factor was 1:2; consequently, no more than 25 uL of undiluted sample was added per well. 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: 1:2 is recommended for human serum and plasma; 1:400 or 1:800 is recommended for cell culture supernatant; 1:50 or 1:100 is recommended for cell lysate.

Standard Serial Dilution

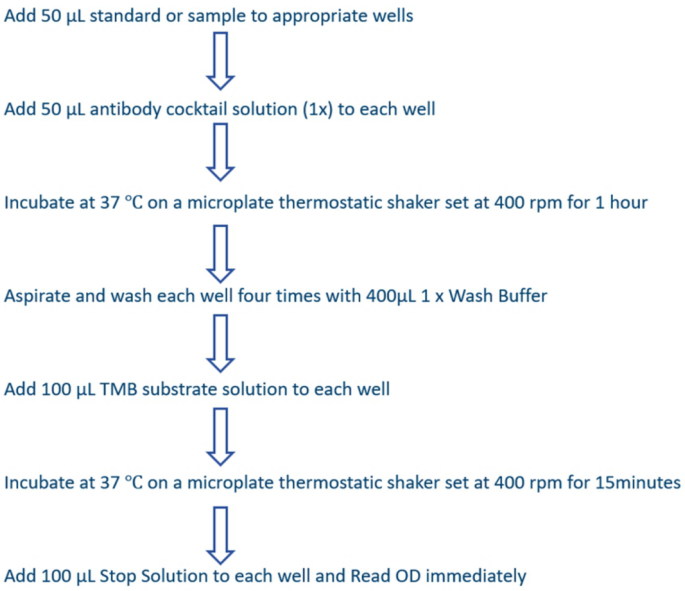
For human serum and plasma, add 1 mL Sample Diluent PT 3 in protein standard. For cell culture supernatant and cell lysate, add 2 mL Sample Diluent PT 4B1 in protein standard.



Add # µL of Standard diluted in the previous step	—	500 µL	500 µL	500 µL	500 µL	500 µL	500 µL
# µL of Sample Diluent PT 3	**1000 µL**	500 µL	500 µL	500 µL	500 µL	500 µL	500 µL
	"sd7"	"sd6"	"sd5"	"sd4"	"sd3"	"sd2"	"sd1"

ASSAY PROCEDURE

Bring all reagents to room temperature before use (Detection antibody, HRP-conjugated antibody 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.



1. Preset the layout of the microplate, including control group, standard group and sample group, 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.

2. Add 50 µL standard or sample to appropriate wells. To avoid high background always add samples or standards to the well before the addition of antibody cocktail.

3. Add 50 µL 1× Antibody Cocktail solution (refer to Reagent Preparation 7.2) to each well. Seal plate with cover seal and incubate at 37°C on a microplate thermostatic shaker set at 400 rpm for 1 hour (incubate at 37°C for 2 hours is recommended if thermostatic shaker is not available).

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 1× 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.

5. Add 100 µL TMB substrate solution to each well, protected from light. Incubate at 37°C on a microplate thermostatic shaker set at 400 rpm for 15 to 20 minutes. (Substrate Solution should remain colorless until added to the plate.)

6. Add 100 µL Stop Solution to each well in the same order as addition of the TMB substrate. Note: Avoid skin and eye contact with the Stop solution.

7. Read results immediately on a microplate reader at a wavelength of 450 nm. If possible, perform a double wavelength readout (450 nm and 630 nm).

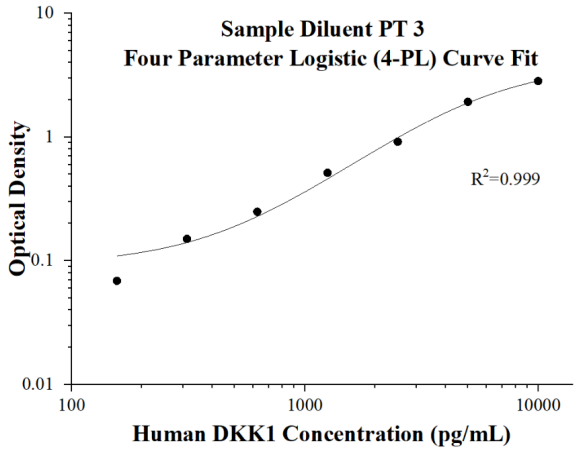
CALCULATION OF RESULTS

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, four-parameter logistic curvefit (4-PL) analysis is recommend. If the samples have been diluted, the fitting result must be multiplied by the dilution factor used.

TYPICAL DATA

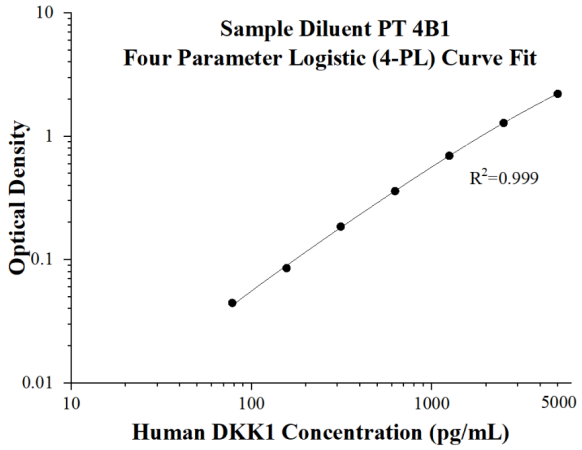
These standard curves are provided for demonstration only. A standard curve should be generated for each set of samples assayed.

