ANASPEC SensoLyte® Thioflavin T Beta-Amyloid (1-40) Aggregation Kit **Fluorimetric**

Revision number: 1.2 *Last updated: February 2021*

Catalog #	AS-72213
Kit Size	96-well plate format

- ***Optimized Performance:*** Optimal conditions for Aβ40 fibrillation.
- ***High Speed:*** Minimal hands-on time.
- ***Assured Reliability:*** Detailed protocol and references are provided.

Kit Components, Storage and Handling

Component	Description	Quantity
Component A	Assay Buffer	25 ml
Component B	Beta-Amyloid (1-40) (Aβ40), human	0.5 mg (2 x 0.25 mg, net peptide)
Component C	Thioflavin T (ThT)	20 mM, 100 µl
Component D	Rhodamine B	20 mM, 25 µl
Component E	Phenol Red	20 mM, 25 µl

Other Materials Required (but not provided)

- 96-well plate: non-binding black microplate.
- Fluorescence microplate reader: Capable of detecting emission at 484 nm with excitation at 440 nm.
- The amount of Aβ40 supplied with the kit is enough for 20 assays and can be purchased separately (Cat. #AS-72215). All other components are supplied to run 100 assays.

Storage and Handling

- Store kit components at 4 °C.
- Components B, D, and E should be stored at -20 °C if not used within one week.

Introduction

Alzheimer's disease (AD), the most common cause of dementia, is characterized by the presence of senile plaques and neurofibrillary tangles, surrounded by damaged neurons. Beta-Amyloid (Aβ) peptides, Aβ40 (1-40) and Aβ42 (1-42), were found to be a major component of the above plaques.

Many studies suggest that these peptides can form toxic oligomers and fibrils under physiological conditions and rapidly aggregate. Since Aβ aggregation is evidently an essential event in the pathogenesis of AD, a reliable assay is important to study Aβ fibrillation kinetics and screen for Aβ aggregation inhibitors.

SensoLyte® ThT Aβ40 Aggregation kit provides a convenient and standard method to measure Aβ40 aggregation using Thioflavin T dye. Aβ40 peptide is pretreated to ensure it is in a monomer state. Optimized fibrillation buffer is included with the kit, and two known inhibitors are supplied as a control. The assay is based on the property of ThT dye to increase its fluorescence Ex/Em=440/484 nm when bound to aggregated Aβ peptides.

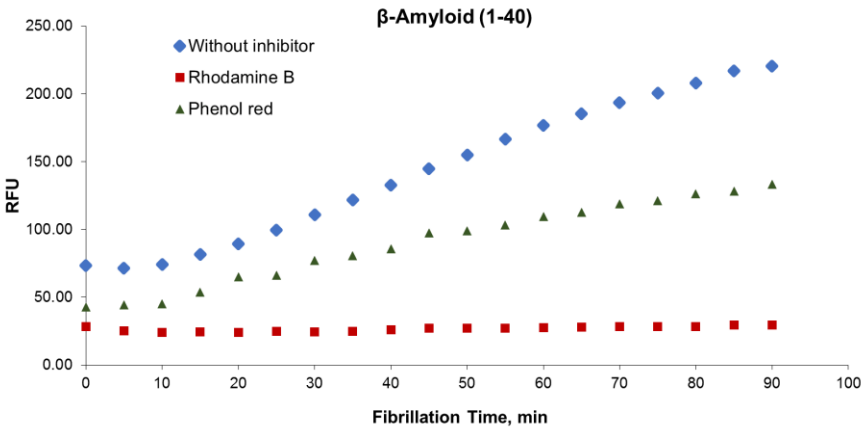

Figure 1.
An increase of fluorescence signal is correlated with an increase of Aβ40 fibril formation. Rhodamine B and Phenol Red were added at 100 µM final concentration to inhibit Aβ40 aggregation. Fluorescence signal was monitored at Ex/Em= 440/484 nm every 5 minutes at 37 ºC with 15 seconds shaking between reads (SpectraMax M5e, Molecular Devices.).

