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Sunlong Medical™ Human Carbonic Anhydrase IX/CA9 One-Step ELISA Kit

Catalog Number: One-EL086Hu
Size: 96 Test

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

Sensitivity: 6.5 pg/mL
Assay range: 31.25-2000 pg/mL

For the quantitative detection of human Carbonic Anhydrase IX/CA9 concentrations in serum, plasma, cell culture

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.

TABLE OF CONTENTS

ASSAY PROCEDURE SUMMARY 1

Introduction

Description 2

Principle of the Assay 2

Limitations of the Procedure 2

General Information

Materials Provided 2

Storage 3

Other Supplies Required 3

Precaution 3

Technical Hints 3

Assay Protocol

Sample Collection and Storage 4

Reagent Preparation 4

Assay Procedure 5

Analysis

Calculation of Results 6

Typical Data 6

Sensitivity 7

Precision 7

Recovery 8

Linearity 8

Calibration 8

Sample Values 8

Specificity 9

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℃ on a microplate thermostatic shaker set at 400 rpm for 1 hour (incubate at 37℃ for 2 hours is recommended if thermostatic shaker is not available).

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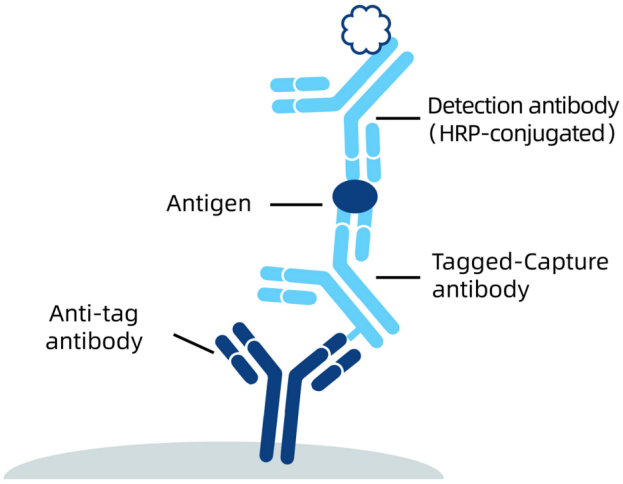
7. Read results immediately on a microplate reader at a wavelength of 450 nm. If possible, perform a double wavelength readout (450 nm and 630 nm).

DESCRIPTION

CA9 (Carbonic anhydrase 9) may be involved in the control of cell proliferation and transformation and appears to be a novel specific biomarker for a cervical neoplasia. It is a tumor-associated antigen that has been shown to have diagnostic utility in identifying cervical dysplasia and carcinoma. The protein is presentboth on the plasma membrane and in the nucleus of cells and has the molecular. Under hypoxic conditions, CA9 expression increases, helping cells adapt to the acidic environment.

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:** 4000 pg/bottle; lyophilized (2 bottles)
- **Capture antibody (100×):** 60 µL/vial* (1 vial)
- **Detection antibody, HRP-conjugated (100×):** 60 µL/vial* (1 vial)
- **Sample Diluent PT 4B1:** 30 mL/bottle. For human serum and plasma. (1 bottle)
- **Sample Diluent PT 6:** 30 mL/bottle. For cell culture supernatant and urine. (1 bottle)

- **Detection Diluent:** 15 mL/bottle (1 bottle)
- **Wash Buffer Concentrate (20×):** 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)

STORAGE

Store kit reagents between 2 and 8°C. Immediately after use remaining reagents should be returned to cold storage (2 to 8°C). 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°C for 6 months or -20°C for 12 months. (See expiration date on the label.)
Opened kit	All reagents stored at 2 - 8°C 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.

Urine

Collect urine samples and centrifuge for 20 minutes at 1000xg. Collect the aqueous layer, assay immediately or aliquot and store samples at ≤ -20℃. Avoid repeated freeze-thaw cycles.

