Human Aggregated Beta Amyloid ELISA Kit

Catalog Number KHB3491 (96 tests)
Pub. No. MAN0014907 Rev. 2.0 (30)

CAUTION! This kit contains materials with small quantities of sodium azide. Sodium azide reacts with lead and copper plumbing to form explosive metal azides. Upon disposal, flush drains with a large volume of water to prevent azide accumulation. Avoid ingestion and contact with eyes, skin and mucous membranes. In case of contact, rinse affected area with plenty of water. Observe all federal, state, and local regulations for disposal.

Note: For safety and biohazard guidelines, see the “Safety” appendix in the ELISA Technical Guide (Pub. no. MAN0006706). Read the Safety Data Sheets (SDSs) and follow the handling instructions. Wear appropriate protective eyewear, clothing, and gloves.

Product description
The Invitrogen™ Human Aggregated Beta Amyloid ELISA Kit is a solid-phase sandwich Enzyme-Linked Immunosorbent Assay (ELISA). This assay is designed to detect and quantify the level of aggregated beta amyloid (Aβ) in human tissue homogenates, ventricular fluid, CSF, tissue culture supernatant, and buffered solution. The assay recognizes both natural and recombinant human aggregated Aβ, and does not cross-react with mouse or rat.

Extracellular amyloid plaques are composed primarily of beta amyloid. Associated with the extracellular plaques are activated microglia and astrocytes. An important neurotoxic form of Aβ is an oligomer, composed of approximately 12 subunits, with a composite molecular weight of 54 kDa. This oligomeric form of Aβ (also known as Amyloid Derived Diffusible Ligand or ADDL) can be separated from fibrillar and protofibrillar forms of aggregated beta amyloid by high speed centrifugation or by size exclusion methods.

Contents and storage
Upon receipt, store the kit at 2°C to 8°C.

<table>
<thead>
<tr>
<th>Contents</th>
<th>Cat. No. KHB3491 (96 tests)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hu Aggregated Aβ Standard, lyophilized; contains 0.1% sodium azide.</td>
<td>2 vials</td>
</tr>
<tr>
<td>Standard Diluent Buffer; contains 0.1% sodium azide; red dye [1]</td>
<td>60 mL</td>
</tr>
<tr>
<td>Antibody Coated Plate, 96-well plate</td>
<td>1 plate</td>
</tr>
<tr>
<td>Hu Aggregated Aβ Biotin Conjugate; contains 0.1% sodium azide; blue dye [1]</td>
<td>11 mL</td>
</tr>
<tr>
<td>Streptavidin-HRP (100X); contains 3.3 mM thymol</td>
<td>0.125 mL</td>
</tr>
<tr>
<td>HRP Diluent; contains 3.3 mM thymol; yellow dye [1]</td>
<td>25 mL</td>
</tr>
<tr>
<td>Wash Buffer Concentrate (25X)</td>
<td>100 mL</td>
</tr>
<tr>
<td>Stabilized Chromogen, Tetramethylbenzidine (TMB)</td>
<td>25 mL</td>
</tr>
<tr>
<td>Stop Solution</td>
<td>25 mL</td>
</tr>
<tr>
<td>Plate Covers, adhesive strips</td>
<td>3</td>
</tr>
</tbody>
</table>

Materials required but not supplied
- Distilled or deionized water
- Calibrated adjustable precision pipettes and glass or plastic tubes for diluting solutions; beakers, flask and cylinders for preparation of reagents
- Microtiter plate reader with software capable of measurement at or near 450 nm
- Plate washer–automated or manual (squirt bottle, manifold dispenser, or equivalent)

Prepare 1X Wash Buffer
1. Dilute 16 mL of Wash Buffer Concentrate (25X) with 384 mL of deionized or distilled water. Label as 1X Wash Buffer.
2. Store the concentrate and 1X Wash Buffer in the refrigerator. Use the diluted buffer within 14 days.

Prepare Tissue Extraction Buffer
Note: See the ELISA Technical Guide for detailed information on preparing Tissue Extraction Buffer.
1. Prepare 5 mL of Tissue Extraction Buffer.
   Tissue Extraction Buffer consists of 25 mM Tris (pH 7.4), and 150 mM NaCl.
2. Immediately before use, add 1.46 μM pepstatin A, 0.154 μM aprotinin, 2.03 μM leupeptin, 0.5 mM AEBSF, and 0.29 mM PMSF.
   If desired, supplement the buffer with phosphatase inhibitors: 0.05 mM fenvalerate, 0.05 mM cantharidin, 1 mM Na₃VO₄, 1 mM Na₂P₂O₇, and 50 mM NaF.

Before you begin
IMPORTANT! Reagents are lot-specific. Do not mix or interchange different reagent lots from various kit lots.
- Allow reagents to reach room temperature before use. Mix to redissolve any precipitated salts.
Prepare aggregated Aβ sample (liquid)

Due to shared epitopes, the following analytes may cause interference with this assay: APP, monomeric Aβ40, monomeric Aβ42, protofibrillar Aβ, and fibrillar Aβ. Sample preparation should therefore be carefully considered when using this assay.

