

Code No. 27714

**Human Amyloid  $\beta$  (1-40) (N) Assay Kit (L) - IBL****INTRODUCTION**

The first case of Alzheimer's disease was defined and reported in 1907 by the German scientist, Dr. A. Alzheimer. His studies have shown that this is the main cause of dementia in the elderly. The plaques which appear in the brains of Alzheimer's disease patients are mostly constituted by the Amyloid  $\beta$  protein (A $\beta$ ). A $\beta$  is a peptide which consists of 40 or 42 (43) amino acids, and reports show that this is cleaved from  $\beta$ - and  $\gamma$ -secretase from the amyloid precursor protein. APP is a trans-membrane protein consisting of 695, 751, or 770 amino acids (ref. 1). Reports have shown many variants of A $\beta$  exist and are clarified into the culture supernatant from the APP cDNA transfected mouse neuroblastoma cell (ref. 2). Furthermore, in 1995, a dominant and differential deposition of distinct  $\beta$  amyloid peptide species, A $\beta$  (N3pE), in senile plaques was found by Saido et al. This modified molecule, starting at the 3rd amino terminal residue, glutamate, was discovered to convert to pyroglutamate through intramolecular dehydration (ref. 3).

This kit can be measured A $\beta$  (1-40) which held N terminal side completely. Similarly, when measuring A $\beta$  (1-40) which held N terminal side completely, please use IBL Code No.27718, Human Amyloid  $\beta$  (1-40) (FL) Assay Kit (L). Human Amyloid  $\beta$  (1-40) (FL) Assay Kit (L) uses a monoclonal antibody. When measuring A $\beta$  (1-40) variants cleaved N terminal side by any cause, please use IBL Code No.27713, Human Amyloid  $\beta$  (1-40) Assay Kit (L).

Moreover, in assay of A $\beta$  (1-42) variants cleaved N terminal side, it is a Human Amyloid  $\beta$  (1-42) Assay Kit (L) similarly. When measuring A $\beta$  (1-42) variants cleaved by N terminal side, please use IBL Code No.27711, Human Amyloid  $\beta$  (1-42) Assay Kit (L). And, when measuring A $\beta$  (1-42) which held N terminal side completely, please use IBL Code No.27712, Human Amyloid  $\beta$  (1-42) (N) Assay Kit (L).

Furthermore, in measurement of A $\beta$  (N3pE-42), please use IBL Code No.27716, Human Amyloid  $\beta$  (N3pE) assay Kit (L).

Thus, it will be very useful for Alzheimer's research to assay A $\beta$  (1-40), A $\beta$  (1-42), and A $\beta$  (N3pE-42), respectively.

Meanwhile, you can use IBL Code No.27729, Human Amyloid  $\beta$  (1-x) Assay Kit (L) to measure A $\beta$  variants such as A $\beta$  (1-38), A $\beta$  (1-40), A $\beta$  (1-42) and A $\beta$  (1-43) all at once.

IBL Amyloid  $\beta$  Product Lines:

Code No.	Name	Volume
27711	Human Amyloid $\beta$ (1-42) Assay Kit (L) - IBL	96 Well
27712	Human Amyloid $\beta$ (1-42) (N) Assay Kit (L) - IBL	96 Well
27713	Human Amyloid $\beta$ (1-40) Assay Kit (L) - IBL	96 Well
<b>27714</b>	<b>Human Amyloid <math>\beta</math> (1-40) (N) Assay Kit (L) - IBL</b>	<b>96 Well</b>
27716	Human Amyloid $\beta$ (N3pE) Assay Kit (L) - IBL	96 Well
27718	Human Amyloid $\beta$ (1-40) (FL) Assay Kit (L) - IBL	96 Well
27729	Human Amyloid $\beta$ (1-x) Assay Kit (L) - IBL	96 Well

**PRINCIPLE**

This kit is a solid phase sandwich ELISA using 2 kinds of high specific antibodies. Tetra Methyl Benzidine (TMB) is used as coloring agent (Chromogen). The strength of coloring is in proportion to the quantities of human A $\beta$  (1-40).

