Electronic Supplementary Material for

Using multifunctional peptide conjugated Au nanorods for monitoring β-amyloid aggregation and chemo-photothermal treatment of Alzheimer's Disease

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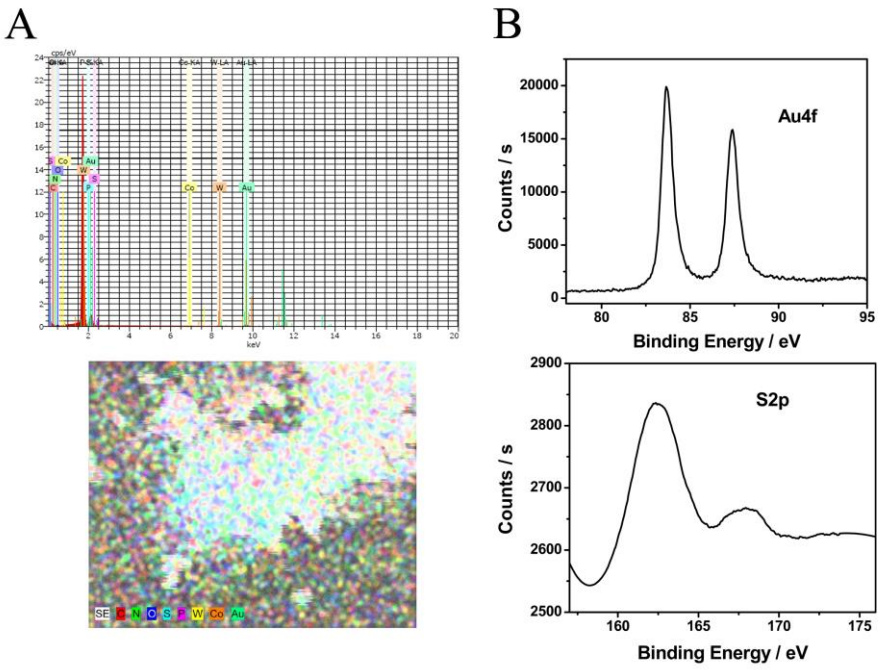

Figure S1. (A) X-ray energy dispersive spectroscopy analysis for AuP nanorods. (B) X-ray photoelectron spectroscopy analysis for amine modified Au nanorods.

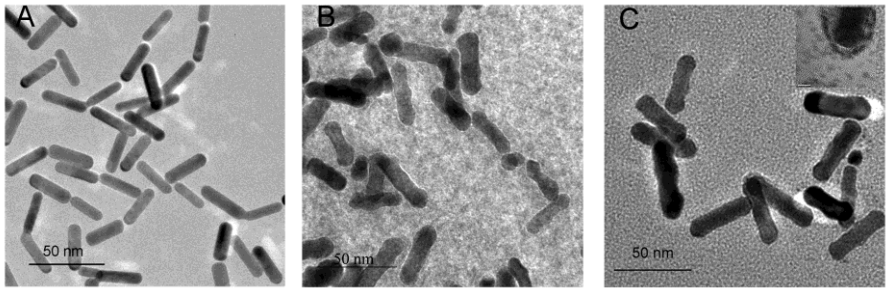

Figure S2. TEM images of (A) Au nanorods, (B) Au-POM nanorods and (c) AuP nanorods.

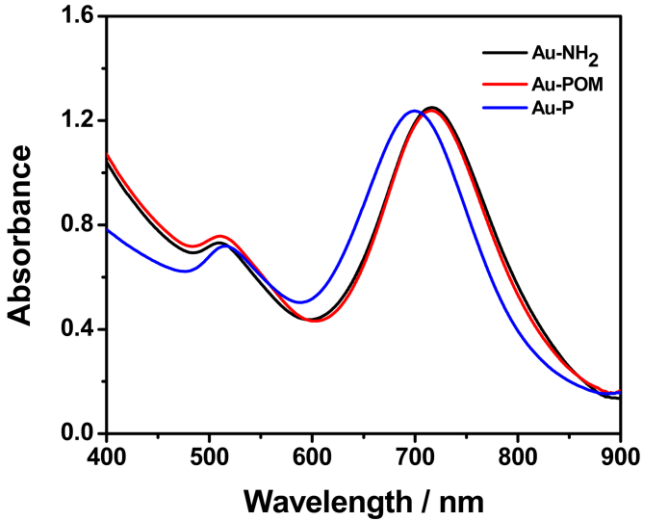

Figure S3. UV-Vis spectra of different modified Au nanorods. The concentrations of these nanorods were all kept in 0.3 nM.