1. Collect samples in pyrogen/endotoxin-free polypropylene tubes.

   **Note:** Aggregated Aβ is sensitive to freeze-thaw cycles. Avoid multiple freeze-thaw cycles of frozen samples. Thaw completely and mix well prior to analysis.

2. Clarify samples by centrifugation prior to analysis.
   a. Centrifuge at 14,000 x g for 10 minutes to minimize fibrils in aggregated Aβ-containing samples.
   b. Centrifuge at 100,000 x g for 1 hour at 4°C to minimize fibrils and protofibrils.

   Size exclusion methods, such as gel permeation chromatography or ultrafiltration, can also improve assay performance.

Prepare tissue homogenate

1. Determine the mass of the tissue sample in a microcentrifuge tube.
2. Add 10 x the tissue mass of Tissue Extraction Buffer, then homogenize thoroughly.
3. Sonicate the homogenized tissue sample (2 blasts, 10 seconds each).
4. Centrifuge the homogenate at 100,000 x g for 1 hour at 4°C.
5. Carefully transfer the clear supernatant fraction into clean microcentrifuge tubes on ice.

The supernatant fraction contains TBS-soluble aggregates of Aβ.

Pre-dilute samples

Sample concentrations should be within the range of the standard curve. Because conditions may vary, each investigator should determine the optimal dilution for each application.

- Perform sample dilutions with Standard Diluent Buffer.
- Dilute samples prepared in Tissue Extraction Buffer 1:2 or greater in Standard Diluent Buffer (e.g., 25 μL sample into 25 μL buffer).

Dilute standards

**Note:** Use glass or plastic tubes for diluting standards.

1. Reconstitute Hu Aggregated Aβ Standard to 5.7 ng/mL with Standard Diluent Buffer. Refer to the standard vial label for instructions. Swirl or mix gently and allow the contents to sit for 10 minutes to ensure complete reconstitution. Label as 5.7 ng/mL human aggregated Aβ. **Use the standard within 1 hour of reconstitution.**
2. Add 250 μL Standard Diluent Buffer to each of 7 tubes labeled as follows: 2.9, 1.4, 0.71, 0.36, 0.18, 0.09, and 0 ng/mL human aggregated Aβ.
3. Make serial dilutions of the standard as shown in the following dilution diagram. Mix thoroughly between steps.
4. Remaining reconstituted standard should be discarded or frozen in aliquots at –80°C for further use. Standard can be frozen and thawed one time only without loss of immunoreactivity.

Prepare 1X Streptavidin-HRP solution

**Note:** Prepare 1X Streptavidin-HRP within 15 minutes of usage.

The Streptavidin-HRP (100X) is in 50% glycerol, which is viscous. To ensure accurate dilution:

1. For each 8-well strip used in the assay, pipet 10 μL Streptavidin-HRP (100X) solution, wipe the pipette tip with clean absorbent paper to remove any excess solution, and dispense the solution into a tube containing 1 mL of Streptavidin-HRP Diluent. Mix thoroughly.
2. Return the unused Streptavidin-HRP (100X) solution to the refrigerator.
Perform ELISA (Total assay time: 4 hours)

**IMPORTANT!** Perform a standard curve with each assay.

- Allow all components to reach room temperature before use. Mix all liquid reagents prior to use.
- Determine the number of 8-well strips required for the assay. Insert the strips in the frames for use. Re-bag any unused strips and frames, and store at 2°C to 8°C for future use.

1. **Bind antigen**
   a. Add 100 μL of standards, controls, or samples (see “Pre-dilute samples” on page 2) to the appropriate wells. Leave the wells for chromogen blanks empty.
   b. Cover the plate with a plate cover and incubate for 2 hours at room temperature.
   c. Thoroughly aspirate the solution and wash wells 4 times with 1X Wash Buffer.

2. **Add Biotin Conjugate**
   a. Add 100 μL Hu Aggregated Aβ Biotin Conjugate solution into each well except the chromogen blanks.
   b. Cover the plate with plate cover and incubate for 1 hour at room temperature.
   c. Thoroughly aspirate the solution and wash wells 4 times with 1X Wash Buffer.

3. **Add Streptavidin-HRP**
   a. Add 100 μL 1X Streptavidin-HRP solution (see page 2) into each well except the chromogen blanks.
   b. Cover the plate with plate cover and incubate for 30 minutes at room temperature.
   c. Thoroughly aspirate the solution from the wells and wash wells 4 times with 1X Wash Buffer.

4. **Add Stabilized Chromogen**
   a. Add 100 μL Stabilized Chromogen to each well. The substrate solution begins to turn blue.
   b. Incubate for 30 minutes at room temperature in the dark.
   
