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Electronic Supplementary Information (ESI)

Photo-triggered Zn^{2+} release for regulation of zinc enzymes

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Materials and chemicals

Zinc acetate, dichloromethane, and methanol were purchased from Macklin (Shanghai, China). DMSO was purchased from Sigma-Aldrich, 3-(4,5-Dimethylthiazol-2-yl)-2,5-diphenyltetrazolium bromide (MTT) was purchased from Biofroxx (Germany). Serine/Threonine Phosphatase Assay System (V2460) was purchased from Promega Corporation. Amplite™ Colorimetric Zinc Ion Quantitation was purchased from AAT Bioquest Inc. The ultrafiltration Centrifuge tubes (10 kDa) was purchased from Merck Millipore Ltd. The RIPA and Caspase 3 Activity Assay Kit were purchased from Beyotime Biotechnology. TAT was purchased from GL Biochem (Shanghai) Ltd. RPMI-1640 (Roswell Park Memorial Institute), DMEM (Dulbecco's Modified Essential Medium) and FBS (fetal bovine serum) were purchased from Gibco (Life Technologies). Ultrapure water was supplied by Milli-Q Plus System (Millipore Corporation, United States).

Equipment and methods

UV-Vis absorption spectra were measured on a Shimadzu UV-2600 spectrophotometer, medium scanning rate, and quartz cuvettes of 2 cm path length. Photoluminescence spectra were recorded on a Shimadzu RF-6000 spectrofluorometer. Particle size and zeta potential measurements were performed using a Malvern ZetaSizer. TEM measurements were performed on Hitachi HT7700. Confocal lasing scanning microscopic (CLSM) images were obtained on the confocal microscope (Zeiss LSM 880). Ultrasound irradiation was conducted using a Scientz-IID Ultrasonic Homogenizer. ^{1}H and ^{13}C NMR spectra were measured on a Bruker AV 400 NMR spectrometer. Intracellular Zn^{2+} concentration was determined by ICP-MS measurement (Agilent 7700).