**MEASUREMENT RANGE**

15.63 ~ 1,000 pg/mL

(3.6 ~230.9 pmol/L, as molecular weight of A $\beta$  (1-40) is 4331)**INTENDED USE**

- The IBL's Human Amyloid  $\beta$  (1-40) (N) Assay Kit is a complete kit for the quantitative determination of human A $\beta$  (1-40) in EDTA-plasma, cerebrospinal fluids, serum, cell culture media or the extract from brain tissue (ref. 4).
- A $\beta$  (1-40) in serum is very unstable. Since reduction in measured value is accepted according to a preservation situation.
- If FCS etc. is contained in samples of culture supernatant, A $\beta$  (1-40)-like in FCS may be measured. We recommend you to take the negative control.
- Both recombinant and native forms of human A $\beta$  (1-40) can be detected with the kit.

**KIT COMPONENT**

1	Precoated plate	: Anti- Human A $\beta$ (35-40) (1A10) Mouse IgG MoAb Affinity Purify	96Well x 1
2	Labeled antibody Conc.	: HRP conjugated Anti-Human A $\beta$ (N) Rabbit IgG Affinity Purify (X30)	0.4mL x 1
3	Standard	: Human A $\beta$ (1-40)	1.0mL x 2
4	EIA buffer	: 1% BSA, 0.05% Tween 20 in PBS	30mL x 1
5	Solution for Labeled antibody: 1% BSA, 0.05%Tween 20 in PBS		12mL x 1
6	Chromogen	: TMB solution	15mL x 1
7	Stop solution	: 1N H <sub>2</sub> SO <sub>4</sub>	12mL x 1
8	Wash buffer Conc.	: 0.05% Tween20 in phosphate buffer (X40)	50mL x 1

**OPERATION MANUAL****1. Materials needed but not supplied**

- Plate reader (450nm)
- Graduated cylinder and beaker
- Refrigerator(as 4°C)
- Paper towel
- Washing bottle for precoated plate
- Disposable test tube for "2, Labeled antibody Conc." and "6, Chromogen"
- Micropipette and tip
- Distilled water
- Graph paper (log/log)
- Tube for dilution of Standard

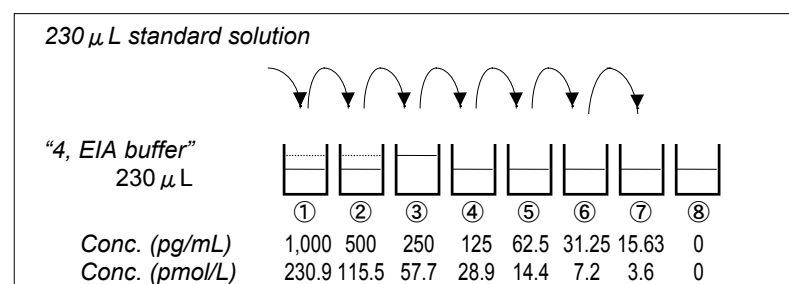
**2. Preparation**

- 1) Preparation of wash buffer  
"8, Wash buffer Conc." is a concentrated (X40) buffer. The temperature of "8, Wash buffer Conc." shall be adjusted to room temperature and then, mix it gently and completely before use. Dilute 50mL of "8, Wash buffer Conc." with 1,950mL of distilled water and mix it. This is the wash buffer for use. This prepared wash buffer shall be stored in refrigerator and used within 2 weeks after dilution.
- 2) Preparation of Labeled antibody  
"2, Labeled antibody Conc." is a concentrated (X30). Dilute "2, Labeled antibody Conc." with "5, Solution for Labeled antibody" in 30 times according to required quantity into a disposable test tube. Use this resulting solution as Labeled antibody.  
Example)  
In case you use one slit (8 well), the required quantity of Labeled antibody is 800  $\mu$  L. (Dilute 30  $\mu$  L of "2, Labeled antibody Conc." with 870  $\mu$  L of "5, Solution for Labeled antibody" and mix it. And use the resulting solution by 100  $\mu$  L in each well.)  
This operation should be done just before the application of Labeled antibody.  
The remaining "2, Labeled antibody Conc." should be stored at 4°C in firmly sealed vial.
- 3) Preparation of Standard  
Put just 1.0 mL of distilled water into the vial of "3, Standard" and mix it gently and completely. This solution is 2,000 pg/mL Human A $\beta$  (1-40) standard.
- 4) Dilution of Standard  
Prepare 8 tubes for dilution of "3, Standard". Put 230  $\mu$  L each of "4, EIA buffer" into the tube.  
Specify the following concentration of each tube.

