



# AssayMax Human Leptin ELISA Kit

Catalog No. EL2001-1

## Introduction

Leptin, a 16-kDa protein secreted from white adipocytes, has been implicated in the regulation of food intake, energy expenditure, and whole-body energy balance in rodents and humans (1). Leptin has been a potential target for treating obesity. The plasma insulin response appears more closely associated with the plasma leptin concentration (2).

Neonatal leptin levels are strongly associated with female gender, birth length, and formula feeding (3). Leptin concentrations were higher in women than in men. In women, serum leptin was the most important predictor of myocardial infarction (MI) (4). In patients with angiographically confirmed coronary atherosclerosis, leptin is a novel predictor of future cardiovascular events independent of other risk factors, including lipid status and CRP (5). Leptin may also play an important role in the pathophysiology of osteoarthritis (OA) (6).

## Principal of the Assay

The AssayMax Human Leptin ELISA kit is designed for detection of human leptin in plasma, serum and cell culture supernatants. This assay employs a quantitative sandwich enzyme immunoassay technique that measures leptin in less than 5 hours. A murine monoclonal antibody specific for leptin has been pre-coated onto a microplate. Leptin in standards and samples is sandwiched by the immobilized antibody and a biotinylated polyclonal antibody specific for leptin, which is recognized by a streptavidin-peroxidase conjugate. All unbound material is then washed away and a peroxidase enzyme substrate is added. The color development is stopped and the intensity of the color is measured.

## Caution and Warning

- This kit is for research use only.
- The kit should not be used beyond the expiration date.
- The Stop Solution is an acid solution.

## Reagents

- **Leptin Microplate:** A 96-well polystyrene microplate (12 strips of 8 wells) coated with a monoclonal antibody against Leptin.
- **Sealing Tapes:** Each kit contains 3 pre-cut, pressure-sensitive sealing tapes that can be cut to fit the format of the individual assay.
- **Leptin Standard:** Human Leptin in a buffered protein base (64 ng, lyophilized).
- **Biotinylated Leptin Antibody (50x):** A 50-fold concentrated biotinylated polyclonal antibody against human leptin (140 µl).

- **MIX Diluent Concentrate (10x):** A 10-fold concentrated buffered protein base (30 ml).
- **Wash Buffer Concentrate (20x):** A 20-fold concentrated buffered surfactant (30 ml).
- **Streptavidin-Peroxidase Conjugate (SP Conjugate):** A 100-fold concentrate (80 µl).
- **Chromogen Substrate:** A ready-to-use stabilized peroxidase chromogen substrate tetramethylbenzidine (8 ml).
- **Stop Solution:** A 0.5 N hydrochloric acid to stop the chromogen substrate reaction (12 ml).

## Storage Condition

- Store kit at 2-8<sup>0</sup>C or -20<sup>0</sup>C upon arrival up to the expiration date.
- Opened MIX Diluent may be stored for up to 1 month at 2-8<sup>0</sup>C. Store reconstituted reagents at -20<sup>0</sup>C or below.
- Opened unused strip wells may return to the foil pouch with the desiccant pack, reseal along zip-seal. May be stored for up to 1 month in a vacuum desiccator.

## Other Supplies Required

- Microplate reader capable of measuring absorbance at 450 nm
- Pipettes (1-20 µl, 20-200 µl, 200-1000 µl and multiple channel)
- Deionized or distilled reagent grade water

## Sample Collection, Preparation and Storage

- **Plasma:** Collect plasma using one-tenth volume of 0.1 M sodium citrate as an anticoagulant. Centrifuge samples at 2000 x g for 10 minutes and assay. Dilute samples 1:8 with MIX Diluent. Store the remaining samples at -20<sup>0</sup>C or below. Avoid repeated freeze-thaw cycles. (EDTA or Heparin can also be used as anticoagulant.)
- **Serum:** Samples should be collected into a serum separator tube. After clot formation, centrifuge samples at 2000 x g for 10 minutes. Remove serum and assay. Dilute samples 1:8 into MIX Diluent. Store serum at -20<sup>0</sup>C or below. Avoid repeated freeze-thaw cycles
- **Cell Culture Supernatants:** Centrifuge cell culture media at 2000 x g for 10 minutes to remove debris. Collect supernatants and assay. Store the remaining samples at -20<sup>0</sup>C or below. Avoid repeated freeze-thaw cycles

## Reagent Preparation

- Freshly dilute all reagents and bring all reagents to room temperature before use. If crystals have formed in the concentrate, mix gently until the crystals have completely dissolved.
- **MIX Diluent Concentrate (10x):** Dilute MIX Diluent Concentrate 1:10 with reagent grade water. Store for up to 1 month at 2-8<sup>0</sup>C.
- **Standard Curve:** Reconstitute the 64 ng of Human Leptin Standard with 2 ml of MIX Diluent to generate a stock solution of 32 ng/ml. Allow the standard to sit for 10 minutes with gentle agitation prior to making dilutions. Prepare duplicate or triplicate standard points by serially diluting the leptin standard solution (32 ng/ml) 1:4 with MIX Diluent to produce 8, 2, 0.5, and 0.125 ng/ml solutions. MIX Diluent serves as the zero standard (0 ng/ml). Any remaining solution should be frozen at -20<sup>0</sup>C.

