Supporting information

Composite of KLVFF-Transthyretin-Penetratin and Manganese Dioxide Nanoclusters: A Multifunctional Agent against Alzheimer's β-Amyloid Fibrillogenesis

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Table S1. Lag time (T_{lag}) of $A\beta_{40}$ aggregation kinetics calculated from Figure S2.

Sample	T_{lag} (h)
Aβ only	49.8 ± 5.8
Aβ + 10 μg/mL TTR	58.5 ± 2.1
Aβ + 25 μg/mL TTR	81.1 ± 3.0
Aβ + 50 μg/mL TTR	86.5 ± 2.2
Aβ + 10 μg/mL KTP	16.8 ± 1.5
Aβ + 25 μg/mL KTP	26.4 ± 2.5
Aβ + 50 μg/mL KTP	——
Aβ + 10 μg/mL KTP @MnO_2	21.2 ± 3.1
Aβ + 25 μg/mL KTP @MnO_2	68.1 ± 3.5
Aβ + 50 μg/mL KTP @MnO_2	——

Table S2. The content of secondary structure of $A\beta_{40}$ incubated with different inhibitor was calculated by the BeStSeL algorithm (http://bestsel.elte.hu/). Others include 3_{10}-helix, bends, π-helix, β-bridge, and irregular/loop.

Secondary structure	Aβ only	Aβ only (0 h)	+ 50 μg/mL TTR	+ 50 μg/mL KTP	+ 50 μg/mL KTP@MnO_2
Helix	22.4	30.3	12.8	11.3	0
Antiparallel β-sheet	20.5	64.8	35.5	44.9	44.5
Parallel β-sheet	57.1	0	36.8	0	0
Turn	0	0	15	13.2	9.7
Others	0	5	0	30.6	45.8

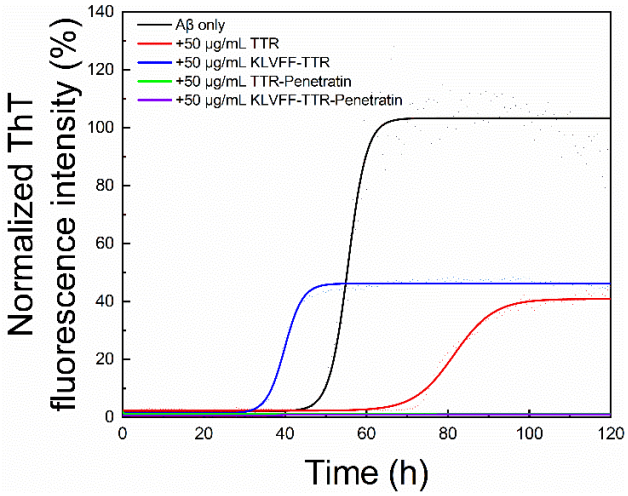

Figure S1. Aggregation kinetics of $A\beta_{40}$ incubated with TTR-derived proteins.