Tube-1	1,000 pg/mL
Tube-2	500 pg/mL
Tube-3	250 pg/mL
Tube-4	125 pg/mL
Tube-5	62.5 pg/mL
Tube-6	31.25 pg/mL
Tube-7	15.63 pg/mL
Tube-8	0 pg/mL (Test Sample Blank)

Put 230  $\mu$  L of Standard solution into tube-1 and mix it gently. Then, put 230  $\mu$  L of tube-1mixture into tube-2. Dilute two times standard solution in series to set up 7 points of diluted standard between 1,000 pg/mL and 15.63 pg/mL. Tube-8 is the test sample blank as 0 pg/mL.

See following picture.



- 5) Dilution of test sample  
Test sample may be diluted with "4, EIA buffer" if the need arises.  
If the concentration of A $\beta$  in samples may not be estimated in advance, the pre-assay with several different dilutions will be recommended to determine the proper dilution of samples.

**3. Measurement procedure**

All reagents shall be brought to room temperature approximately 30 minutes before use. Then mix it gently and completely before use. Confirm no change in quality of the reagents. Standard curve shall be prepared simultaneously with the measurement of test samples.

Reagents	Test Sample	Standard	Test Sample Blank	Reagent Blank
	Test sample 100 $\mu$ L	Diluted standard (Tube 1~7) 100 $\mu$ L	EIA buffer (Tube-8) 100 $\mu$ L	EIA buffer 100 $\mu$ L
Incubation for overnight at 4°C with plate lid				
Washing 7 times				
Labeled Antibody	100 $\mu$ L	100 $\mu$ L	100 $\mu$ L	-
Incubation for 1 hour at 4°C with plate lid				
Washing 9 times				
Chromogen	100 $\mu$ L	100 $\mu$ L	100 $\mu$ L	100 $\mu$ L
Incubation for 30 minutes at room temperature (shielded)				
Stop solution	100 $\mu$ L	100 $\mu$ L	100 $\mu$ L	100 $\mu$ L
Read the plate at 450nm within 30 minutes after application of Stop solution.				

- 1) Determine wells for reagent blank. Put 100  $\mu$  L each of "4, EIA buffer" into the wells.
- 2) Determine wells for test sample blank, test sample and diluted standard. Then, put 100  $\mu$  L each of test sample blank (tube-8), test sample and dilutions of standard (tube-1~7) into the appropriate wells.
- 3) Incubate the precoated plate for overnight at 4°C after covering it with plate lid.
- 4) Wash each well of the precoated plate vigorously with wash buffer using washing bottle. Then, fill each well with wash buffer and place the precoated plate for 15~30 seconds. Remove wash buffer completely from the precoated plate by snapping. This procedure must be repeated more than 7 times. Then, remove the remaining liquid from all wells completely by snapping the precoated plate onto paper towel.

