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Electronic Supplementary Information for

Three Birds with one stone: A single AIEgen for dual-organelle imaging, cell viability evaluation and photodynamic cancer cell ablation

Yuewei Zhang[a,b], Shuohang Wang[a], Ning Zhang[a], Xiaodong Wang[b], Qi Zan[b], Li Fan [b,], Xue Yu[a,]*, Shaomin Shuang[b] and Chuan Dong[b,]**

[a]School of Chemistry and Pharmaceutical Engineering, Jilin Institute of Chemical Technology, Jilin, 132022, P. R. China.
[b]Institute of Environmental Science, Shanxi Laboratory for Yellow River, College of Chemistry and Chemical Engineering, Shanxi University, Taiyuan, 030006, P. R. China

E-mail: fanli128@sxu.edu.cn; dongjibinghuayuxue@163.com; dc@sxu.edu.cn

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Experimental section

MTT assay

Cell viability was investigated using MTT assay. HeLa cells were cultured in 96-well plates (1×10^4 cells per well) for 24 h. Different concentrations of **Mito-TTPE** or LD-TTP (0, 1, 2, 5 and 10 μM) were incubated with the cells for 30 min, respectively. Then, the cells were cultured for another 24 h after treatment with or without light irradiation (50 mW cm^{-2}) for 20 min, respectively. 100 μL of fresh DMEM medium containing 10 μL MTT (5 mg mL^{-1}) was added after the culture medium in each 96-well plate removed completely. The cells were further incubated for 4 h. 100 μL of DMSO was added into each well after the DMEM/MTT medium was removed. Then each well was analysed with an ELISA microplate reader and the absorbance was detected at 490 nm. The cell viability was expressed as relative to the control cells taken as 100 % metabolic activity.

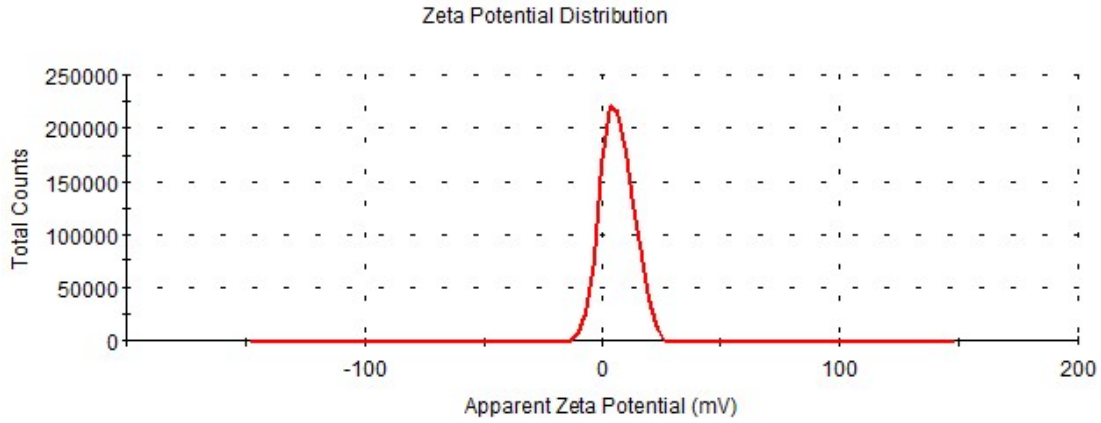
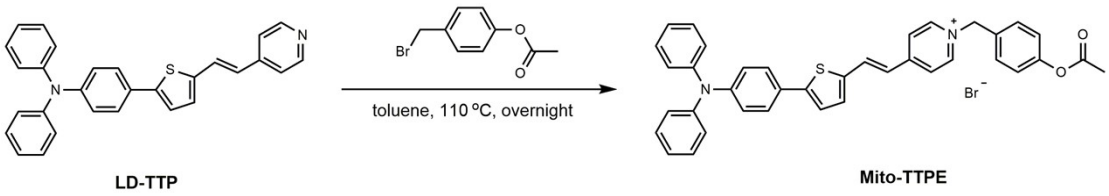


Fig. S1 Average Zeta potentials of **Mito-TTPE**.



Scheme **S1** The synthetic routine of **Mito-TTPE**.

