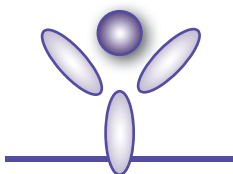




Enabling Legendary Discovery™

LEGEND MAX™

ELISA Kit



Human Amyloid Beta (1-42)

Cat. No. 448707

ELISA Kit for Accurate Quantitation of
Human Amyloid Beta (1-42)
from Cerebrospinal Fluid, Serum, Plasma, and Tissue Lysate

BioLegend, Inc.
biolegend.com

It is highly recommended that this manual be read in its entirety before using this product. Do not use this kit beyond the expiration date.

For Research Purposes Only. Not for use in diagnostic or therapeutic procedures. Purchase does not include or carry the right to resell or transfer this product either as a stand-alone product or as a component of another product. Any use of this product other than the permitted use without the express written authorization of BioLegend is strictly prohibited.



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Introduction:

The Amyloid peptides are peptides of 36-43 amino acids which are produced through the post-translational cleavage of the Amyloid Precursor Protein by beta and gamma secretase. Although numerous different Amyloid beta species exist, the majority of the Amyloid Beta peptides produced by post-translational modification consists of either Amyloid Beta (1-40) (80-90%) and Amyloid Beta (1-42) (5-10%). Both variants are major components of the extracellular plaques found in Alzheimer's disease brain. However, Amyloid Beta (1-42) was reported to be more prone to aggregation than the 1-40 variant despite differing in only 2 amino acids at the C terminus. Other studies that aimed at characterizing the difference in aggregation tendency between the two variants suggested that they have distinct 3D structures in solution.

The LEGEND MAX™ Human Amyloid Beta (1-42) ELISA Kit is a Sandwich Enzyme-Linked Immunosorbent Assay (ELISA) with a 96-well strip plate that is pre-coated with anti-human Amyloid Beta (1-42) antibody. The detection antibody is a biotinylated anti-human Amyloid Beta (1-42) monoclonal antibody. This kit is specifically designed for the accurate quantitation of human Amyloid Beta (1-42) from cerebrospinal fluid, serum, plasma, and tissue lysate. It is analytically validated with ready-to-use reagents.

Materials Provided:

Description	Quantity	Volume	Part #
Human Amyloid Beta (1-42) pre-coated 96-well Strip Microplate	1 plate		750002550
Human Amyloid Beta (1-42) Detection Antibody	1 bottle	12 mL	750002552
Human Amyloid Beta (1-42) Lyophilized Standard	1 vial	lyophilized	750002555
Streptavidin-Polymer HRP	1 bottle	12 mL	750002513
Assay Buffer E	1 bottle	25 mL	79559
Wash Buffer (20x)	1 bottle	50 mL	78233
Substrate Solution D	1 bottle	12 mL	78115
Stop Solution	1 bottle	12 mL	79133
Plate Sealers	4 sheets		78101

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Materials to be Provided by the End-User:

- Microplate reader able to measure absorbance at 450 nm
- Adjustable pipettes to measure volumes ranging from 1 µL to 1,000 µL
- Deionized water
- Wash bottle or automated microplate washer
- Log-Log graph paper or software for data analysis
- Polypropylene tubes to prepare standard dilutions
- Timer
- Plate Shaker
- Polypropylene vials

Storage Information:

Store unopened kit components between 2°C and 8°C. Do not use this kit beyond its expiration date.

Opened or Reconstituted Components	
Microplate wells	If not all microplate strips are used, remove the excess strips by pressing up from underneath each strip. Place excess strips back in the foil pouch with the included desiccant pack and reseal. Store between 2°C and 8°C for up to one month.
Standard	The remaining reconstituted standard stock solution can be aliquoted into polypropylene vials and stored at -70°C for up to one month. Avoid repeated freeze-thaw cycles.
Streptavidin-Polymer HRP	Store opened reagent bottles at 2° - 8°C and use within 1 month
Assay Buffer E	
Wash Buffer (20X)	
Substrate Solution D	
Stop Solution	

Health Hazard Warnings:

1. Reagents that contain preservatives may be harmful if ingested, inhaled or absorbed through the skin. Refer to the MSDS online at BioLegend's website for details (www.biolegend.com/msds).
2. Substrate Solution D is harmful if inhaled or ingested. Avoid skin, eye and clothing contact.
3. To reduce the likelihood of blood-borne transmission of infectious agents,

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handle all serum, plasma and other biological fluids in accordance with NCCLS regulations.