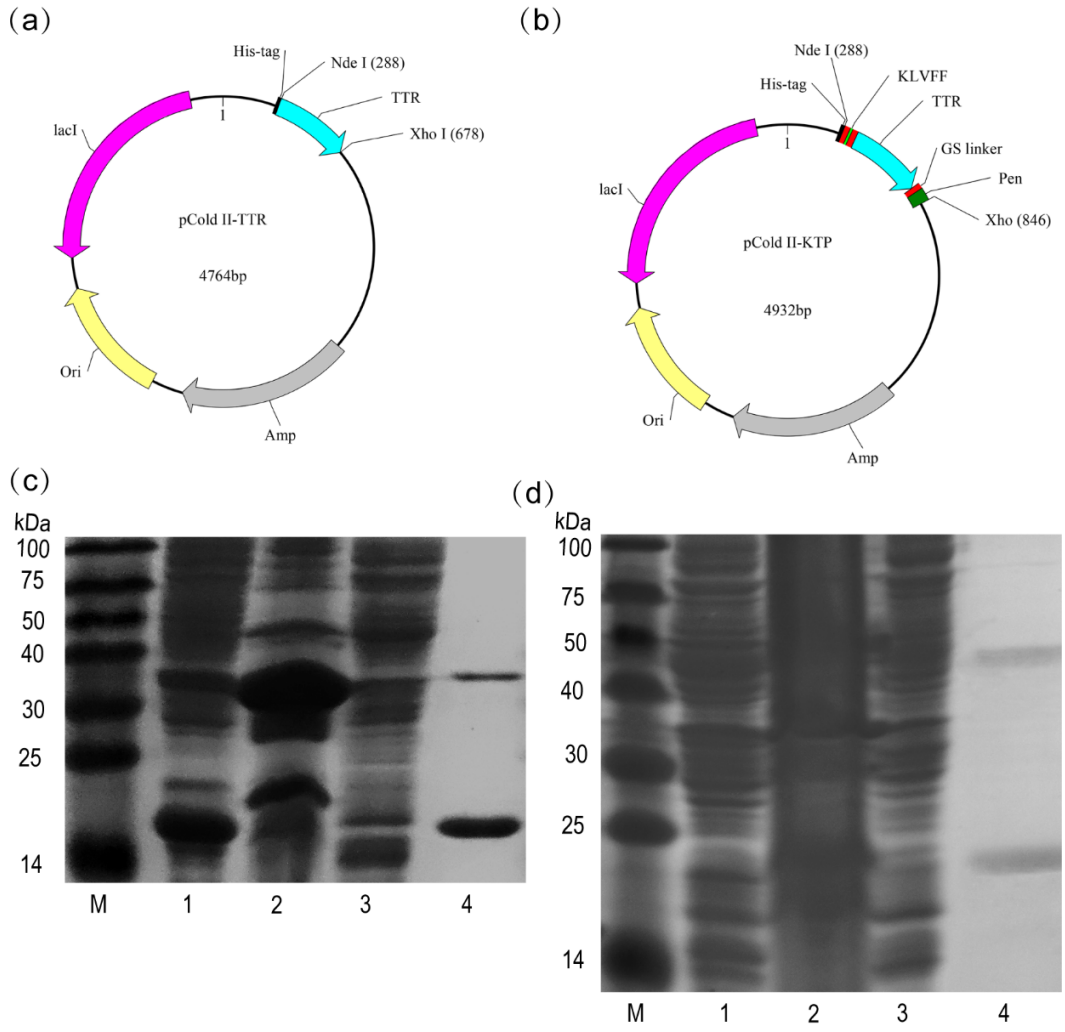

Figure S2. (a)-(b) Construction of pCold II-TTR and pCold II-KTP expression vectors. (c) SDS-PAGE of TTR. Lanes: M, protein marker; 1, supernatant of cell lysate; 2, precipitate of cell lysate; 3, washing eluent; 4, purified TTR. (d) SDS-PAGE of KTP. Lanes: M, protein marker; 1, supernatant of cell lysate; 2, precipitate of cell lysate; 3, washing eluent; 4, purified KTP.

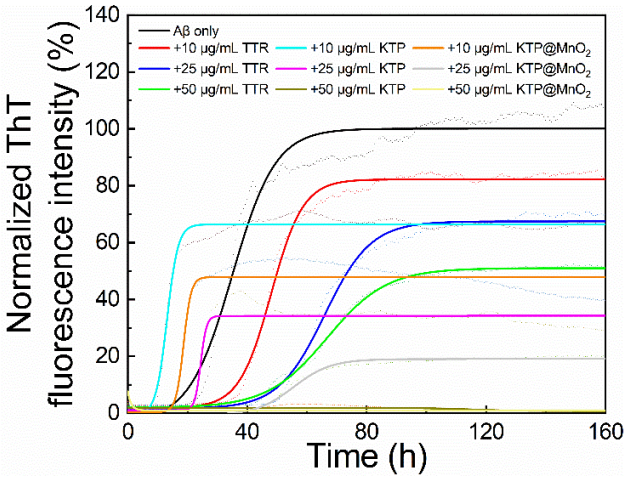

Figure S3. Aggregation kinetics of Aβ40 incubated with different concentrations of TTR, KTP or KTP@MnO2.