*In case of using plate washer, after 4 times washing with plate washer, washing with above washing bottle must be repeated 3 times.*

- 5) Pipette 100  $\mu$ L of labeled antibody solution into the wells of test samples, diluted standard and test sample blank.
- 6) Incubate the precoated plate for 1 hour at 4°C after covering it with plate lid.
- 7) Wash the precoated plate 9 times in the same manner above 4).
- 8) "6, Chromogen" should be taken the required quantity into a disposable test tube. Then, pipette 100  $\mu$ L from the test tube into the wells. Please avoid to return the rest of test tube into "6, Chromogen" bottle due to avoid to cause of contamination.
- 9) Incubate the precoated plate for 30 minutes at room temperature in the dark. The liquid will turn blue by the addition of "6, Chromogen".
- 10) Pipette 100  $\mu$ L of "7, Stop solution" into the wells. Mix the liquid by tapping the side of precoated plate. The liquid will turn yellow by the addition of "7, Stop solution".
- 11) Remove any dirt or drop of water on the bottom of the precoated plate and confirm there is no bubble on the surface of the liquid. Then, run the plate reader and conduct measurement at 450nm. The measurement shall be done within 30minutes after the addition of "7, Stop solution".

#### SPECIAL ATTENTION

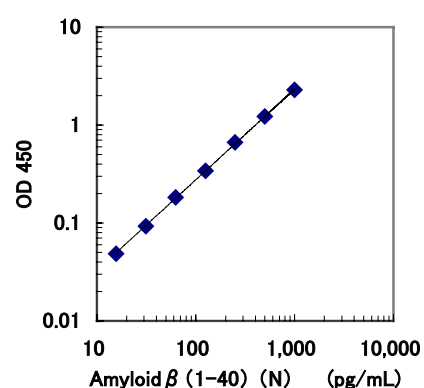
- 1) Test samples should be measured soon after the collection. In case of the storage of test samples, they should be stored under frozen conditions and do not repeat freeze/thaw cycles. Thaw the test samples at low temperature and mix them completely before measurement.
- 2) Test samples should be diluted with "4, EIA buffer", if the need arises.
- 3) The measurement of test samples and standard in duplicate is recommended.
- 4) Use test samples in neutral pH range. The contaminations of organic solvent may affect the measurement.
- 5) Use only wash buffer contained in this kit for washing the precoated plate. Insufficient washing may lead to the failure in measurement.
- 6) Remove the wash buffer completely by tapping the precoated plate on paper towel. Do not wipe wells with paper towel.
- 7) "6, Chromogen" should be stored in the dark due to its sensitivity against light. "6, Chromogen" should be avoided contact with metals.
- 8) Measurement should be done within 30 minutes after addition of "7, Stop solution".

#### CALCULATION OF TEST RESULT

Subtract the absorbance of test sample blank from all data, including standards and unknown samples before plotting. Plot the subtracted absorbance of the standards against the standard concentration on log-log graph paper. Draw the best smooth curve through these points to construct the standard curve. Read the concentration for unknown samples from the standard curve.

*Example of standard curve*

Conc. (pg/mL)	Absorbance (450nm)
1,000	2.327
500	1.269
250	0.710
125	0.386
62.5	0.228
31.25	0.138
15.63	0.094
0 (TestSample Blank)	0.045



\* The typical standard curve is shown above. This curve can not be used to derive test results. Please run a standard curve for each assay.

#### PERFORMANCE CHARACTERISTICS

##### 1. Titer Assay

Specimen	Titer (X)	Measurement Value (pg/mL)	Theoretical Value (pg/mL)	%
10% FCS added RPMI-1640	2	233.21	256.58	90.9
	4	120.66	128.56	93.9
	8	63.63	64.28	99.0
	16	29.66	32.14	92.3
Human Serum	2	388.15	498.33	77.9
	4	258.34	286.25	90.3
	8	128.03	143.31	89.3
	16	65.94	76.21	86.5
Human Plasma (EDTA)	2	179.65	370.66	48.5
	4	145.04	205.67	70.5
	8	91.76	114.88	79.9
	16	54.75	61.60	88.9
	32	33.73	34.71	97.2
Human Cerebrospinal fluids	8	65.35	79.86	81.8
	16	37.15	42.97	86.5
	32	20.70	22.20	93.3
	64	12.34	10.82	87.7