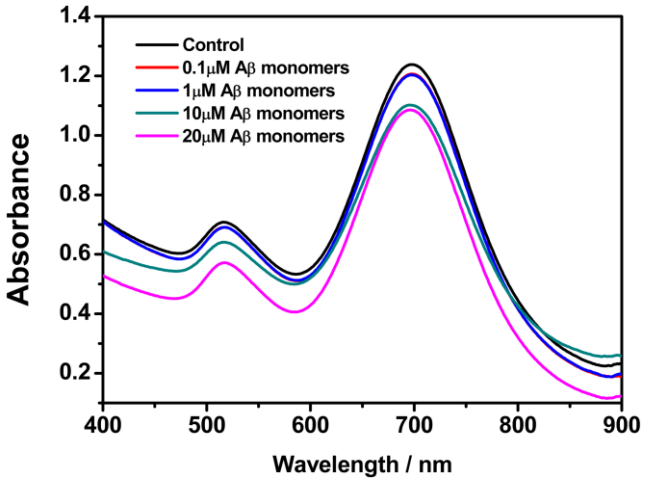

Figure S4. UV-Vis spectra of AuP nanorods in the presence of different concentrations of Aβ monomers. The concentration of AuP nanorods was 0.3 nM.

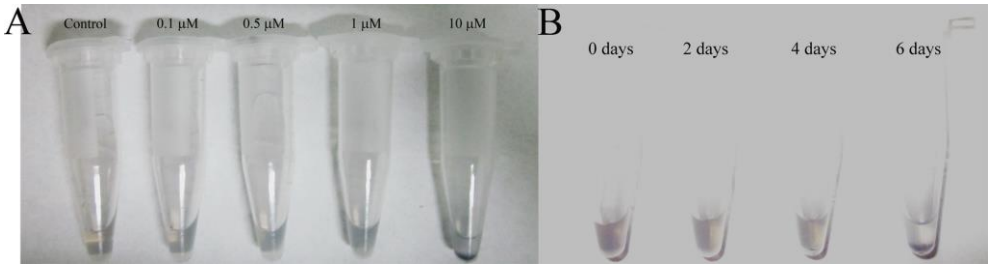

Figure S5. (A) Colorimetric response of AuP nanorods in the presence of different concentrations of Aβ1-40 fibrils. The concentration of AuP nanorods was 0.3 nM. (B) Colorimetric response of the AuP nanorods in the presence of Aβ1-40 in Tris buffer measured at different incubation times. The final concentration of AuP nanorods and Aβ1-40 were 0.6 nM and 10 μM.

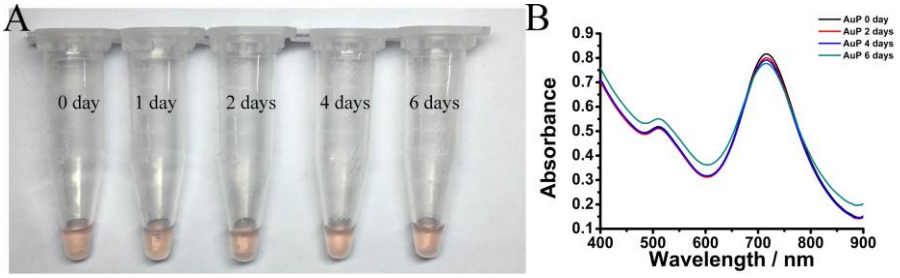

Figure S6. (A) Colorimetric change of AuP itself during incubation time. (B) UV-Vis spectra of AuP itself during incubation time.

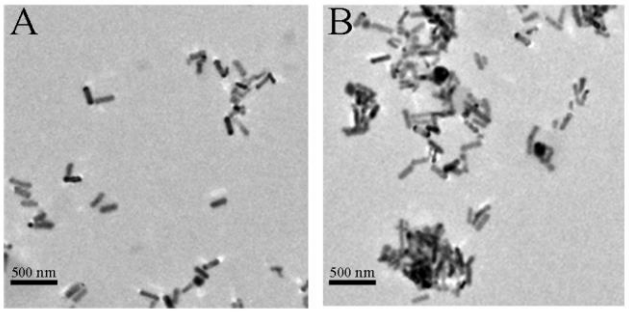

Figure S7. Representative TEM images for the AuP nanorods (A) in the absorbance and (B) prescence of Aβ1-40 fibrils.