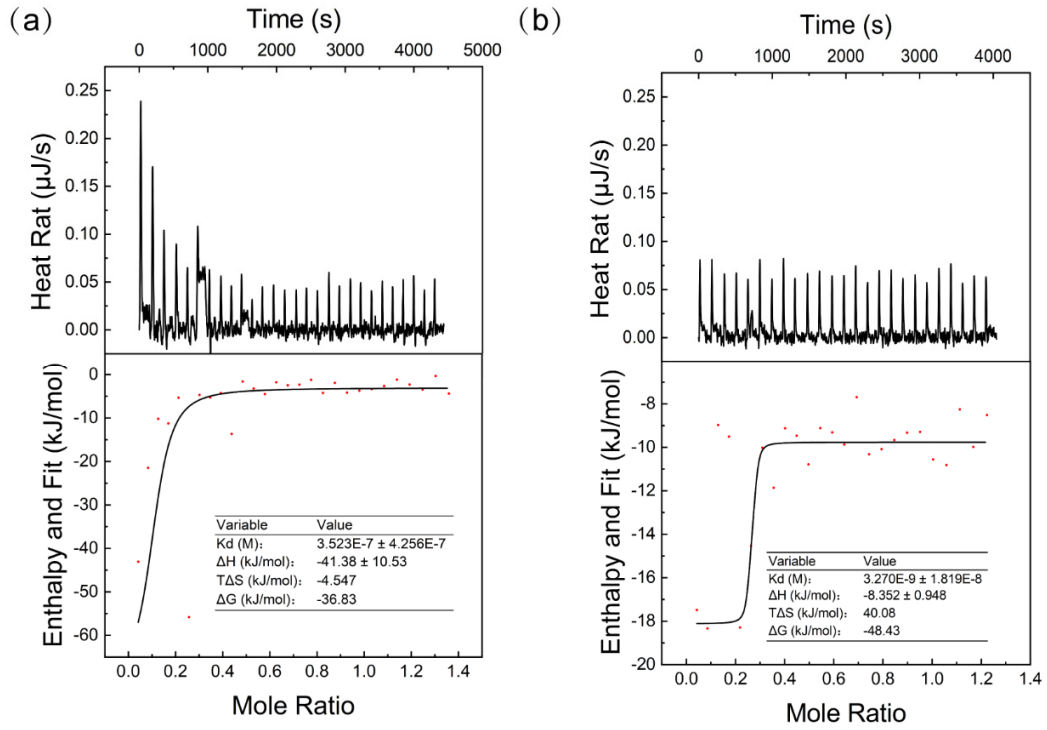

Figure S4. ITC binding isotherm for the titration of (a) TTR and (b) KTP to Aβ40.

