# Supporting Information

## 1. Synthesis of Monodisperse Oleate-Capped $Fe_3O_4$ Nanoparticles.

100 mmol $FeCl_3 \cdot 6H_2O$ and 50 mmol $FeCl_2 \cdot 4H_2O$ were first dissolved in 250 mL of pure water, followed by adjusting the solution temperature to 90 ºC. Then 75 mL concentrated ammonium hydroxide aqueous solution and 5 g oletic acid were sequentially added rapidly while stirring was continued. The mixture was allowed to stir for 3h to give rise to black precipitates. The product was separated with an assistant magnet, washed with deionized water and ethanol, as well as dried in vacuum overnight. After drying, the oleate-capped $Fe_3O_4$ nanoparticles were dispersed in chloroform ($CHCl_3$) with a concentration of 30 mg/mL for further use.

## 2. Synthesis of $Fe_3O_4$-DA.

$Fe_3O_4$ nanoparticle (10 mg) was added to a solution of DA (7.5 mg) in dichloromethane (5 mL). The mixture was stirred overnight at room temperature. The modified $Fe_3O_4$ nanoparticles were precipitated by adding n-hexane, collected by centrifugation at 6000 rpm, then washed sequentially with dichloromethane/n-hexane (1:5, v/v) and dimethylformamide (DMF). Finally, the product was redispersed in DMF.

## 3. Synthesis of $Fe_3O_4$-DA-BNA.

A 10 mg portion of $Fe_3O_4$-DA was suspended in 5 mL DMF and sonicated for 1 h at room temperature. 4-bromomethyl-3-nitrobenizoic acid (BNA, 10 mg), N-hydroxysulfosucnimide sodium salt (NHS, 10 mg), and 1-[3-(dimethylamino)propyl]-3-ethylcarbodiimide hydrochloride (EDC, 10 mg) were suspended in 5 ml DMF and stirred for 1h. Following the activation step, the solution of $Fe_3O_4$-DA (10 mg) in dichloromethane was added, and the mixture was stirred at room temperature. After approximately 24 h, the nanoparticles were precipitated by adding n-hexane, and collected by centrifugation at 6000 rpm, then washed sequentially with dichloromethane/n-hexane (1:5, v/v) and DMF. Finally, the product was redispersed in DMF.

## 4. Synthesis of 1c.

CQ (12 mg) and $K_2CO_3$ (10 mg) were added to a solution of $Fe_3O_4$-DA-BNA (10 mg) in dimethylformamide (DMF) (5 mL), and the mixture was stirred for 18 h at 40 ºC. Then, the reaction mixture was cooled and with a small permanent magnet the product was separated from the solution and then washed with ethanol two times. The obtained NPs were finally evaporated in vacuum.

## 5. Characterization of 1c.

The presence of CQ on $Fe_3O_4$ NPs was characterized by FTIR.[1] IR spectrum of **1**c (Figure S2) has the ether (=C-O-C) vibration at 1155 $cm^{-1}$ and 1010 $cm^{-1}$ that do not appear in **1**c, demonstrating the covalent bonding between CQ and BNA. The vibration at 823 $cm^{-1}$ and 706 $cm^{-1}$ for **1**c can be assigned to the vibration peak of quinoline, suggesting that CQ is connected to $Fe_3O_4$ NPs through substitution reaction.

## 6. Analysis of photoreleased product (CQ) from 1c.

Since CQ is slightly soluble in water, 2 mM stock CQ solution and 125mg/mL stock **1**c solution were prepared in methanol. In each titration, the solvent composition in the vessel was 50% (v/v) methanol /buffer (10 mM HEPSE, 150 mM NaCl, pH 6.6). The final concentration of CQ is 40 μM and **1**c is 2.5mg/mL. The solution of **1**c was kept in different glass vials. Each vial was irradiated for different duration of time viz. 0, 30 s, 45 s, 1 min, 2 min, 3 min, 4 min, 5 min and 6 min. Subsequently, the irradiated solutions were centrifuged, and the supernates which contain the photoproduct were determined using a UV-Vis spectrophotometer. The final concentration of methanol in our experiment did not exceed 2%.