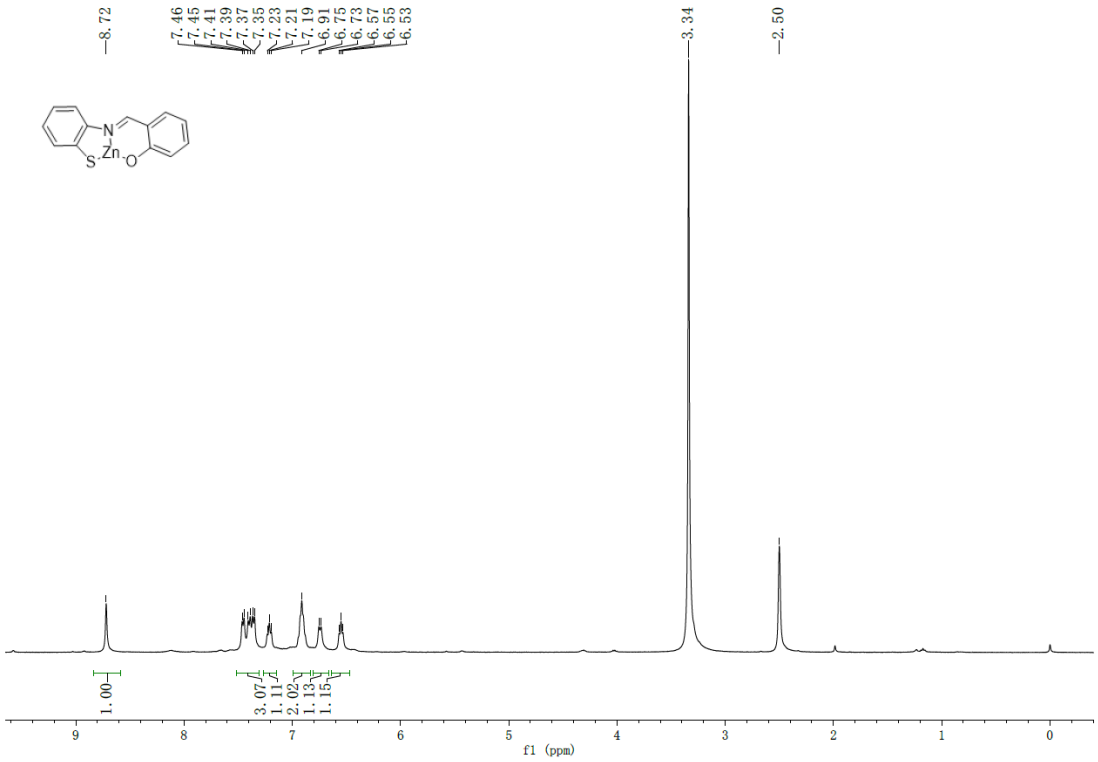

Fig. S1 ^{1}H NMR spectrum of HBTH-Zn in DMSO-d_6.

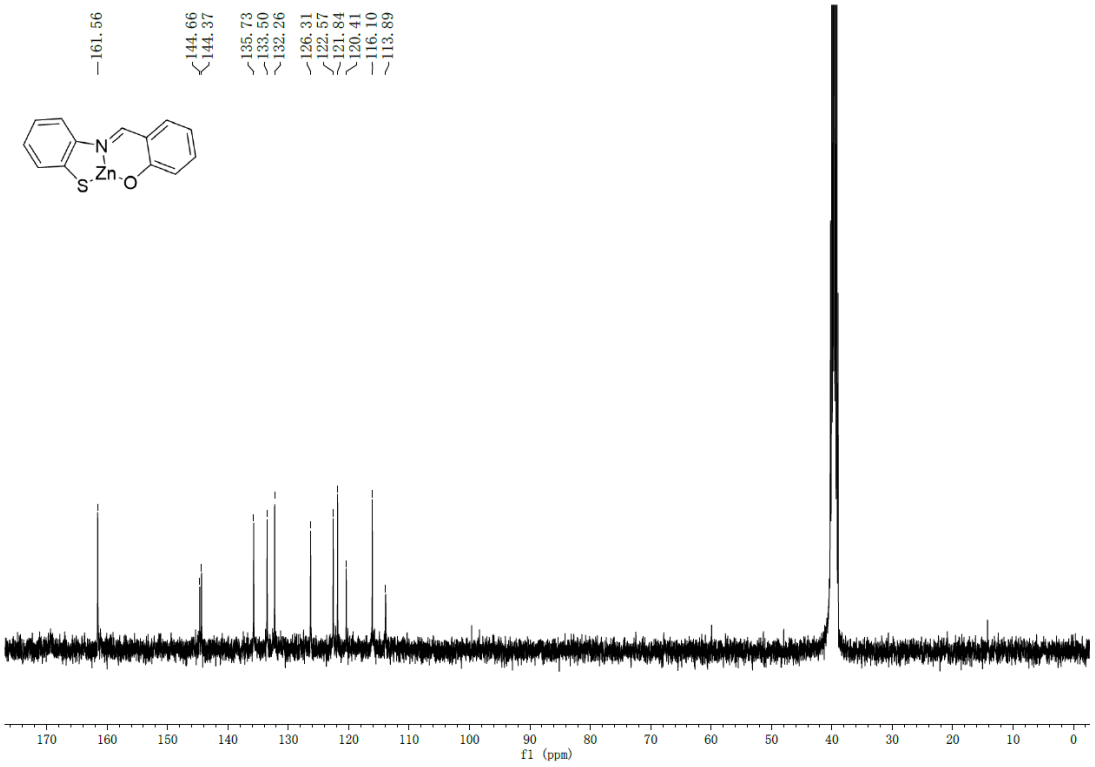

Fig. S2 ^{13}C NMR spectrum of HBTH-Zn in DMSO-d_6.

