ab125961 – Human HDL ELISA Kit

Instructions for Use

For the quantitative measurement of Human HDL in plasma, serum, milk, cell lysate, and tissue samples.

This product is for research use only and is not intended for diagnostic use.

Version 6b Last Updated 9 January 2024

Table of Contents

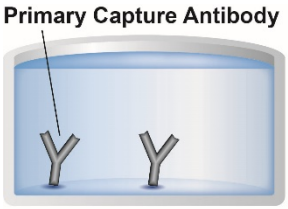
1. BACKGROUND

Abcam's High-Density Lipoprotein (HDL) Human *in vitro* competitive ELISA (Enzyme-Linked Immunosorbent Assay) kit is designed for the quantitative measurement of Human HDL in plasma, serum, and milk sample.

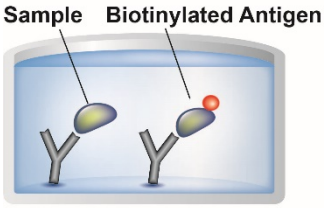
A HDL specific antibody has been precoated onto 96-well plates and blocked. Standards or test samples are added to the wells and subsequently biotinylated HDL is added and then followed by washing with wash buffer. Streptavidin-Peroxidase Complex is added and unbound conjugates are washed away with wash buffer. TMB is then used to visualize Streptavidin-Peroxidase enzymatic reaction. TMB is catalyzed by Streptavidin-Peroxidase to produce a blue color product that changes into yellow after adding acidic stop solution. The density of yellow coloration is inversely proportional to the amount of HDL captured in plate.

Human high-density lipoprotein (HDL) is the smallest and the densest of the discoidal and spherical lipoprotein particles. When fractionated by ultracentrifugation, HDL is separated into two major sub-fractions HDL2 (d 1.063 – 1.125 g/mL) and HDL3 (d 1.125 – 1.21 g/mL). It contains 70% of apolipoprotein A-I, 20% of apolipoprotein A-II, phospholipids, and free cholesterol. HDL delivers cholesterol to liver cells which then secrete bile acids and cholesterol for excretion or re-utilization. HDL plays important anti-atherogenic roles, including cellular cholesterol efflux capacity, anti-oxidative, anti-inflammatory, antiapoptotic, vasodilatory, antithrombotic, and anti-infectious activities. Low plasma HDL cholesterol is an independent risk factor for the development of premature atherosclerosis. A rare form of genetic HDL deficiency is Tangier disease which is associated with mutations in the ATP-binding cassette transporter 1 gene.

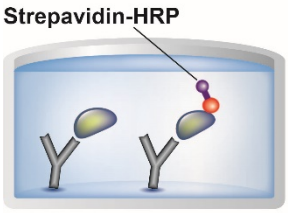
2. ASSAY SUMMARY



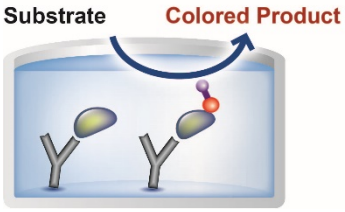
Prepare all reagents, samples and standards as instructed.



Add standard or sample to each well used and add prepared biotin protein to each well. Incubate at room temperature.



Wash and add prepared Streptavidin-Peroxidase Conjugate. Incubate at room temperature.



Wash and add Chromogen Substrate to each well. Incubate at room temperature. Add Stop Solution to each well. Read immediately.

3. PRECAUTIONS

Please read these instructions carefully prior to beginning the assay.

Modifications to the kit components or procedures may result in loss of performance.

4. STORAGE AND STABILITY

Store kit at 4°C immediately upon receipt, apart from the SP Conjugate & Biotinylated Protein, which should be stored at -20°C.

Refer to list of materials supplied for storage conditions of individual components. Observe the storage conditions for individual prepared components in sections 9 & 10.

5. MATERIALS SUPPLIED

Item	Amount	Storage Condition (Before Preparation)
HDL Microplate (12 x 8 well strips)	96 wells	4°C
HDL Standard	1 vial	4°C
10X Diluent M Concentrate	30 mL	4°C
Biotinylated Human HDL (Lyophilized)	2 vial	-20°C
100X Streptavidin-Peroxidase Conjugate (SP Conjugate)	80 µL	-20°C
Chromogen Substrate	7 mL	4°C
Stop Solution	11 mL	4°C
20X Wash Buffer Concentrate	30 mL	4°C
Sealing Tapes	3	N/A

6. MATERIALS REQUIRED, NOT SUPPLIED

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

- 1 Microplate reader capable of measuring absorbance at 450 nm.
- Precision pipettes to deliver 1 µL to 1 mL volumes.
- Adjustable 1-25 mL pipettes for reagent preparation.
- 100 mL and 1 liter graduated cylinders.
- Absorbent paper.
- Distilled or deionized water.
- Log-log graph paper or computer and software for ELISA data analysis.
- 8 tubes to prepare standard or sample dilutions.