4. Stop Solution contains strong acid. *Wear eye, hand, and face protection.*
5. Before disposing of the plate, rinse it with an excess amount of tap water.

Specimen Collection and Handling:

Specimens should be clear and non-hemolyzed. If possible, unknown samples should be run at a number of dilutions to determine the optimal dilution factor that will ensure accurate quantitation.

Cerebrospinal Fluid: If necessary, centrifuge all samples to remove debris prior to analysis. Store samples at <-70°C. Avoid repeated freeze-thaw cycles.

Cell Culture Supernatant: If necessary, centrifuge all samples to remove debris prior to analysis. It is recommended that samples be stored at <-70°C. Avoid repeated freeze-thaw cycles.

Serum: Use a serum separator tube and allow clotting for at least 30 minutes, then centrifuge for 10 minutes at 1,000 x g. Remove serum layer and assay immediately or store serum samples at <-70°C. Avoid repeated freeze-thaw cycles.

Plasma: Collect blood samples in citrate, heparin or EDTA containing tubes. Centrifuge for 10 minutes at 1,000 x g within 30 minutes of collection. Assay immediately or store plasma samples at <-70°C. Avoid repeated freeze-thaw cycles.

Tissue lysate: Rinse and then homogenize tissue in PBS. Add an equal volume of NP40 lysis buffer (50 mM Tris-HCL, 150 mM NaCl, 1% NP-40) containing protease inhibitor and lyse tissue at Room Temperature for 30 min with gentle agitation. Centrifuge to remove debris, then assay immediately or store at <-70°C. Quantify total protein using total protein assay.

Reagent and Sample Preparation:

Note: All reagents should be diluted immediately prior to use.

1. Dilute the 20X Wash Buffer to 1X with deionized water. For example, make 1 liter of 1X Wash Buffer by adding 50 mL of 20X Wash Buffer to 950 mL of deionized water. If crystals have formed in the 20X Wash Buffer, bring to room temperature and vortex until dissolved.
2. Reconstitute the lyophilized Human Amyloid Beta (1-42) Standard by adding the volume of Assay Buffer E to make the 24 ng/mL standard stock solution (Refer to LEGEND MAX Kit Lot-Specific Certificate of Analysis/ LEGEND MAX Kit Protocol). Allow the reconstituted standard to sit at room temperature for 15-20 minutes, then briefly vortex to mix completely.
3. In general, a 32-folds dilution in Assay Buffer E is recommended for cerebrospinal fluid samples. No dilutions is needed for serum and plasma samples. However, samples can be diluted further to fit within the range of

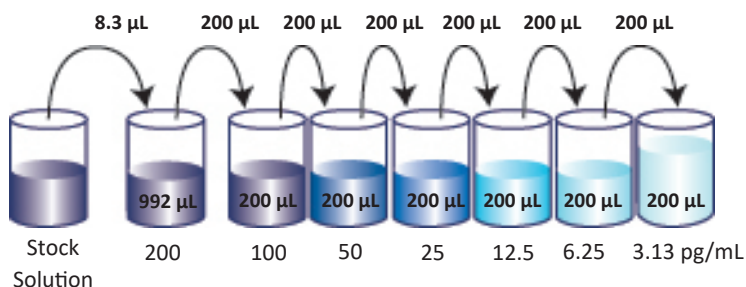
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the assay as determined by the end user.

Assay Procedure:

Note: Do not mix reagents from different kits or lots. Reagents and/or antibodies from different manufacturers should not be used with this kit.

1. Bring all reagents to room temperature prior to use. It is strongly recommended that all standards and samples be run in duplicate or triplicate. A standard curve is required for each assay.
2. If not all microplate strips will be used, remove the excess strips by pressing up from underneath each strip. Place excess strips back in the foil pouch with the included desiccant pack and reseal.
3. Prepare 1000 μL of the 200 pg/mL top standard by adding 8.3 μL of the 24 ng/mL standard stock solution into 992 μL Assay Buffer E. Perform six two-fold serial dilutions of the 200 pg/mL top standard in separate tubes using Assay Buffer E as the diluent. Thus, the Amyloid Beta (1-42) standard concentrations in the tubes are 200 pg/mL , 100 pg/mL , 50 pg/mL , 25 pg/mL , 12.5 pg/mL , 6.25 pg/mL and 3.13 pg/mL , respectively. Assay Buffer E serves as the zero standard (0 pg/mL).



