1. **Intended use**
This immunoassay kit allows for the specific measurement of human amyloid beta peptide 1-40, Aβ1-40 concentrations in cell culture supernates, serum and plasma.

2. **Introduction**
Alzheimer’s disease was first reported by the German neuropathologist A. Alzheimer in 1907, and it is now the most common cause of senile dementia. The numerous senile plaques that occur in the brain in Alzheimer’s disease are formed by amyloid beta-protein (Aβ). Aβ is a peptide composed of 40 to 42 (43) amino acids, and is said to be cleaved out of the precursor protein APP (a protein composed of 695, 751, or 770 amino acids) by the action of β- or γ-secretase. In addition, the presence of numerous variant Aβ molecules has been demonstrated in the culture fluid of human neuroblastoma cells transfected with cDNA coding rat amyloid precursor protein (APP). Furthermore, in 1995 Saïdo et al. discovered another type of Aβ peptide, Aβ(N3pE), that is predominant in senile plaques and differed from any type discovered until then. The molecule starts with a molecule in which the 3rd glutamine has been converted to proglutamine by an intramolecular dehydration reaction.

3. **Test principle**
The microtiter plate provided in this kit has been pre-coated with a monoclonal antibody specific to Aβ1-40. Standards or samples are then added to the appropriate microtiter plate wells with a biotin-conjugated polyclonal antibody preparation specific for AB1-40 and Avidin conjugated to Horseradish Peroxidase (HRP) is added to each microplate well and incubated. Then a TMB (3,3'5,5' tetramethyl-benzidine) substrate solution is added to each well. Only those wells that contain AB1-40, biotin-conjugated antibody and enzyme-conjugated Avidin will exhibit a change in color. The enzyme-substrate reaction is terminated by the addition of a sulphuric acid solution and the color change is measured spectrophotometrically at a wavelength of 450 nm ± 2 nm. The concentration of AB1-40 in the samples is then determined by comparing the O.D. of the samples to the standard curve.

4. **Materials and components**
- Assay plate 1
- Standard 2
- Sample Diluent 1 x 20 ml
- Assay Diluent A 1 x 10 ml
- Assay DiluentB 1 x 10 ml
- Detection Reagent A 1 x 120 µl
- Detection Reagent B 1 x 120 µl
- Wash Buffer (25 x concentrate) 1 x 30 ml
- Substrate 1 x 10 ml
- Stop Solution 1 x 10 ml
Sample collection and storage

- **Cell culture supernates** - Remove particulates by centrifugation and assay immediately or aliquot and store samples at ≤ -20°C. Avoid repeated freeze-thaw cycles.

- **Serum** - Use a serum separator tube (SST) and allow samples to clot for 30 minutes before centrifugation for 15 minutes at approximately 1000 × g. Remove serum and assay immediately or aliquot and store samples at -20°C.

- **Plasma** - Collect plasma using EDTA or heparin as an anticoagulant. Centrifuge samples for 15 minutes at 1000 × g at 2 - 8°C within 30 minutes of collection. Store samples at -20°C or -80°C. Avoid repeated freeze-thaw cycles.

- **Other biological fluids** - Remove particulates by centrifugation and assay immediately or aliquot and store samples at -20°C or -80°C. Avoid repeated freeze-thaw cycles.

**Note:** Serum, plasma, and cell culture supernatant samples to be used within 7 days may be stored at 2-8 °C, otherwise samples must stored at -20°C (≤ 1 months) or -80°C (≤ 2 months) to avoid loss of bioactivity and contaminations. Avoid freeze-thaw cycles. When performing the assay slowly bring samples to room temperature.

It is recommended that all samples be assayed in duplicate.

DO NOT USE HEAT-TREATED SPECIMENS.

5. Limitations of the procedure

- The kit should not be used beyond the expiration date on the kit label.
- Do not mix or substitute reagents with those from other lots or sources.
- If samples generate values higher than the highest standard, further dilute the samples with the Assay Diluent and repeat the assay. Any variation in standard diluent, operator, pipetting technique, washing technique, incubation time or temperature, and kit age can cause variation in binding.
- This assay is designed to eliminate interference by soluble receptors, ligands, binding proteins, and other factors present in biological samples. Until all factors have been tested in the Quantikine Immunoassay, the possibility of interference cannot be excluded.

6. Reagent preparation

- Bring all reagents to room temperature before use.
- **Wash Buffer** - If crystals have formed in the concentrate, warm to room temperature and mix gently until the crystals have completely dissolved. Dilute 20 mL of Wash Buffer Concentrate into deionized or distilled water to prepare 500 mL of Wash Buffer.
- **Standard** - Reconstitute the **Standard** with 1.0 mL of **Sample Diluent**. This reconstitution produces a stock solution of 300 pg/mL. Allow the standard to sit for a minimum of 15 minutes with gentle agitation prior to making serial dilutions. The diluted standard serves as the high standard (300 pg/mL). The **Sample Diluent** serves as the zero standard (0 pg/mL).
 Detection Reagent A and B - Dilute to the working concentration specified on the vial label using Assay Diluent A and B (1:100), respectively.