7. LIMITATIONS

- Do not mix or substitute reagents or materials from other kit lots or vendors.

8. TECHNICAL HINTS

- Samples generating values higher than the highest standard should be further diluted in the appropriate sample dilution buffers.
- Avoid foaming or bubbles when mixing or reconstituting components.
- Avoid cross contamination of samples or reagents by changing tips between sample, standard and reagent additions.
- Ensure plates are properly sealed or covered during incubation steps.
- Complete removal of all solutions and buffers during wash steps.
- **This kit is sold based on number of tests. A 'test' simply refers to a single assay well. The number of wells that contain sample, control or standard will vary by product. Review the protocol completely to confirm this kit meets your requirements. Please contact our Technical Support staff with any questions.**

9. REAGENT PREPARATION

Equilibrate all reagents to room temperature (18-25°C) prior to use. Prepare fresh reagents immediately prior to use. When diluting the concentrates, make sure to rinse the bottle thoroughly to extract any precipitates left in the bottle. Mix the 1x solution gently until the crystals have completely dissolved.

9.1 **1X Diluent M**

Dilute the 10X Diluent M Concentrate 1:10 with reagent grade water. Mix gently and thoroughly. *Store for up to 1 month at 4°C.*

9.2 **1X Wash Buffer**

Dilute the 20X Wash Buffer Concentrate 1:20 with reagent grade water. Mix gently and thoroughly.

9.3 **1X Biotinylated HDL**

Add 5 mL 1X Diluent M to the lyophilized Biotinylated HDL vial to generate the 1X Biotinylated HDL. Allow the vial of 1X Biotinylated HDL to sit for 10 minutes with gentle agitation prior to use. Reconstitute a new vial for each assay.

Any remaining solution should be frozen at -20°C.

9.4 **1X SP Conjugate**

Spin down the 100X Streptavidin-Peroxidase Conjugate (SP Conjugate) briefly and dilute the desired amount of the conjugate 1:100 with 1X Diluent M.

Any remaining solution should be frozen at -20°C.

10. STANDARD PREPARATIONS

- **Prepare serially diluted standards immediately prior to use. Always prepare a fresh set of standards for every use.**
- **Any remaining standard should be stored at -20°C after reconstitution and used within 30 days.**
- **This procedure prepares sufficient standard dilutions for duplicate wells.**

10.1 Reconstitution of the HDL Standard vial to prepare a 100 µg/mL HDL **Standard #1**:

10.1.1 First consult the HDL Standard vial to determine the mass of protein in the vial.

10.1.2 Calculate the appropriate volume of 1X Diluent M to add when resuspending the HDL Standard vial to produce a 100 µg/mL HDL **Standard #1** by using the following equation:

C_S = Starting mass of HDL Standard (see vial label) (µg)

C_F = The 100 µg/mL HDL **Standard #1** final required concentration

V_D = Required volume of 1X Diluent M for reconstitution (µL)

Calculate total required volume 1X Diluent M for resuspension:

$$(C_S / C_F) \times 1{,}000 = V_D$$

Example:

NOTE: This example is for demonstration purposes only. Please remember to check your standard vial for the actual amount of standard provided.

C_S = 1,600 µg of HDL Standard in vial

C_F = 100 µg/mL HDL **Standard #1** final concentration

V_D = Required volume of 1X Diluent M for reconstitution

(1,600 µg / 100 µg/mL) x 1,000 = 16,000 µL

10.1.3 First briefly spin the HDL Standard vial to collect the contents on the bottom of the tube.

10.1.4 Reconstitute the HDL Standard vial by adding the appropriate calculated amount V_D of 1X Diluent M to the vial to generate the 100 µg/mL HDL **Standard #1**. Mix gently and thoroughly.