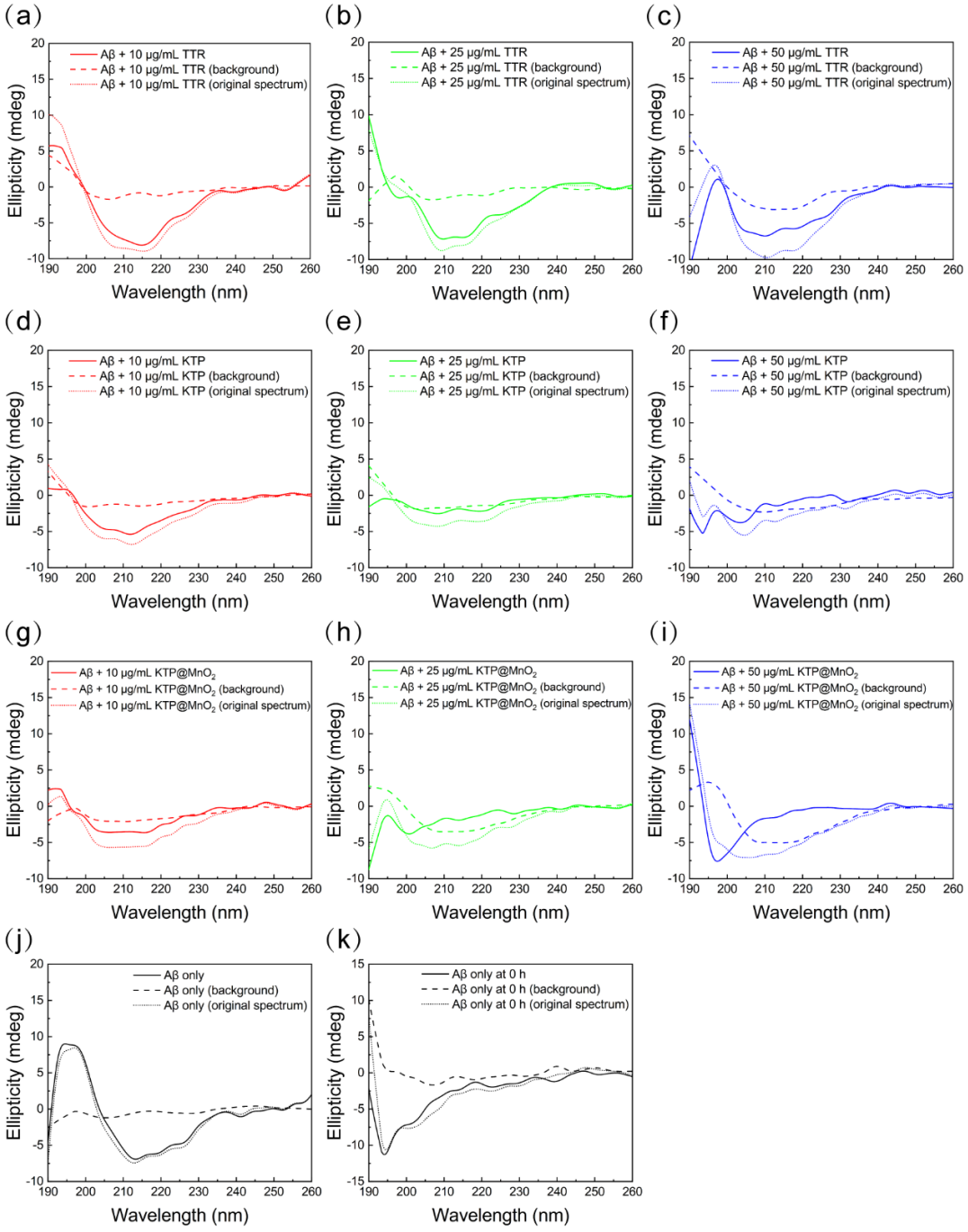

Figure S5. CD spectra of $A\beta_{40}$ incubated with (a) 10 μg/mL TTR, (b) 25 μg/mL TTR, (c) 50 μg/mL TTR, (d) 10 μg/mL KTP, (e) 25 μg/mL KTP, (f) 50 μg/mL KTP, (g) 10 μg/mL KTP@MnO_2, (h) 25 μg/mL KTP@MnO_2, and (i) 50 μg/mL KTP@MnO_2. (j) CD spectra of $A\beta_{40}$ after incubation. (k) CD spectra of $A\beta_{40}$ without incubation. (Background is an Aβ-free solution, and the spectrum corresponding to the solid line is the original spectrum minus the background spectrum).