# References

1 a) Z. Liu, M. Li, X. J. Yang, J. S. Ren, X. G. Qu, *Biomaterials*, 2011, **32**, 4683; b) Y. J. Song, C. Zhao, J. S. Ren, X. G. Qu, *Chem. Commun.*, 2009, 1975; c) Y. J. Song, K. G. Qu, C. Xu, J. S. Ren, X. G. Qu, *Chem. Commun.*, 2010, **46**, 6572.

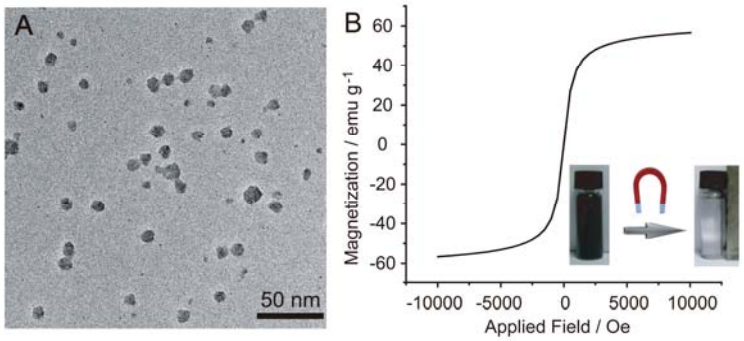


**Fig. S1** Transmission electron micrograph (TEM) images of **1**c (A) and its magnetic properties (B).

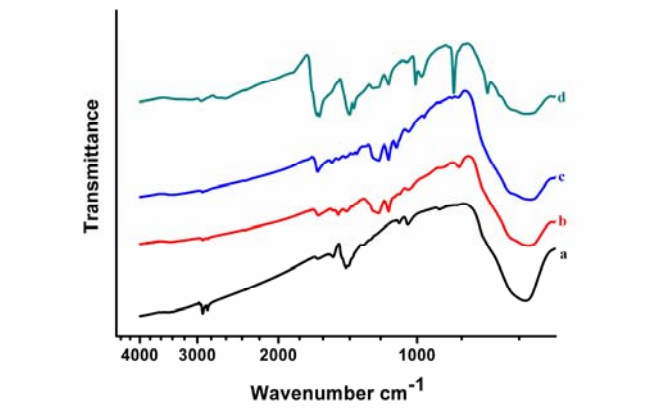


**Fig. S2** IR spectra for (a) $Fe_3O_4$, (b) $Fe_3O_4$-DA, (c) $Fe_3O_4$-DA-BNA and (d) **1**c.

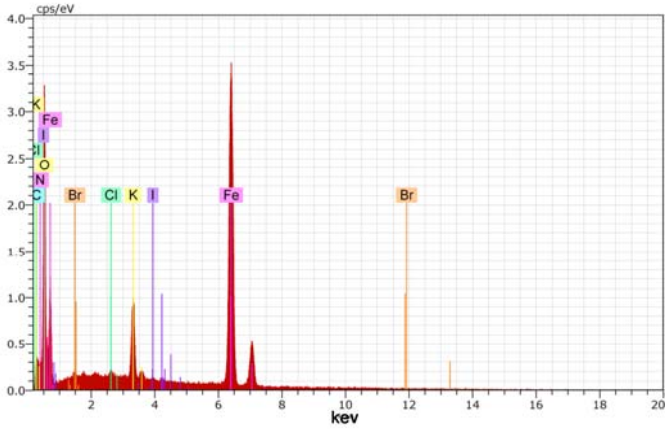


**Fig. S3** EDS spectrum originated from the point scan of **1**c.

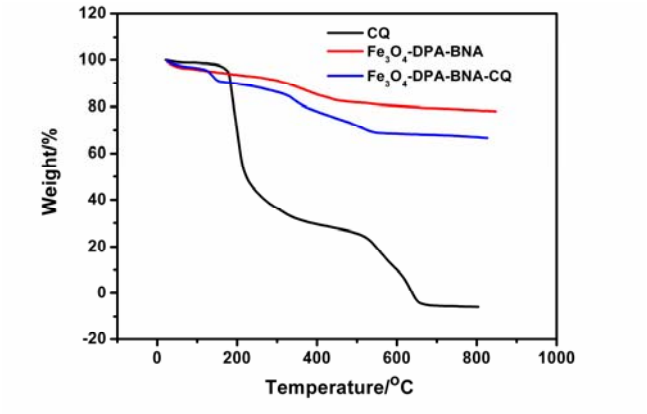


**Fig. S4** Thermogravimetric analysis for CQ (black), $Fe_3O_4$-DA-BNA (red) and **1**c (blue) in air atmosphere with a ramp of 10 °C/min.

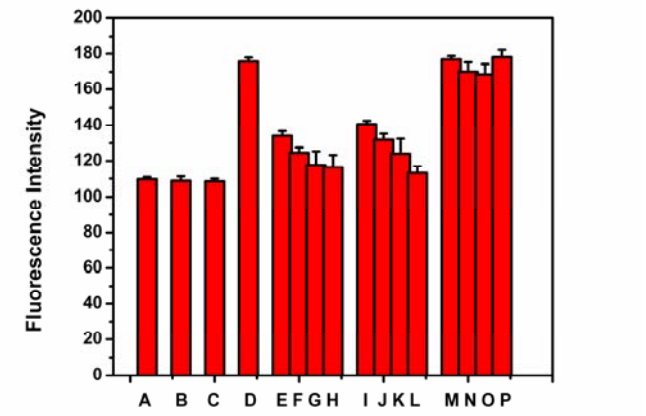


**Fig. S5** Cells were treated with aged Aβ40-$Cu^{2+}$ at the concentration of 5 μM in the absence or presence of compounds and 48 h later ROS generation inside the cells was measured using DCF fluorescence. A: control, B: Aβ, C: $Cu^{2+}$, D: Aβ-Cu complex, E-H: Aβ-Cu complex with different concentration of CQ (1 μM, 5 μM, 10 μM, 50 μM), I-L: Aβ-Cu complex in the presence of different concentration of **1**c with irradiation for 5 min (0.05 mg/mL, 0.25 mg/Ml, 0.5 mg/mL, 2.5 mg/mL), M-P: Aβ-Cu complex in the presence of different concentration of **1**c without irradiation (0.05 mg/mL, 0.25 mg/Ml, 0.5 mg/mL, 2.5 mg/mL). Data represents mean ± SEM of at least three different experiments. Control: Aβ-Cu -untreated cells [Aβ] = 5 μM, [$Cu^{2+}$] = 5 μM.