7. Assay procedure
Allow all reagents to reach room temperature. All the reagents should be mixed thoroughly by gently swirling before pipetting. Avoid foaming. Arrange and label required number of strips. Prepare all reagents, working standards and samples as directed in the previous sections.

1. Add 100 uL of Standard, Blank, or Sample per well. Cover with the adhesive strip. Incubate for 2 hours at 37°C.
2. Remove the liquid of each well, don’t wash.
3. Add 100 uL of Detection Reagent A to each well. Incubate for 1 hour at 37°C. Detection Reagent A may appear cloudy. Warm to room temperature and mix gently until solution appears uniform.
4. Aspirate each well and wash, repeating the process three times for a total of three washes.
   Wash by filling each well with Wash Buffer (350 uL) using a squirt bottle, multi-channel pipette, manifold dispenser or autowasher. Complete removal of liquid at each step is essential to good performance. After the last wash, remove any remaining Wash Buffer by aspirating or decanting. Invert the plate and blot it against clean paper towels.
5. Add 100 uL of Detection Reagent B to each well. Cover with a new adhesive strip. Incubate for 1 hours at 37°C.
6. Repeat the aspiration/wash as in step 5.
7. Add 90 uL of Substrate Solution to each well. Incubate for 30 minutes at 37°C. Protect from light.
8. Add 50 uL of Stop Solution to each well. If color change does not appear uniform, gently tap the plate to ensure thorough mixing.
9. Determine the optical density of each well within 30 minutes, using a microplate reader set to 450 nm.

8. Specificity
This assay recognizes recombinant and natural human Aβ1-40. No significant cross-reactivity or interference was observed.

9. Sensitivity
The minimum detectable dose of human Aβ1-40 is typically less than 2.4 pg/mL.
The sensitivity of this assay, or Lower Limit of Detection (LLD) was defined as the lowest detectable concentration that could be differentiated from zero.

10. Detection Range
4.7-300 pg/mL. The assay range was estimated by calculating the coefficient of variation (CV) of each standard constructing five independent standard curves. The standard curve concentrations used for the ELISA’s were 300 pg/mL, 150 pg/mL, 75 pg/mL, 37.5 pg/mL, 18.8 pg/mL, 9.4 pg/mL, 4.7 pg/mL.
11. Important Note:
1. The wash procedure is critical. Insufficient washing will result in poor precision and falsely elevated absorbance readings.
2. It is recommended that no more than 32 wells be used for each assay run if manual pipetting is used since pipetting of all standards, specimens and controls should be completed within 5 minutes. A full plate of 96 wells may be used if automated pipetting is available.
3. Duplication of all standards and specimens, although not required, is recommended.
4. When mixing or reconstituting protein solutions, always avoid foaming.
5. 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.
6. To ensure accurate results, proper adhesion of plate sealers during incubation steps is necessary.
7. Do not substitute reagents from one kit lot to another. Standard, conjugate a microtiter plates are matched for optimal performance. Use only the reagents supplied by manufacturer.

12. Calculation of results
Average the duplicate readings for each standard, control, and sample and subtract the average zero standard optical density. Create a standard curve by reducing the data using computer software capable of generating a four parameter logistic (4-PL) curve-fit. As an alternative, construct a standard curve by plotting the mean absorbance for each standard on the y-axis against the concentration on the x-axis and draw a best fit curve through the points on the graph. The data may be linearized by plotting the log of the Aβ1-40 concentrations versus the log of the O.D. and the best fit line can be determined by regression analysis. This procedure will produce an adequate but less precise fit of the data. If samples have been diluted, the concentration read from the standard curve must be multiplied by the dilution factor.

13. Storage of test kits and instrumentation
1. Unopened test kits should be stored at 2-8°C upon receipt and the microtiter plate should be kept in a sealed bag with desiccants to minimize exposure to damp air. The test kit may be used throughout the expiration date of the kit (six months from the date of manufacture). Refer to the package label for the expiration date.
2. Opened test kits will remain stable until the expiring date shown, provided it is stored as prescribed above.
3. A microtiter plate reader with a bandwidth of 10nm or less and an optical density range of 0-3 OD or greater at 450nm wavelength is acceptable for use in absorbance measurement.

14. Precaution
The Stop Solution suggested for use with this kit is an acid solution. Wear eye, hand, face, and clothing protection when using this material.
Abeta1-40 (Human) ELISA Kit (Cat # KA1158 V.01)
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