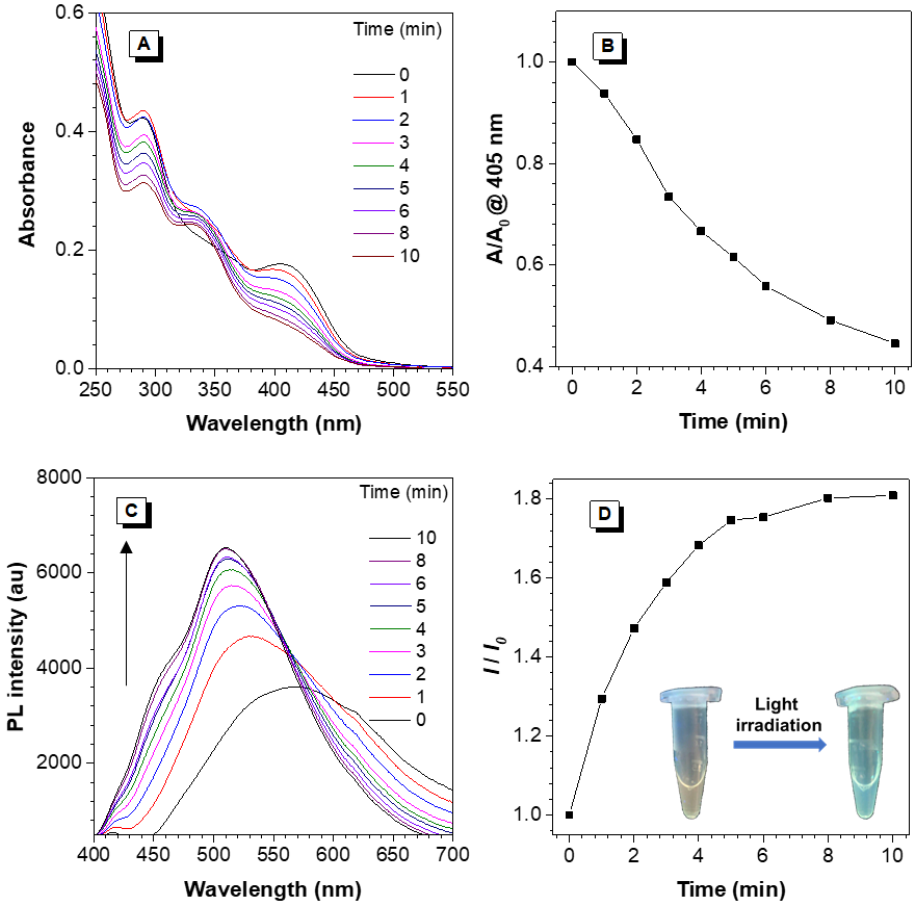

Fig. S3 (A) The UV-Vis absorption and (C) PL spectra changes of HBTH-Zn-TAT NPs (50 μM of HBTH-Zn) under 365 nm (5 mW·cm^{-2}) irradiation for different time. (B) The plot of relative absorbance intensity at 400 nm and (D) relative maximum PL intensity (I/I_0) versus the irradiation time. λ_{ex} = 365 nm. Inset figures show the images of HBTH-Zn-TAT NPs in aqueous solution under hand-held UV lamp before and after UV light irradiation (365 nm, 5 mW·cm^{-2}).

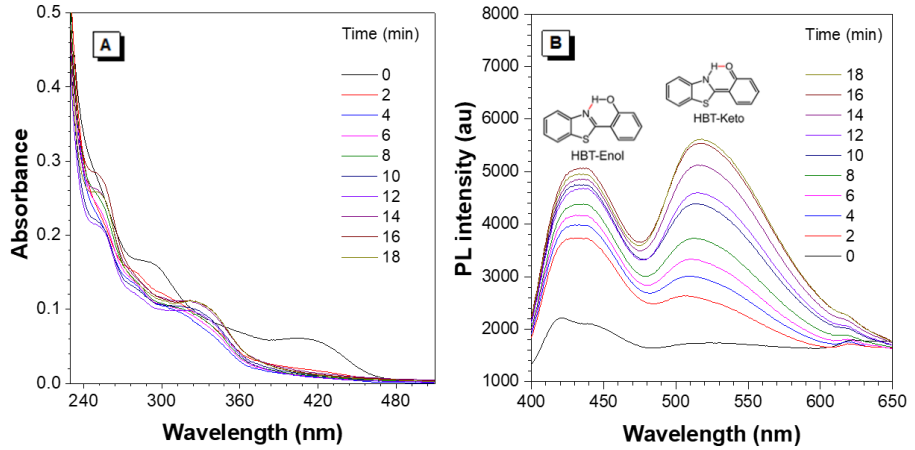

Fig. S4 (A) The UV-Vis absorption and (B) PL intensity changes of HBTH-Zn-TAT NPs (50 μM of HBTH-Zn) under 365 nm irradiation for different time in Britton-Robinson buffer solution (pH = 5.0).