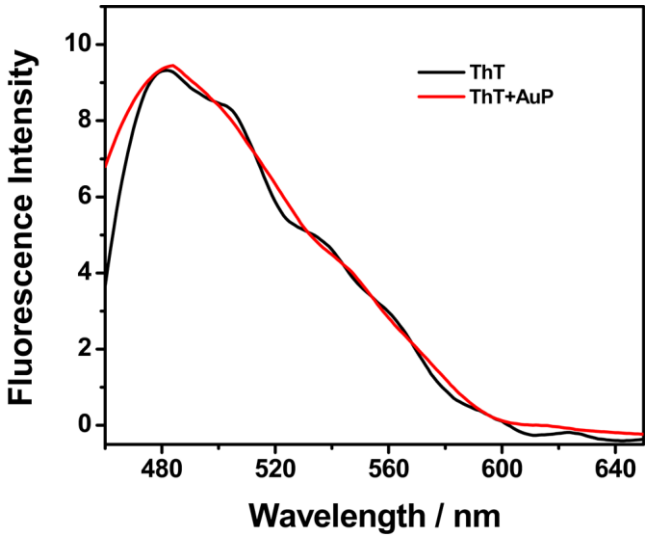

Figure S8. The influence of AuP nanorods on the fluorescence of ThT. The concentration of AuP nanorods and ThT were 0.03 nM and 10 μM.

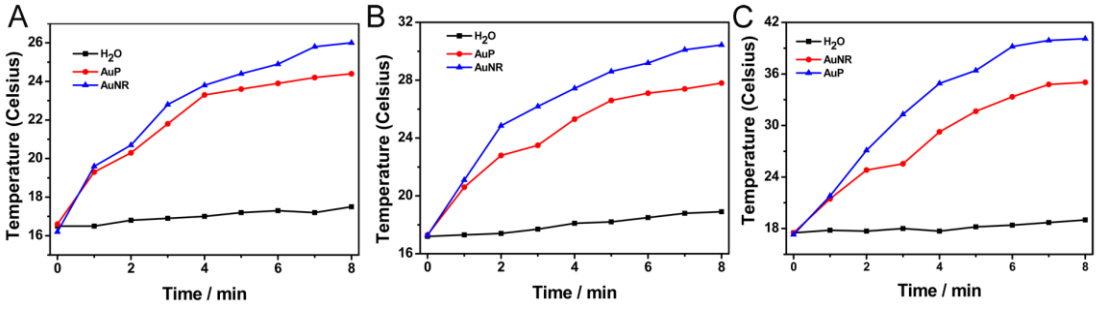

Figure S9. Temperature change curves of the AuP solution and the water exposed to the 808 nm laser at a power density of 0.5 W/cm^2 (A), 1 W/cm^2 (B) and 2 W/cm^2 (C). Blue curve is 400 μL of solution with 1nM concentration of AuP nanorods, red curve is Au nanorods and black curve is water.

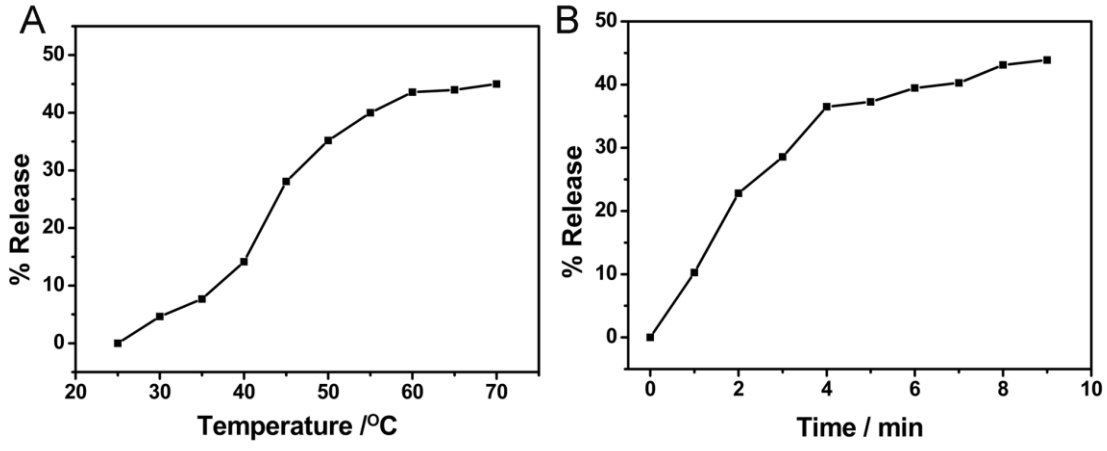

Figure S10. Release profiles of POMs from the assembled AuP nanorods triggered by (A) increased temperature and (B) by 808 nm NIR light at power density of 1 W/cm^2 for 9 min. The concentration of AuP nanorods was 0.3 nM.