   **Note:** TMB should not touch aluminum foil or other metals.

5. **Add Stop Solution**
   Add 100 μL Stop Solution to each well. Tap the side of the plate to mix. The solution in the wells changes from blue to yellow.

**Read the plate and generate the standard curve**

1. Read the absorbance at 450 nm. Read the plate within 2 hours after adding the Stop Solution.
2. Use curve-fitting software to generate the standard curve. A 4 parameter algorithm provides the best standard curve fit. Optimally, the background absorbance may be subtracted from all data points, including standards, unknowns and controls, prior to plotting.
3. Read the concentrations for unknown samples and controls from the standard curve. Multiply value(s) obtained for sample(s) by the appropriate factor to correct for the sample dilution.

   **Note:** Dilute samples producing signals greater than the upper limit of the standard curve in Standard Diluent Buffer and reanalyze. Multiply the concentration by the appropriate dilution factor.

**Performance characteristics**

**Standard curve example**

The following data were obtained for the various standards over the range of 0 to 5.7 ng/mL human aggregated Aβ.

<table>
<thead>
<tr>
<th>Standard Human Aggregated Aβ (pg/mL)</th>
<th>Optical Density (450 nm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>5.7</td>
<td>3.09</td>
</tr>
<tr>
<td>2.9</td>
<td>2.22</td>
</tr>
<tr>
<td>1.4</td>
<td>1.46</td>
</tr>
<tr>
<td>0.71</td>
<td>0.57</td>
</tr>
<tr>
<td>0.36</td>
<td>0.37</td>
</tr>
<tr>
<td>0.18</td>
<td>0.26</td>
</tr>
<tr>
<td>0.09</td>
<td>0.17</td>
</tr>
<tr>
<td>0</td>
<td>0.09</td>
</tr>
</tbody>
</table>

**Inter-assay precision**

Samples were assayed 48 times in multiple assays to determine precision between assays.

<table>
<thead>
<tr>
<th>Parameters</th>
<th>Sample 1</th>
<th>Sample 2</th>
<th>Sample 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean (ng/mL)</td>
<td>2.82</td>
<td>1.36</td>
<td>0.33</td>
</tr>
<tr>
<td>Standard Deviation</td>
<td>0.16</td>
<td>0.12</td>
<td>0.03</td>
</tr>
<tr>
<td>% Coefficient of Variation</td>
<td>5.74</td>
<td>8.99</td>
<td>7.61</td>
</tr>
</tbody>
</table>

**Intra-assay precision**

Samples of known human aggregated Aβ concentrations were assayed in replicates of 16 to determine precision within an assay.

<table>
<thead>
<tr>
<th>Parameters</th>
<th>Sample 1</th>
<th>Sample 2</th>
<th>Sample 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean (ng/mL)</td>
<td>2.84</td>
<td>1.48</td>
<td>0.32</td>
</tr>
<tr>
<td>Standard Deviation</td>
<td>0.19</td>
<td>0.09</td>
<td>0.03</td>
</tr>
<tr>
<td>% Coefficient of Variation</td>
<td>6.68</td>
<td>6.29</td>
<td>9.26</td>
</tr>
</tbody>
</table>
Linearity of dilution
Aggregated Aβ was diluted in Standard Diluent Buffer over the range of the assay and measured. Linear regression analysis of sample values versus the expected concentrations yielded a correlation coefficient of 0.99.

<table>
<thead>
<tr>
<th>Dilution</th>
<th>Measured (pg/mL)</th>
<th>Expected Conc. (pg/mL)</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Neat</td>
<td>2.55</td>
<td>2.55</td>
<td>100</td>
</tr>
<tr>
<td>1/2</td>
<td>1.35</td>
<td>1.28</td>
<td>106</td>
</tr>
<tr>
<td>1/4</td>
<td>0.737</td>
<td>0.638</td>
<td>115</td>
</tr>
<tr>
<td>1/8</td>
<td>0.344</td>
<td>0.319</td>
<td>108</td>
</tr>
<tr>
<td>1/16</td>
<td>0.214</td>
<td>0.159</td>
<td>134</td>
</tr>
<tr>
<td>1/32</td>
<td>0.088</td>
<td>0.079</td>
<td>110</td>
</tr>
</tbody>
</table>

Parallelism
Aggregated Aβ peptide was serially diluted in Standard Diluent Buffer. The optical density of each dilution was plotted against the human aggregated Aβ standard curve. The standard accurately reflects aggregated human aggregated Aβ content in a sample.

Sensitivity
The analytical sensitivity of the assay is <0.01 ng/mL human aggregated Aβ. This was determined by adding two standard deviations to the mean O.D. obtained when the zero standard was assayed 30 times.

Specificity
The specificity of the Human Aggregated Beta Amyloid ELISA Kit for human aggregated Aβ was determined by measuring samples containing Aβ40 peptide, Aβ42 peptide, and aggregated Aβ. The data confirms that the assay recognizes the aggregated form of Aβ, but not the nonaggregated Aβ40 or Aβ42 peptides.

Limited product warranty
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