Standard curve 1



(pg/mL)	O.D.	Average	Corrected
0	0.0425 0.0224	0.0325	-
156.3	0.1013 0.1013	0.1013	0.0689
312.5	0.1932 0.1719	0.1826	0.1501
625	0.2838 0.2799	0.2819	0.2494
1250	0.5187 0.5722	0.5455	0.5130
2500	0.9684 0.9302	0.9493	0.9169
5000	2.0519 1.8701	1.9610	1.9286
10000	2.873 2.8608	2.8669	2.8345

Standard curve 2



(pg/mL)	O.D.	Average	Corrected
0	0.0676 0.0634	0.0655	-
78.1	0.1188 0.1013	0.1101	0.0446
156.3	0.1584 0.1436	0.1510	0.0855
312.5	0.2776 0.2242	0.2509	0.1854
625	0.4654 0.3858	0.4256	0.3601
1250	0.8746 0.6498	0.7622	0.6967
2500	1.421 1.2799	1.3505	1.2850
5000	2.3282 2.2393	2.2838	2.2183

SENSITIVITY

The minimum detectable dose of human DKK1 is 27.9 pg/mL. This was determined by adding two standard deviations to the concentration corresponding to the mean O.D. of 20 zero standard replicates.

PRECISION

Intra-assay Precision (Precision within an assay) Three samples of known concentration were tested 8 times on one plate to assess intra-assay precision. Inter-assay Precision (Precision between assays) Three samples of known concentration were tested in 16 separate assays to assess inter-assay precision.

Intra-assay Precision

Sample	n	Mean (pg/mL)	SD	CV%
1	8	2,623.4	88.9	3.4
2	8	648.4	16.1	2.5
3	8	308.3	21.3	6.9

Inter-assay Precision

Sample	n	Mean (pg/mL)	SD	CV%
1	16	2,691.7	135.2	5.0
2	16	643.5	21.0	3.3
3	16	307.7	17.5	5.7

RECOVERY

The recovery of human DKK1 spiked to three different levels throughout the range of the assay in various matrices was evaluated.

Sample Type		Average% of Expected	Range (%)
Human serum	1:2	109	97-117
	1:4	106	102-109
Cell culture supernatant	1:1,600	91	81-97
	1:3,200	106	99-112
Cell lysate	1:400	116	114-119

LINEARITY

To assess the linearity of the assay, samples were diluted with the appropriate Sample Diluent to produce samples with values within the dynamic range of the assay. (The cell culture supernatant was initially diluted 1:200. The cell lysate was initially diluted 1:25.)

		Human serum (Sample Diluent PT 3)	Cell culture supernatant (Sample Diluent PT 4B1)	Cell lysate (Sample Diluent PT 4B1)
1:2	Average% of Expected	100	100	100
	Range (%)	-	-	-
1:4	Average% of Expected	105	92	94
	Range (%)	101-109	88-95	88-99
1:8	Average% of Expected	91	99	107
	Range (%)	70-112	97-101	106-108
1:16	Average% of Expected	96	112	111
	Range (%)	83-110	97-127	109-114

CALIBRATION

This immunoassay is calibrated against a highly purified recombinant **human DKK1** produced at Sunlong Medical™.

SAMPLE VALUES

Human serum - human serum samples were evaluated for the presence of human DKK1 in this assay. Cell culture supernatant: PC-3 human prostate cancer cells were cultured in RPMI media supplemented with 10% fetal bovine serum, 2.5 mM L- glutamine, 100 U/mL penicillin, and 100 ug/mL streptomycin sulfate for 3 days. An aliquot of the cell culture supernate was removed, assayed for human DKK1, and measured 1,630.0 ng/mL. PC-3 human prostate cancer cells were cultured in RPMI media supplemented with 10% fetal bovine serum until confluent, then changed to serum-free RPMI media for 3 days prior to conditioned media harvest. An aliquot of the cell culture supernate was removed, assayed for human DKK1, and measured 681.8 ng/mL. HT-1080 human fibrosarcoma cells were cultured in RPMI media supplemented with 10% fetal bovine serum until confluent, then changed to serum-free RPMI media for 2 days prior to conditioned media harvest. An aliquot of the cell culture supernate was removed and assayed for human DKK1. No detectable levels were observed. Cell lysate

Sample Type	Mean (pg/mL)	Range (pg/mL)
Human serum (n=15)	1,341.2	28.3-6,687.8
	Human DKK1 (ng/mL)	**Total protein (mg/mL)**
PC-3 cell lysate	269.1	1.2
A549 cell lysate	114.7	1.2

SPECIFICITY

This kit specifically recognizes native and recombinant human DKK1.

PLATE LAYOUT

	1	2	3	4	5	6	7	8	9	10	11	12
A												
B												
C												
D												
E												
F												
G												
H												