10.2 Allow the reconstituted 100 µg/mL HDL **Standard #1** to sit for 10 minutes with gentle agitation prior to making subsequent dilutions

10.3 Label seven tubes #2 - 8.

10.4 Add 120 µL of 1X Diluent M to tube #2 – 8.

10.5 To prepare **Standard #2**, add 120 µL of the **Standard #1** into tube #2 and mix gently.

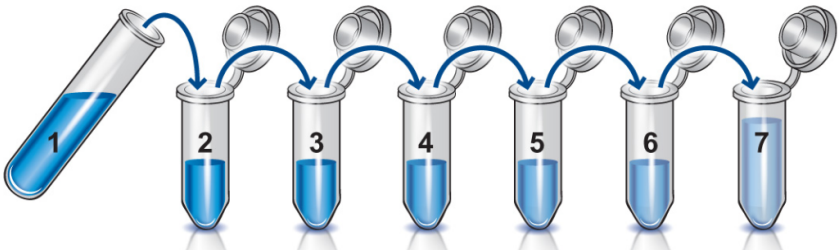
10.6 To prepare **Standard #3**, add 120 µL of the **Standard #2** into tube #3 and mix gently.

10.7 Using the table below as a guide, prepare subsequent serial dilutions.

10.8 1X Diluent M serves as the zero standard, 0 µg/mL (tube #8).

Standard Dilution Preparation Table

Standard #	Volume to Dilute (µL)	Volume Diluent M (µL)	Total Volume (µL)	Starting Conc. (µg/mL)	Final Conc. (µg/mL)
1	Step 10.1				100.0
2	120	120	240	100.0	50.0
3	120	120	240	50.0	25.0
4	120	120	240	25.0	12.50
5	120	120	240	12.50	6.25
6	120	120	240	6.25	3.125
7	120	120	240	3.125	1.563
8	-	120	120	-	0



11. SAMPLE PREPARATION

11.1 Milk

Collect milk using sample tube. Centrifuge samples at 800 x *g* for 10 minutes. Dilute milk samples 1:20 into 1X Diluent M and assay. The undiluted samples can be stored at -20°C or below for up to 3 months. Avoid repeated freeze-thaw cycles.

11.2 Plasma

Collect plasma using one-tenth volume of 0.1 M sodium citrate as an anticoagulant. Centrifuge samples at 3,000 x *g* for 10 minutes. Dilute samples 1:80 into 1X Diluent M and assay. The undiluted samples can be stored at -20°C or below for up to 3 months. Avoid repeated freeze-thaw cycles. (EDTA or Heparin can also be used as anticoagulant).

11.3 Serum

Samples should be collected into a serum separator tube. After clot formation, centrifuge samples at 3,000 x *g* for 10 minutes and remove serum and. Dilute samples 1:80 into 1X Diluent M and assay. The undiluted samples can be stored at -20°C or below. Avoid repeated freeze-thaw cycles.

12. 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 well plate strips should be returned to the plate packet and stored at 4°C.
- For statistical reasons, we recommend each sample should be assayed with a minimum of two replicates (duplicates).
- Well effects have not been observed with this assay. Contents of each well can be recorded on the template sheet included in the Resources section.

13. ASSAY PROCEDURE

- **Equilibrate all materials and prepared reagents to room temperature (18-25°C) prior to use.**
- **It is recommended to assay all standards, controls and samples in duplicate.**

13.1 Prepare all reagents, working standards and samples as instructed. Equilibrate reagents to room temperature before use. The assay is performed at room temperature (18-25°C).

13.2 Remove excess microplate strips from the plate frame and return them immediately to the foil pouch with desiccant inside. Reseal the pouch securely to minimize exposure to water vapor and store in a vacuum desiccator.

13.3 Add 25 µL of HDL Standard and/or sample per well, and immediately add 25 µL of Biotinylated HDL to each well (on top of the standard or sample) and tap plate to mix gently. Cover wells with a sealing tape and incubate for 2 hours at room temperature. Start the timer after the last sample addition.

13.4 Wash five times with 200 µL of 1X Wash Buffer manually. Invert the plate each time and decant the contents; tap it 4-5 times on absorbent paper towel to completely remove the liquid. If using a machine wash six times with 300 µL of 1X Wash Buffer and then invert the plate, decant the contents; tap it 4-5 times on absorbent paper towel to completely remove the liquid..

13.5 Add 50 µL of 1X SP Conjugate to each well and incubate for 30 minutes. Turn on the microplate reader and set up the program in advance.

13.6 Wash microplate as described above.

13.7 Add 50 µL of Chromogen Substrate per well and incubate in ambient light for 20 minutes or until the optimal blue colour density develops. Gently tap plate to ensure

thorough mixing and break the bubbles in the well with pipette tip.