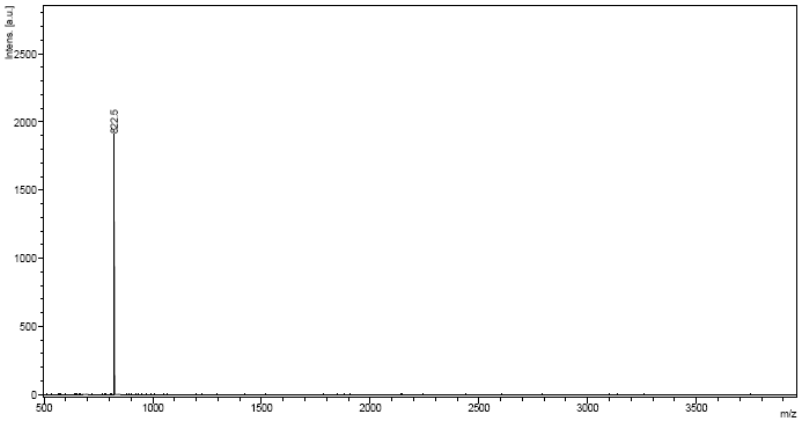

Figure S11. MALDI-TOF mass spectra of the supernatant of AuP solution which was centrifuged (8000 rpm) after irradiation for 8 min.

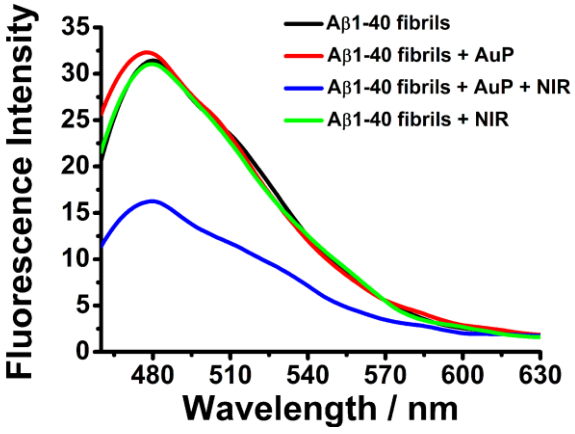

Figure S12. The influence of the photothermal effect of AuP nanorods on Aβ1-40 aggregation monitored by fluorescence spectroscopy. [Aβ1-40] = 2 μM, [ThT] = 10 μM, [AuP] = 0.012 nM.

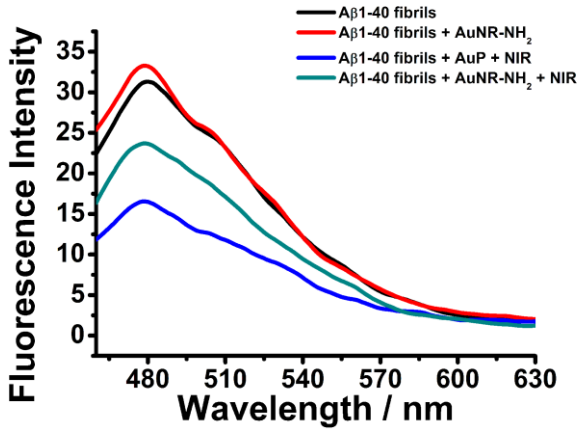

Figure S13. The influence of the photothermal effect of $AuNH_2$ nanorods on Aβ1-40 aggregation monitored by fluorescence spectroscopy. [Aβ1-40] = 2 μM, [ThT] = 10 μM, [$AuNH_2$] = 0.012 nM.

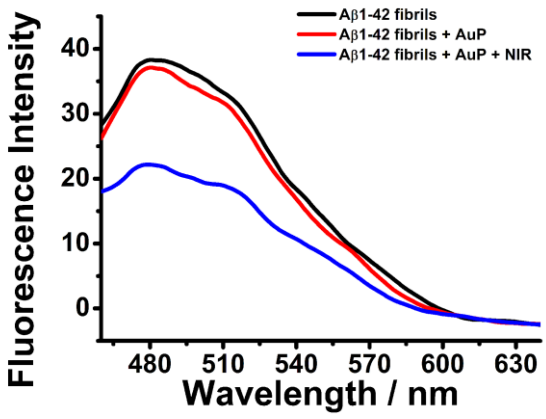

Figure S14. The influence of the photothermal effect of AuP nanorods on Aβ1-42 aggregation monitored by fluorescence spectroscopy. [Aβ1-42] = 2 μM, [ThT] = 10 μM, [AuP] = 0.012 nM.