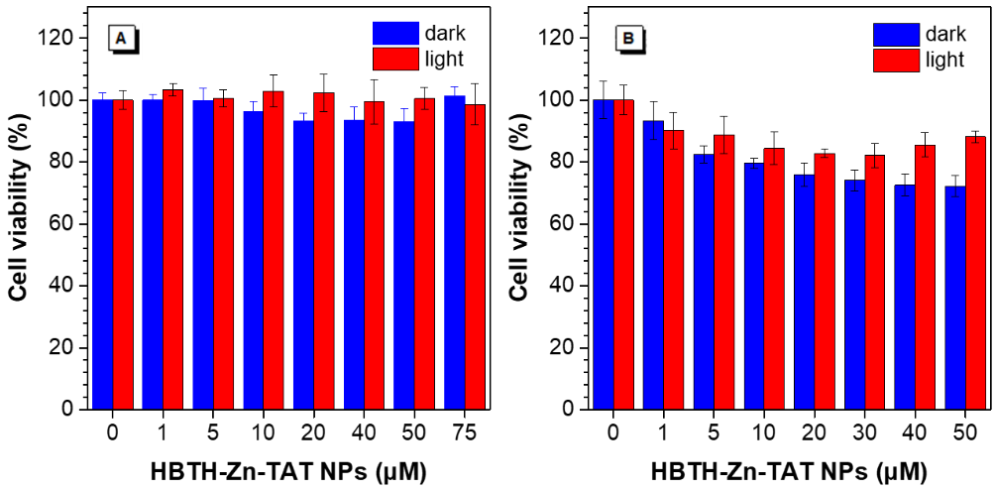

Fig. S5 Cell viability of (A) NIH-3T3 cells or (B) PC-12 cells incubated with HBTH-Zn-TAT NPs under dark and white light irradiation (10 mW·cm^{-2}, 15 min).

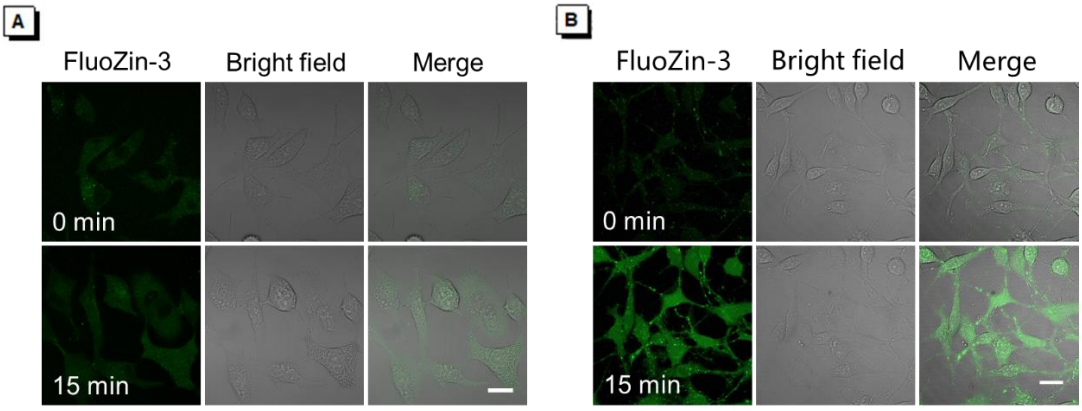

Fig. S6 The CLSM images of PC-12 cells treated with (A) HBTH-Zn (50 μM) and (B) HBTH-Zn-TAT NPs (50 μM of HBTH-Zn) under white light irradiation (10 mW·cm^{-2}) for 0 and 15 min, respectively. [FluoZin-3] = 1.0 μM; λ_{ex} = 488 nm, λ_{em} = 495-650 nm.