##### 2. Added Recovery Assay

Specimen	Theoretical Value (pg/mL)	Measurement Value (pg/mL)	%
10% FCS added RPMI-1640 (x2)	250.00	203.82	81.5
	125.00	102.49	82.0
	62.50	53.42	85.5
Human Serum (x10)	398.18	401.42	100.8
	273.18	232.78	85.2
	210.68	200.72	95.3
	179.43	160.94	89.7
Human Plasma (EDTA) (x10)	302.95	249.36	82.3
	177.95	136.04	76.4
	115.45	90.97	78.8
Human Cerebrospinal fluids (x50)	255.52	213.22	83.4
	130.52	123.71	94.8
	68.02	65.49	96.3
	36.77	34.91	94.9

##### 3. Inter - Assay

Measurement Value (pg/mL)	SD value	CV value (%)	n
361.86	10.88	3.0	21
107.25	4.77	4.4	21
33.26	3.40	10.2	21

##### 4. Intra - Assay

Measurement Value (pg/mL)	SD value	CV value (%)	n
364.03	16.19	4.4	29
109.66	6.69	6.1	29
33.33	2.99	9.0	29

##### 5. Specificity

Compound	Cross Reactivity
Human A $\beta$ (1-40)	100.0%
Human A $\beta$ (1-42)	$\leq 0.1\%$
Human A $\beta$ (1-43)	$\leq 0.1\%$
Human A $\beta$ (17-40), (P3 Form)	$\leq 0.1\%$
Rat/Mouse A $\beta$ (1-40)	16.3%
Rat/Mouse A $\beta$ (1-42)	1.5%

##### 6. Sensitivity

2.77 pg/mL

The sensitivity for this kit was determined using the guidelines under the National Committee for Clinical Laboratory Standards (NCCLS) Evaluation Protocols. (National Committee for Clinical Laboratory Standards Evaluation Protocols, SC1, (1989) Villanova, PA: NCCLS.

#### PRECAUTION FOR INTENDED USE AND/OR HANDLING

1. All reagents should be stored at 2~8°C. All reagents shall be brought to room temperature approximately 30 minutes before use.
2. "3, Standard" is lyophilized products. Be careful to open this vial.
3. "7, Stop solution" is a strong acid substance. Therefore, be careful not to contact your skin and clothes with "7, Stop solution" and pay attention to the disposal of "7, Stop solution".
4. "1, Precoated plate" and "3, Standard" contain sodium azide. Therefore, dispose these materials after diluting them with large quantity of water to avoid the production of explosive metallic azide.
5. The precipitation may grow in "2, Labeled antibody Conc.", however, there is no problem in the performance.
6. Wash hands after handling reagents.
7. Do not mix the reagents with the reagents from different lot or different kit.
8. Do not use the reagents expired.
9. This kit is for research purpose only. Do not use for clinical diagnosis.

#### STORAGE AND THE TERM OF VALIDITY

Storage Condition : 2 ~ 8°C  
The term of validity : 12 months  
(The expiry date is specified in outer box.)

#### REFERENCE

1. Selkoe DJ. Normal and abnormal biology of the  $\beta$ -Amyloid precursor protein. Annu. Rev. Neurosci. 17: 489-517, 1994.
2. Wang R, Sweeney D, Gandy SE, and Sisodia SS. The profile of soluble amyloid  $\beta$  protein in cultured cell media. J. Biol. Chem. 271: 31894-31902, 1996.
3. Saido T.C., Iwatsubo T., Mann D.M.A., Shimada H., Ihara Y., and Kawashima S. Dominant and differential deposition of distinct  $\beta$ -amyloid peptide species, A $\beta$  N3(pE), in senile plaques. Neuron 14, 457-466, 1995.
4. Horikoshi Y., Mori T., Maeda M., Kinoshita N., Sato K., Yamaguchi H., A $\beta$  N-terminal-end specific antibody reduced  $\beta$ -amyloid in Alzheimer-model mice. Biochem. Biophys. Res. Commun. 325: 384-387, 2004

Version

040915 Established

051003 Revised (Added Code No. 27729 and INTENDED USE)