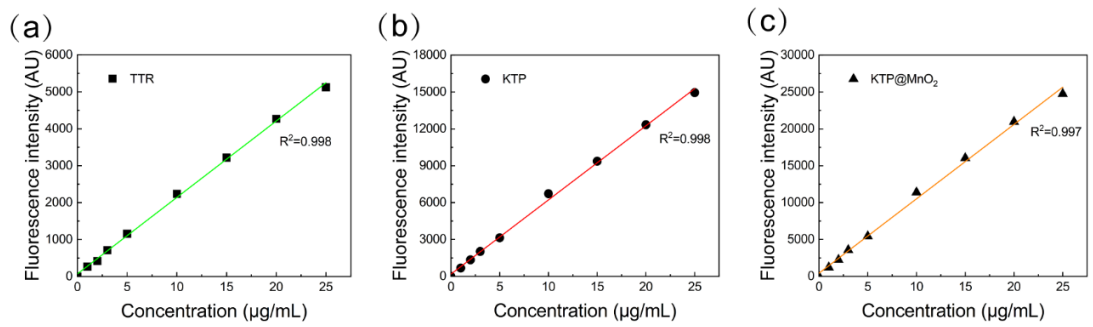

Figure S6. Standard curves of Cy5 fluorescence intensity of (a) TTR, (b) KTP, and (c) KTP@MnO_2.

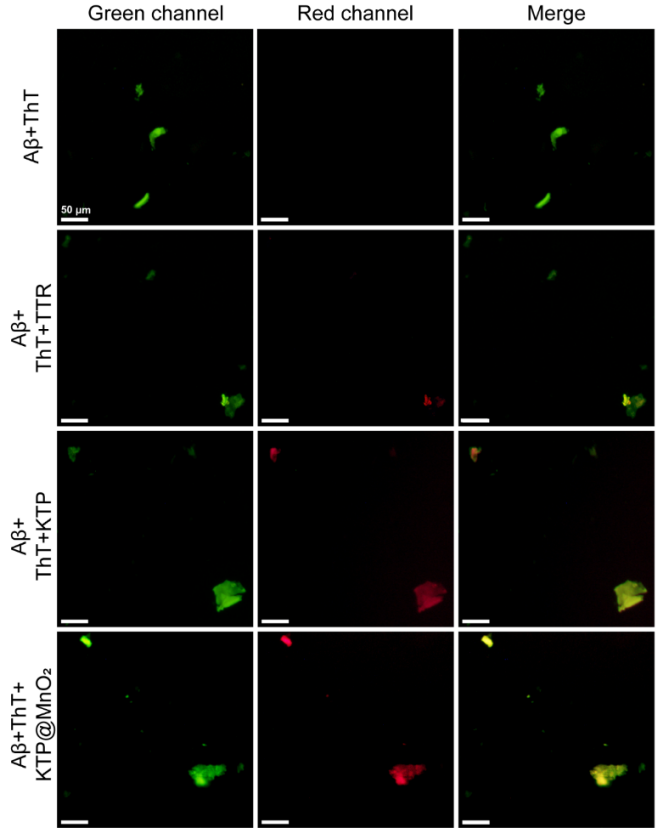

Figure S7. *In vitro* targeting capability of different inhibitors. Aβ plaques were stained with Aβ-specific probe ThT (Green channel) and incubated with Cy5-labelled inhibitors (Red channel). Scale bars, 50 μm.

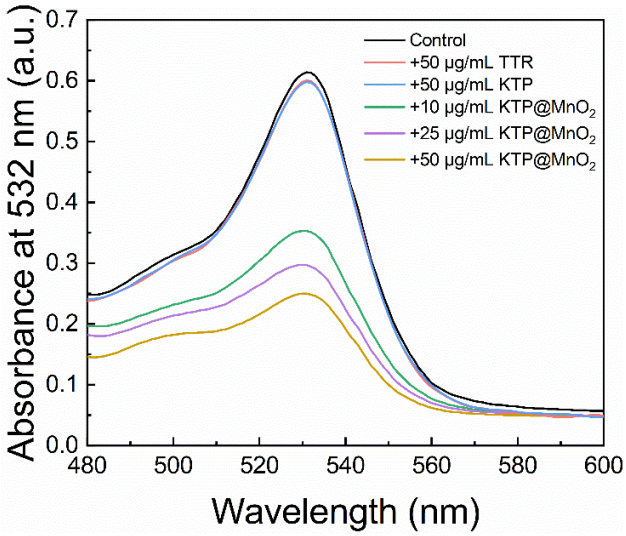

Figure S8. ·OH scavenging ability of different inhibitors.