13.8 Add 50 µL of Stop Solution to each well. The color will change from blue to yellow.

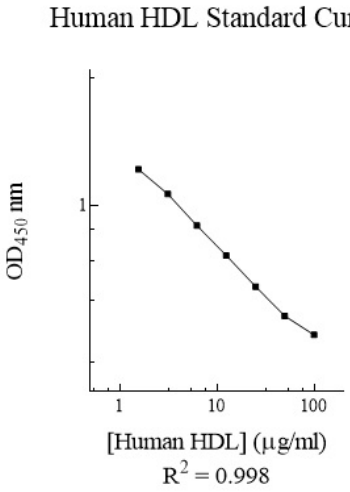
13.9 Read the absorbance on a microplate reader at a wavelength of 450 nm immediately. If wavelength correction is available, subtract readings at 570 nm from those at 450 nm to correct optical imperfections. Otherwise, read the plate at 450 nm only. Please note that some unstable black particles may be generated at high concentration points after stopping the reaction for about 10 minutes, which will reduce the readings.

14. CALCULATIONS

Calculate the mean value of the triplicate readings for each standard and sample. To generate a Standard Curve, plot the graph using the standard concentrations on the x-axis and the corresponding mean 450 nm absorbance on the y-axis. The best-fit line can be determined by regression analysis using log-log or four-parameter logistic curve-fit. Determine the unknown sample concentration from the Standard Curve and multiply the value by the dilution factor.

15. TYPICAL DATA

TYPICAL STANDARD CURVE – Data provided for demonstration purposes only. A new standard curve must be generated for each assay performed.



16. TYPICAL SAMPLE VALUES

SENSITIVITY –

The minimum detectable dose of HDL is typically 1.0 µg/mL.

RECOVERY –

Standard Added Value: 6.25 – 50 µg/mL

Recovery %: 85 – 110.

Average Recovery %: 96

LINEARITY OF DILUTION –

Plasma Dilution	Average % Expected Value
1:40	109
1:80	92
1:160	102

Serum Dilution	Average % Expected Value
1:40	110
1:80	98
1:160	94

PRECISION –

	Intra-Assay	Inter-Assay
% CV	5.8	10.3

17. ASSAY SPECIFICITY

Species	% Cross Reactivity
Canine	10
Bovine	10
Equine	40
Monkey	70
Mouse	20
Rat	20
Swine	50
Rabbit	10
Proteins	**% Cross Reactivity**
LDL	3
IDL	< 10
VLDL	< 10

18. TROUBLESHOOTING

Problem	Cause	Solution
Poor standard curve	Improper standard dilution	Confirm dilutions made correctly
	Standard improperly reconstituted (if applicable)	Briefly spin vial before opening; thoroughly resuspend powder (if applicable)
	Standard degraded	Store sample as recommended
	Curve doesn't fit scale	Try plotting using different scale
Low signal	Incubation time too short	Try overnight incubation at 4°C
	Target present below detection limits of assay	Decrease dilution factor; concentrate samples
	Precipitate can form in wells upon substrate addition when concentration of target is too high	Increase dilution factor of sample
	Using incompatible sample type (e.g. serum vs. cell extract)	Detection may be reduced or absent in untested sample types
	Sample prepared incorrectly	Ensure proper sample preparation/dilution
Large CV	Bubbles in wells	Ensure no bubbles present prior to reading plate
	All wells not washed equally/thoroughly	Check that all ports of plate washer are unobstructed wash wells as recommended
	Incomplete reagent mixing	Ensure all reagents/master mixes are mixed thoroughly
	Inconsistent pipetting	Use calibrated pipettes and ensure accurate pipetting
	Inconsistent sample preparation or storage	Ensure consistent sample preparation and optimal sample storage conditions (eg. minimize freeze/thaws cycles)

Problem	Cause	Solution
High background/ Low sensitivity	Wells are insufficiently washed	Wash wells as per protocol recommendations
	Contaminated wash buffer	Make fresh wash buffer
	Waiting too long to read plate after adding STOP solution	Read plate immediately after adding STOP solution
	Improper storage of ELISA kit	Store all reagents as recommended. Please note all reagents may not have identical storage requirements.
	Using incompatible sample type (e.g. Serum vs. cell extract)	Detection may be reduced or absent in untested sample types

19. NOTES

Technical Support

For all technical or commercial enquiries please go to:
www.abcam.com/contactus
www.abcam.cn/contactus (China)
www.abcam.co.jp/contactus (Japan)