4. Wash the plate 4 times with at least 300 μL of 1X Wash Buffer per well and blot any residual buffer by firmly tapping the plate upside down on absorbent paper. All subsequent washes should be performed similarly.
5. Add 50 μL of Assay Buffer E to each well that will contain either standard dilutions or samples. Then add 50 μL of standard dilutions or samples to the appropriate wells.
6. Seal the plate with a Plate Sealer included in the kit and incubate the plate for 2 hours at room temperature with shaking.
7. Discard the contents of the plate into a sink, then wash the plate 4 times with 1X Wash Buffer as in step 4.
8. Add 100 μL of Human Amyloid Beta (1-42) Detection Antibody solution to each well, seal the plate and incubate at room temperature for 1 hour while

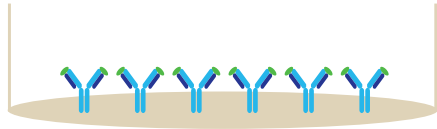
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shaking.

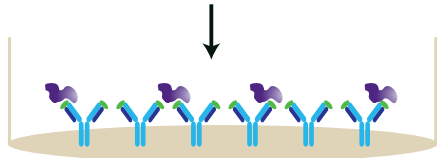
9. Discard the contents of the plate into a sink, then wash the plate 4 times with 1X Wash Buffer as in step 4.
10. Add 100 μ L of Streptavidin-Polymer HRP solution to each well, seal the plate and incubate at room temperature for 30 minutes while shaking.
11. Discard the contents of the plate into a sink, then wash the plate 5 times with 1X Wash Buffer as in step 4. For this final wash, soak wells in 1X Wash Buffer for 30 seconds to 1 minute for each wash. This will help minimize background.
12. Add 100 μ L of Substrate Solution D to each well and incubate for 10 minutes in the dark. Wells containing Human Amyloid Beta (1-42) should turn blue in color with an intensity proportional to its concentration. It is not necessary to seal the plate during this step.
13. Stop the reaction by adding 100 μ L of Stop Solution to each well. The solution color should change from blue to yellow.
14. Read absorbance at 450 nm within 30 minutes. If the reader is capable of reading at 570 nm, the absorbance at 570 nm can be subtracted from the absorbance at 450 nm.

Assay Procedure Summary

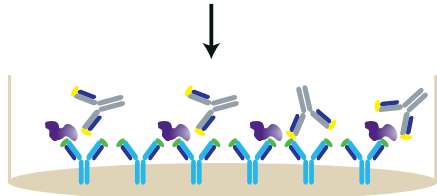
1. Wash 4 times.
Add 50 μ L Assay Buffer E to standard wells and sample wells



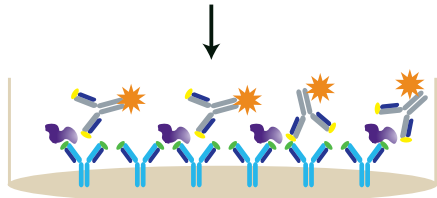
2. Add 50 μ L of standard or sample, incubate 2 hr, RT, shaking



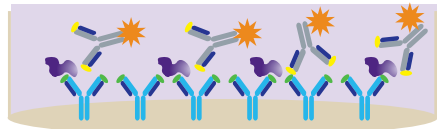
3. Wash 4 times
Add 100 μ L of Human Amyloid Beta (1-42) Detection Antibody solution.
Incubate 1 hr, RT, shaking



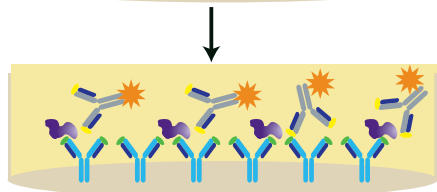
4. Wash 4 times
Add 100 μ L of Streptavidin-Polymer HRP solution
Incubate 30 min, RT, shaking