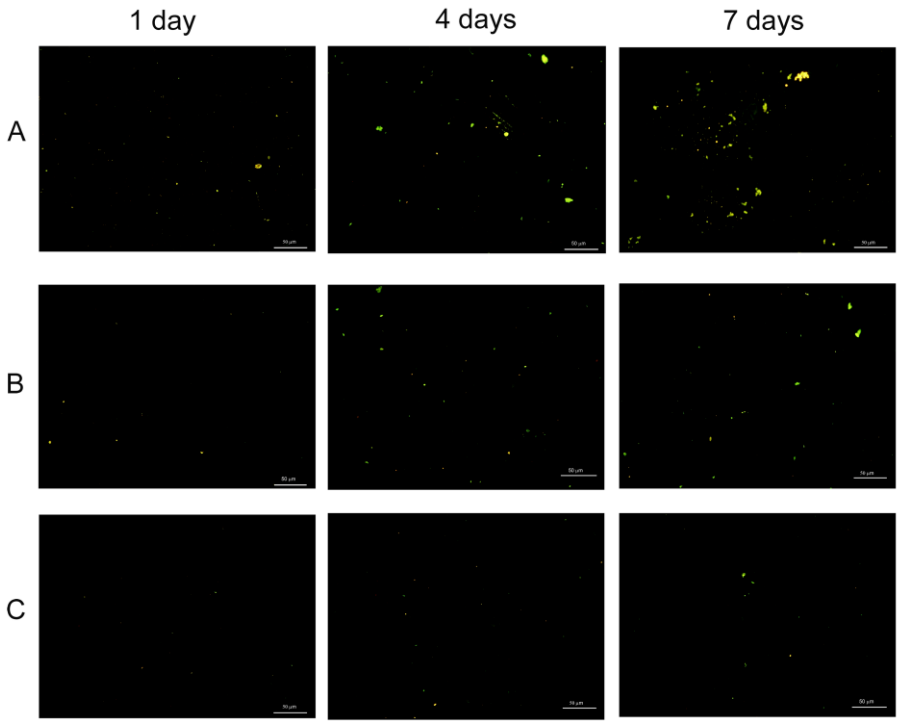

Figure S15. Fluorescence images of Aβ1-40 treated with or without AuP nanorod in mice CSF at different time. (A) Aβ1-40 (B) Aβ1-40 co-incubated with AuP nanorods (C) Aβ1-40 co-incubated with AuP nanorods upon NIR. [Aβ1-40] = 50 μM , [AuP] = 0.3 nM.

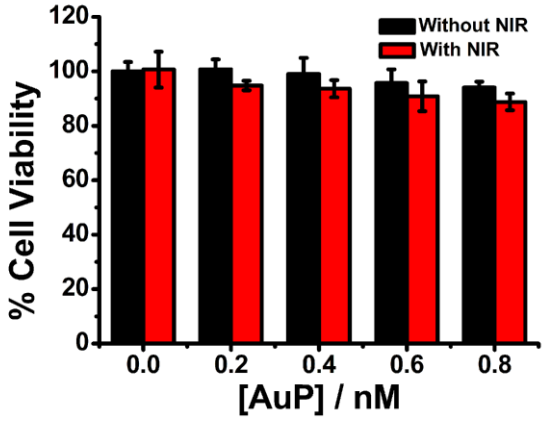

Figure S16. Effects of AuP nanorods on PC12 cell viability. Cell viability was determined using the MTT method and data points shown are the mean values ± standard error of the mean (SEM) from three independent experiments.

Table S1 The zeta potential of different nanomaterials.

Materials	Zeta Potential (mV)
Au Nanorod	39.2
AuNR-NH_2	17.5
Au-POM	-26.0
AuP	-22.2

Table S2 The amount of nanorod accumulation in the brain of the mouse.

	Samples treated with AuP nanorod		Control samples
	ICP results (ng/mL^{-1})	Amounts (%)	ICP results (ng/mL^{-1})
1	21.34	1.422	2.134
2	36.73	2.449	2.021
3	36.28	2.419	1.854
Average	31.45±5.06	2.097±0.337	2.003±0.081