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)

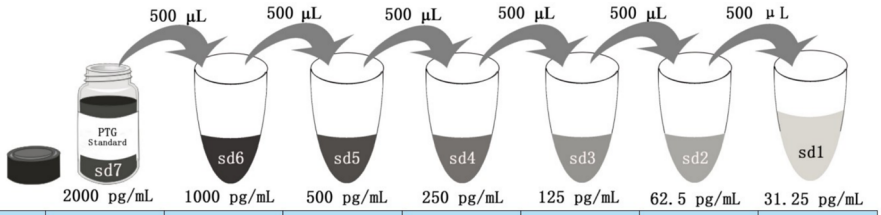
Dilute 100X capture antibody and 100X HRP-conjugated detection antibody using Detection Diluent prior to assay. Suggested 1:100 dilution: 50 µL 100X capture antibody + 50 µL 100X Detection Antibody, HRP-conjugated + 4,900 µL Detection Diluent. Mix gently but thoroughly.

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: 1:2 is recommended for human serum, plasma and urine; 1:40 or 1:80 is recommended for cell culture supernatant.

Standard Serial Dilution

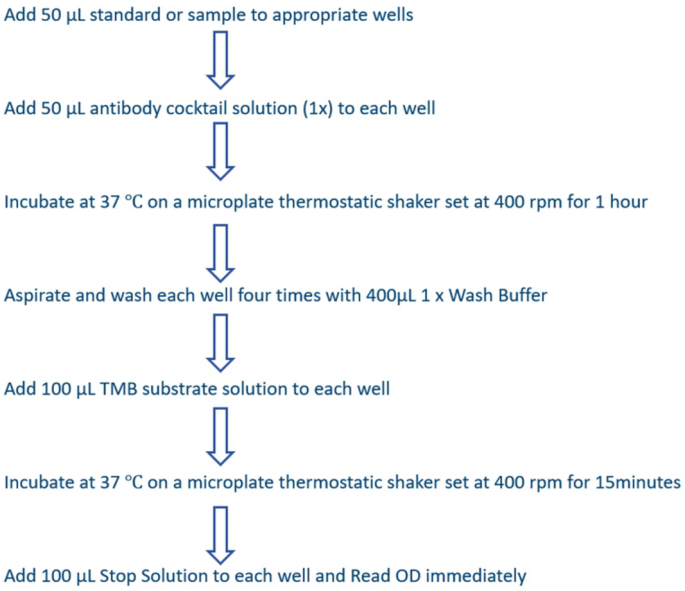
For human serum and plasma, add 2 mL Sample Diluent PT 4B1 in protein standard. For cell culture supernatant and urine, add 2 mL Sample Diluent PT 6 in protein standard.



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 4B1 or PT 6	**2000 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).

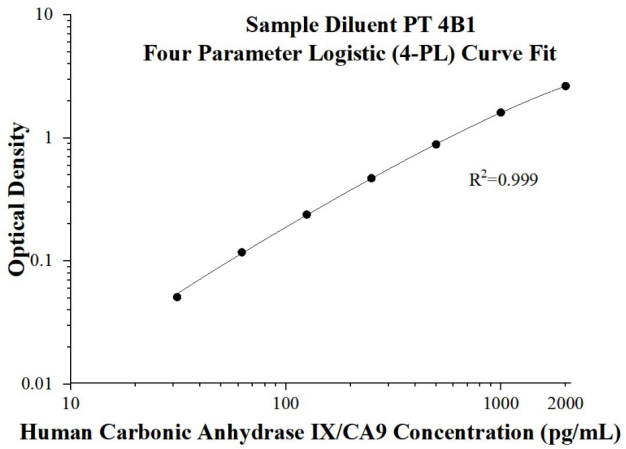
CALCULATION OF RESULTS

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

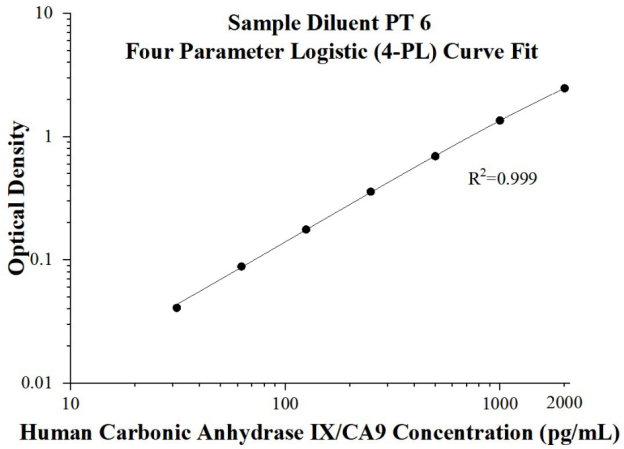
These standard curves are provided for demonstration only. A standard curve should be generated for each set of samples assayed.