5. Wash 5 times
Add 100 μ L Substrate Solution D
Incubate 10 min, RT, in the dark



6. Add 100 μ L Stop Solution



7. Read absorbance at 450 nm and 570 nm

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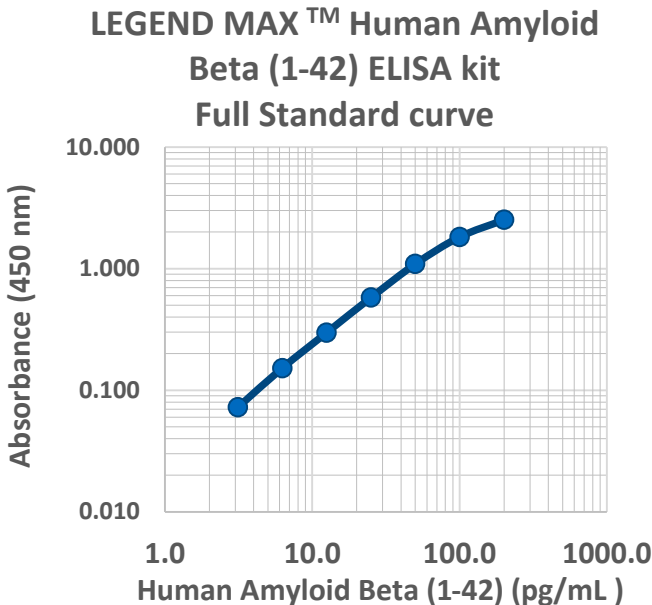
Calculation of Results:

The data can be best calculated with computer-based curve-fitting software using a 5- or 4-parameter logistics curve-fitting algorithm. If an appropriate software is not available, use log-log graph paper to determine sample concentrations. Determine the mean absorbance for each set of duplicate or triplicate standards, controls, and samples. Plot the standard curve on log-log graph paper with analyte concentration on the X-axis and absorbance on the Y-axis. Draw a best fit line through the standard points. To determine the unknown analyte concentrations, find the mean absorbance value of the unknown concentration on the Y-axis and draw a horizontal line to the standard curve. At the point of intersection, draw a vertical line to the X-axis and read the analyte concentration.

If samples were diluted, multiply the concentration by the appropriate dilution factor. If a test sample's absorbance value falls outside the linear portion of the standard curve, the test sample needs to be re-analyzed at a higher (or lower) dilution as appropriate.

Typical Data:

This standard curve was generated at BioLegend for demonstration purposes only. A standard curve must be run with each assay.



Performance Characteristics:

Specificity: This kit recognizes natural and synthetic Human Amyloid Beta (1-42). No significant cross reactivity was observed when this kit was used to analyze the following synthetic human proteins at 10000 pg/mL.

Human	Amyloid Beta (1-38)	Amyloid Beta (1-40)	Amyloid Beta (1-43)
% cross reactivity	0%	0%	1.37%

Sensitivity: The minimum detectable concentration of Human Amyloid Beta (1-42) is 0.49 ± 0.16 pg/mL (n=6).

Recovery: Synthetic Human Amyloid Beta (1-42) at 3 different concentrations was spiked into different human samples of Cerebrospinal Fluid, Serum, Citrate Plasma, EDTA Plasma, and Heparin Plasma. Sample recovery was then analyzed with the LEGEND MAX™ Human Amyloid Beta (1-42) ELISA kit.

Sample Type	N	% Recovery
Cerebrospinal Fluid	4	116.5%
Serum	4	85.4%
Citrate Plasma	3	84.7%
EDTA Plasma	3	95.3%
Heparin Plasma	3	81.7%
NP-40 Lysis Buffer	1	101.0%

Linearity: Natural human cerebrospinal fluid samples were first diluted to 5 folds. Neat natural human serum, plasma samples, and NP40 lysis buffer were spiked with synthetic Amyloid Beta (1-42). Then, they were diluted 2 fold in serial to produce samples within the dynamic range of the kit. Samples were then assayed to determine the dilutional linearity.