Standard Point	Dilution	[Leptin] (ng/ml)
P1	1 part Standard (32 ng/ml)	32.000
P2	1 part P1 + 3 parts MIX Diluent	8.000
P3	1 part P2 + 3 parts MIX Diluent	2.000
P4	1 part P3 + 3 parts MIX Diluent	0.500
P5	1 part P4 + 3 parts MIX Diluent	0.125
P6	MIX Diluent	0.000

- **Biotinylated Leptin Antibody (50x):** Spin down the antibody briefly and dilute the desired amount of the antibody 1:50 with MIX Diluent. Any remaining solution should be frozen at -20°C.
- **Wash Buffer Concentrate (20x):** Dilute Wash Buffer Concentrate 1:20 with reagent grade water.
- **SP Conjugate (100x):** Spin down the SP Conjugate briefly and dilute the desired amount of the conjugate 1:100 with MIX Diluent. Any remaining solution should be frozen at -20°C.

## Assay Procedure

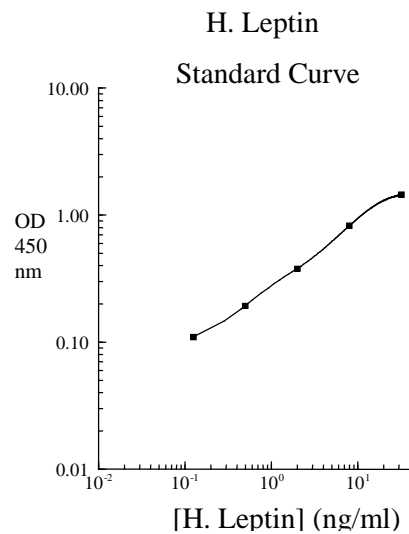
- Prepare all reagents, working standards and samples as instructed. Bring all reagents to room temperature before use. The assay is performed at room temperature (20-30°C).
- Remove excess microplate strips from the plate frame and return them immediately to the foil pouch with desiccant inside. Reseal the pouch securely to minimize exposure to water vapor and store in a vacuum desiccator.
- Add 50 µl of Standard or sample per well. Cover wells and incubate for two hours. Start the timer after the last sample addition.
- Wash five times with 200 µl of Wash Buffer manually. Invert the plate each time and decant the contents; hit it 4-5 times on absorbent paper towel to completely remove the liquid. If using a machine wash six times with 300 µl of Wash Buffer and then invert the plate, decant the contents; hit it 4-5 times on absorbent paper towel to completely remove the liquid.
- Add 50 µl of Biotinylated Leptin Antibody to each well and incubate for two hours.
- Wash a microplate as described above.
- Add 50 µl of Streptavidin-Peroxidase Conjugate per well and incubate for 30 minutes. Turn on the microplate reader and set up the program in advance.
- Wash a microplate as described above.
- Add 50 µl of Chromogen Substrate per well and incubate for about 20 minutes or till the optimal blue color density develops. Gently tap the plate to ensure thorough mixing and break the bubbles in the well with pipette tip.
- Add 50 µl of Stop Solution to each well. The color will change from blue to yellow.
- 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.

## Data Analysis

- Calculate the mean value of the duplicate or 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.

## Standard Curve

- The curve is provided for illustration only. A standard curve should be generated each time the assay is performed.



## Performance Characteristics

- The minimum detectable level of leptin is typically 120 ng/ml.
- Intra-assay and inter-assay coefficients of variation were 4.1 % and 7.3% respectively.

## Linearity

Sample Dilution	Average Percentage of Expected Value	
	Plasma	Serum
1:2	109%	106%
1:4	103%	101%
1:8	100%	101%

## Recovery

Standard Added Value	0.5 – 20 ng/ml
Recovery %	86-111 %
Average Recovery %	99.5 %

## Cross-Reactivity

Species	% Cross Reactivity
Beagle	1%
Bovine	0.5%
Monkey	1%
Mouse	0.5%
Rat	0.5%
Swine	2%
Rabbit	1%

## References

- (1) Houseknecht KL *et. al* (1998) *J Anim Sci.* 76(5):1405-20.
- (2) Abbasi F *et. al.* (2000) *Metabolism.* 49(4): 544-7
- (3) Petridou E *et. al* (2005) *Clin Endocrinol (Oxf).* 62(3): 366-71
- (4) Wallerstedt SM *et. al* (2004) *Blood Press* 13(4):243-6
- (5) Wolk R *et. al* (2004) *J Am Coll Cardiol.* 44(9): 1819-24
- (6) Dumond H *et. al.* (2003) *Arthritis Rheum.* 48(11): 3118-29

Version 4.5

## Related products

- EML2001-1 AssayMax Mouse Leptin ELISA Kit (Plasma, Serum, Cell Culture Supernatants samples)