Standard curve 1



(pg/mL)	O.D.	Average	Corrected
0	0.0931 0.1014	0.09725	-
31.25	0.1535 0.1428	0.14815	0.0509
62.5	0.2129 0.2172	0.21505	0.1178
125	0.3335 0.3382	0.33585	0.2386
250	0.5671 0.5691	0.5681	0.47085
500	0.9878 0.9817	0.98475	0.8875
1000	1.7074 1.7063	1.70685	1.6096
2000	2.7093 2.7741	2.7417	2.64445

Standard curve 2



(pg/mL)	O.D.	Average	Corrected
0	0.0908 0.0887	0.08975	-
31.25	0.1321 0.1291	0.1306	0.04085
62.5	0.1789 0.1776	0.17825	0.0885
125	0.2681 0.2652	0.26665	0.1769
250	0.4507 0.446	0.44835	0.3586
500	0.7919 0.7779	0.7849	0.69515
1000	1.448 1.4459	1.44695	1.3572
2000	2.5618 2.5665	2.56415	2.4744

SENSITIVITY

The minimum detectable dose of human Carbonic Anhydrase IX/CA9 is 6.5 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	1,133.5	25.4	2.2
2	8	283.4	9.2	3.2
3	8	145.5	7.1	4.9

Inter-assay Precision

Sample	n	Mean (pg/mL)	SD	CV%
1	16	1,096.2	52.1	4.8
2	16	278.8	10.9	3.9
3	16	140.6	8.5	6.0

RECOVERY

The recovery of human Carbonic Anhydrase IX/CA9 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	82	79-86
	1:16	93	85-98
Urine	1:2	109	102-116
Cell culture supernatant	1:320	90	85-97

LINEARITY

To assess the linearity of the assay, urine samples were spiked with high concenthumanions of human Carbonic Anhydrase IX/CA9 in various matrices and diluted with the appropriate Sample Diluent to produce samples with values within the dynamic range of the assay. To assess the linearity of the assay, human serum and cell culture supernatant 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 1:20.)

		Human serum (Sample Diluent PT 4B1)	Urine (Sample Diluent PT 6)	Cell culture supernatant (Sample Diluent PT 6)
1:2	Average% of Expected	100	104	100
	Range (%)	-	104-105	-
1:4	Average% of Expected	106	98	118
	Range (%)	96-117	98-98	116-119
1:8	Average% of Expected	100	92	77
	Range (%)	75-126	92-93	70-83
1:16	Average% of Expected	95	79	101
	Range (%)	76-114	77-80	98-104

CALIBRATION

This immunoassay is calibrated against a highly purified recombinant **human Human Carbonic Anhydrase IX/CA9 One-Step ELISA Kit** produced at Sunlong Medical™.

SAMPLE VALUES

Human serum - human serum samples were evaluated for the presence of human Carbonic Anhydrase IX/CA9 in this assay. ND*=Non-detectable

Urine - Eight samples were evaluated for detectable levels of human Carbonic Anhydrase IX/CA9 in this assay. All samples measured less than the lowest standard, 31.25 pg/mL. No medical histories were available for the donors used in this study.

Cell culture supernatant - HT-29 human colorectal cancer cells were cultured in DMEM supplemented with 10% fetal bovine serum, 2.5 mM L-glutamine, 100 U/mL penicillin, and 100 µg/mL streptomycin sulfate. An aliquot of the cell culture supernate was removed, assayed for human Carbonic Anhydrase IX/CA9, and measured 15,712.0 pg/mL.

Sample Type	Mean (pg/mL)	% Detectable	Range (pg/mL)
Human serum (n=16)	128.5	31	ND-738.9

SPECIFICITY

This kit specifically recognizes native and recombinant human Carbonic Anhydrase IX/CA9.

PLATE LAYOUT

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