Sample Type	N	% Linearity
Cerebrospinal Fluid	5	102.4%
Serum	5	105.2%
Citrate Plasma	3	110.0%
EDTA Plasma	3	111.0%
Heparin Plasma	3	108.3%
NP-40 Lysis Buffer	1	96%

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Intra-Assay Precision: Two samples containing different human Amyloid Beta (1-42) concentrations were tested on one plate with 12 replicates.

Concentration	Sample 1	Sample 2
Number of Replicates	12	12
Mean Concentration (pg/mL)	7.9	33.6
Standard Deviation	0.33	1.43
%CV	4.0%	4.0%

Inter-Assay Precision: Two samples containing different human Amyloid Beta (1-42) concentrations were tested in eleven independent assays.

Concentration	Sample 1	Sample 2
Number of Assays	11	11
Mean Concentration (pg/mL)	8.1	34.8
Standard Deviation	0.6	4.5
%CV	7.0%	12.8%

Biological Samples: Human cerebrospinal Fluid, serum, Citrate Plasma, EDTA Plasma, Heparin Plasma were assayed for natural Amyloid Beta (1-42). Cerebrospinal Fluid range detected was Serum and plasma range detected was 187 - 1658 pg/mL. Serum and plasma range detected was 6.2 - 67.9 pg/mL.

	Cerebrospinal Fluid	Serum	Citrate Plasma	EDTA Plasma	Heparin Plasma
N	29	11	10	11	10
Min (pg/mL)	187.2	6.4	13.9	10.5	6.2
Max (pg/mL)	1658.2	25.1	25.1	67.9	67.1
Mean (pg/mL)	791.4	17.6	19.3	26.3	23.1
% detectable	100%	100%	100%	100%	100%

Troubleshooting Guide:

Problem	Probable Cause	Solution
High Background	Background wells were contaminated	Avoid cross-well contamination by using the provided plate sealers. Use multichannel pipettes and change tips between pipetting samples and reagents.
	Insufficient washes	Increase number of washes. Increase soaking time between washes prior to addition of substrate solution.
	TMB Substrate Solution was contaminated	TMB Substrate Solution should be clear and colorless prior to addition to wells. Use a clean container prior to pipetting substrate solution into wells.
No or poor signal	Detection Antibody, Avidin-HRP or Substrate solution were NOT added	Rerun the assay and follow the protocol.
	Wrong reagent or reagents were added in wrong sequential order	
	Insufficient plate agitation	The plate should be agitated during all incubation steps using a plate shaker at a speed where solutions in wells are within constant motion without splashing.
	The wash buffer contains Sodium Azide (NaN ₃)	Avoid Sodium Azide contamination in the wash buffer as it inhibits HRP activity.
	Incubations were done at an inappropriate temperature, timing or without agitation	Rerun the assay and follow the protocol.
Low or poor standard curve signal	The standard was incorrectly reconstituted or diluted	Adjust the calculations and follow the protocol.
	Standard was inappropriately stored	Store the reconstituted standard stock solution in polypropylene vials at -70°C. Avoid repeated freeze-thaw cycles.
	Reagents added to wells with incorrect concentrations	Check for pipetting errors and the correct reagent volume.

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Problem	Probable Cause	Solution
Signal is high, standard curves have saturated signal	Standard reconstituted with less volume than required	Reconstitute new lyophilized standard with the correct volume of solution recommended in the protocol.
	Standards/samples, detection antibody, Avidin-HRP or substrate solution were incubated for too long	Rerun the assay and follow the protocol.
Sample readings are out of range	Samples contain no or below detectable levels of the analyte	If samples are below detectable levels, it may be possible to use a larger sample volume. Contact technical support for appropriate protocol modifications.
	Samples contain analyte concentrations greater than highest standard point	Samples may require dilution and analysis.
High variation in samples and/or standards	Multichannel pipette errors	Confirm that pipette calibrations are accurate.
	Plate washing was not adequate or uniform	Ensure pipette tips are tightly secured. Ensure uniformity in all wash steps.
	Non-homogenous samples	Thoroughly mix samples before assaying.
	Samples may have high particulate matter	Remove particulate matter by centrifugation.
	Cross-well contamination	Do not reuse plate sealers. Always change tips for reagent additions. Ensure that pipette tips do not touch the reagents on the plate.

ELISA Plate Template

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



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