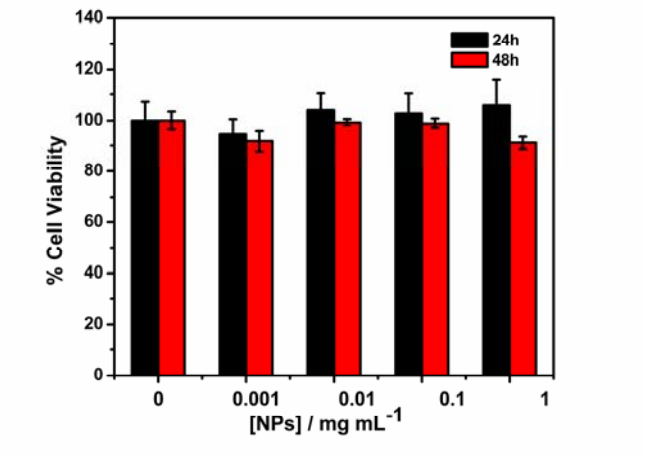


**Fig. S6** Effect of the functional nanoparticles on PC12 cell viability determined by MTT method.

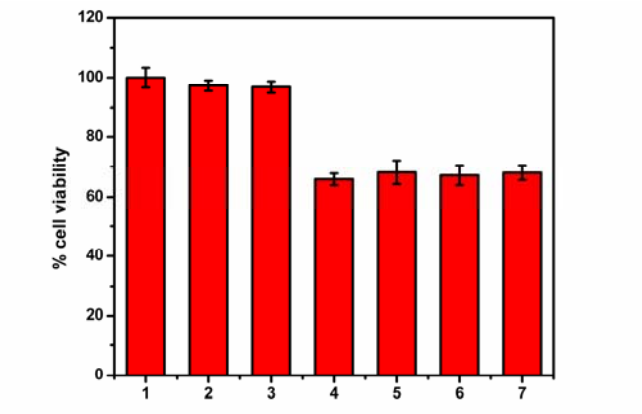


**Fig. S7** Protection effects of compounds on Aβ40-$Cu^{2+}$-induced cytotoxicity of PC12 cells. 1) control, 2) Aβ, 3) $Cu^{2+}$, 4) Aβ-Cu complex, 5) Aβ-Cu complex with irradiation for 5 min, 6) Aβ-Cu complex in the presence of $Fe_3O_4$ NPs with irradiation for 5 min, 7) Aβ-Cu complex in the presence of $Fe_3O_4$ NPs without irradiation. Cell viability was determined using MTT method and data points shown are the mean values ± SEM from three independent experiments. Control: Aβ-Cu -untreated cells [Aβ] = 5 μM, [$Cu^{2+}$] = 5 μM, [$Fe_3O_4$ NPs] = 0.5 mg/ml.

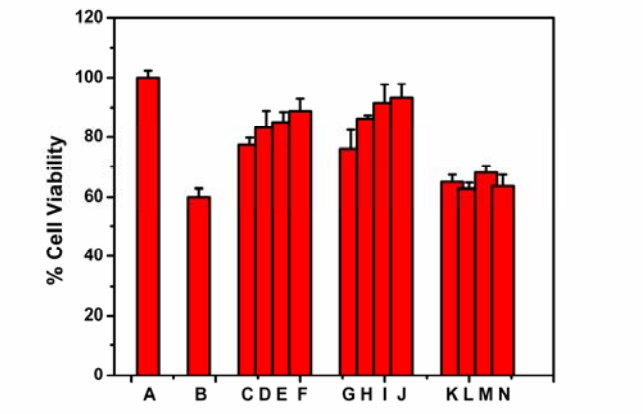


**Fig. S8** Concentration-dependent protection effects of compounds on Aβ40-$Cu^{2+}$-induced cytotoxicity of PC12 cells. A: control, B: Aβ-Cu complex, C-F: Aβ-Cu complex with different concentration of CQ (1 μM, 5 μM, 10 μM, 50 μM), G-J: Aβ-Cu complex in the presence of different concentration of **1**c with irradiation for 5 min (0.05 mg/mL, 0.25 mg/Ml, 0.5 mg/mL, 2.5 mg/mL), K-N: Aβ-Cu complex in the presence of different concentration of **1**c without irradiation (0.05 mg/mL, 0.25 mg/Ml, 0.5 mg/mL, 2.5 mg/mL). Cell viability was determined using MTT method and data points shown are the mean values ± SEM from three independent experiments. [Aβ] = 5 μM, [$Cu^{2+}$] = 5 μM. The control cells are Aβ-Cu -untreated cells. Control: Aβ-Cu -untreated cells [Aβ] = 5 μM, [$Cu^{2+}$] = 5 μM.