Protocol

Note 1: Only the following buffers were tested with this assay: 50mM Tris/150mM NaCl, 20mM HEPES/150mM NaCl, 10mM Phosphate/150mM NaCl (all pH=7.2). Aβ40 may not fibrillate in other buffer systems

Note 2: The amount of Aβ40 supplied with the kit is enough for 20 assays and can be purchased separately (Cat. #AS-72215). All other components are supplied to run 100 assays.

➡ **Use only non-binding black plates to run assay, plates that absorb proteins will affect assay performance!**

1. Prepare working solutions

Note: Warm up all kit components, except Component A, to room temperature.
Component A should be kept at 4 °C to prevent premature Aβ40 aggregation.

1.1 ThT working solution: Add 100 µl of 20mM ThT (Component C) to 900 µl of the assay buffer (Component A) to get 2mM solution. This amount is enough for 100 assays. Adjust amount of 2mM ThT for the number of assays if necessary.

1.2 Aβ40 peptide solution: Add 1 ml of **cold** assay buffer (Component A) to Aβ40 glass vial. Let peptide to hydrate for a few minutes. Sonicate (water bath sonicator) for 3-5 minutes if necessary to completely dissolve peptide. Do not vortex, mix by inversion only. Transfer Aβ40 solution into centrifuge tube and spin at 10,000 rpm for 5 minutes at 4 ºC to centrifuge out any precipitated material.

1.3 Inhibitor solutions: Dilute inhibitors (Components D and E) from 20mM stock solution to 2mM in the assay buffer (Component A). 100 µl of the assay mixture will require 5 µl of the diluted inhibitor to achieve 100µM final concentration. Add 5 µl of the 2mM inhibitor solution into each of the inhibitor control well.

2. Set up the fibrillation reaction

2.1 Add 10 µl of 2mM ThT (from Step 1.1) into each well.

2.2 Add test samples and controls to the microplate wells. Suggested volume of Aβ40 peptide solution is 85 µl and 5 µl of the test compound.

2.3 Simultaneously establish the following control wells as necessary:

- Inhibitor control contains Aβ40 (from Step 1.2) and aggregation inhibitor supplied in the Kit either Rhodamine B of Phenol Red (Components D or E) at 100 µM final concentration.
- Positive control contains Aβ40 (from Step 1.2) without inhibitor.
- Vehicle control contains assay buffer (Component A) and vehicle used in delivering test compound (*i.e.* DMSO, concentration not to exceed 1%).
- Test Compound contains Aβ40 peptide (from Step 1.2) and test compound.
- Test Compound Control contains assay buffer (Component A) and test compound only.
- Blank contains assay buffer (Component A) only.

2.4 Bring the total volume of all samples to 100 µl using assay buffer (Component A).

3. Run Fibrillation Assay

3.1 Immediately start measuring fluorescence intensity at 37ºC with Ex/Em=440 nm/484 nm and 15 sec shaking between reads to facilitate aggregation. Read every 5 or 10 minutes.

Note: If temperature control is unavailable in fluorescence reader, incubate plate in 37 ºC incubator between reads. Protect plate from light.

4. Analysis of Data.

4.1 The fluorescence reading from the blank control wells is used as the background fluorescence. This background reading should be subtracted from the readings of the other wells. All fluorescence readings are expressed in relative fluorescence units (RFU).

4.2 Plot fibrillation kinetics curve as RFU versus fibrillation time.

4.3 Determine inhibition %, IC_{50}, etc.

References

1. Hellstrand E., *et. al*., ACS Chem. Neurosci., (2010) **1**: 13-18.
2. Karafin A., *et. al*., MEDIMOND, (2009) **11-15**: 255-259.
3. Hudson S. A., *et. al*., FEBS J., (2009) **276**: 5960-5972.
4. Liu R., *et. al*., Neurobiol. of Disease, (2005) **20**: 74-81.
5. Kudva Y. C., *et. al*., Biochem. J., (1998) **331**: 809-813.