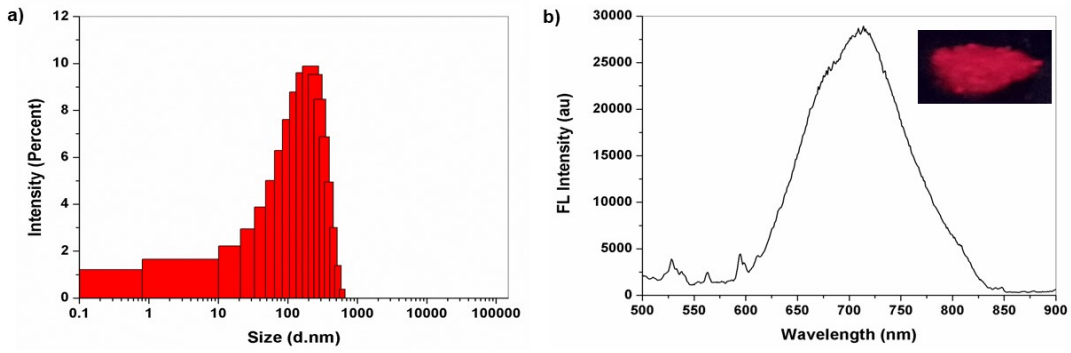


Fig. S2 (a) Dynamic light scattering data of **Mito-TTPE** in EtOH/hexane mixtures with f_H of 95%. (b) Solid-state fluorescence spectra of **Mito-TTPE**. Inset: Fluorescent photo of **Mito-TTPE** in solid-state taken under a 365 nm UV irradiation.

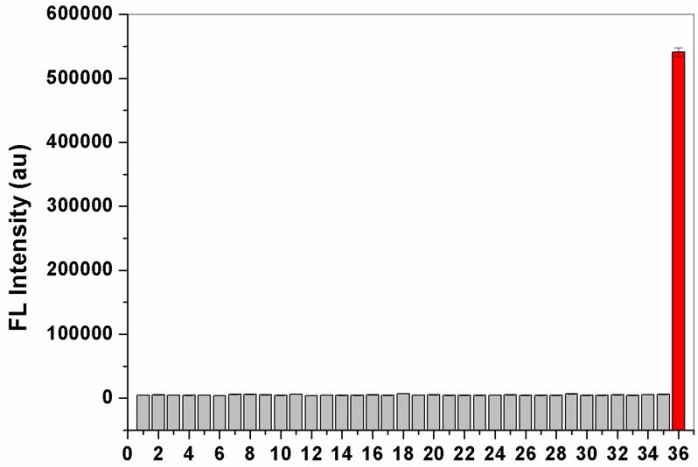


Fig. S3 Fluorescence intensity of Mito-TTPE (5 μM) at 550 nm in PBS buffer (pH 7.4) and various species, with λ_{ex} = 410 nm. (1) Blank, (2) K^+, (3) Na^+, (4) Cu^{2+}, (5) Fe^{2+}, (6) CN^-, (7) Cl^-, (8) Br^-, (9) NO_3^-, (10) ClO^-, (11) SO_4^{2-}, (12) NO_2^-, (13) S^{2-}, (14) Cys, (15) GSH, (16) Gln, (17) Ser, (18) Arg, (19) Phe, (20) Pro, (21) Lys, (22) His, (23) Thr, (24) Trp, (25) Leu, (26) Val, (27) Ala, (28) Tyr, (29) Asn, (30) H_2O_2, (31) BSA, (32) nitroreductase, (33) lysozyme, (34) alkaline phosphatase, (35) lipase, (36) CES2.

Table S1 Photophysical properties of **Mito-TTPE**

Solvents	λ_{abs} (nm)	λ_{em} (nm)	Stokes shift (nm)	ε ($M^{-1}cm^{-1}$)	Φ (%)
Toluene	488	516	28	2.13×10^4	0.266
THF	486	504	18	2.35×10^4	0.086
EtOH	206	548	46	2.36×10^4	0.023
EtOH/Hexane = 5/95	482	496	14	1.83×10^4	0.054

λ_{abs} = absorption maximum; λ_{em} = emission maximum; ε is molar absorptivity at maximum absorption wavelength; Φ = fluorescence quantum yield using XDS 307 as the standard reference with a quantum yield of 0.56 in ethanol.

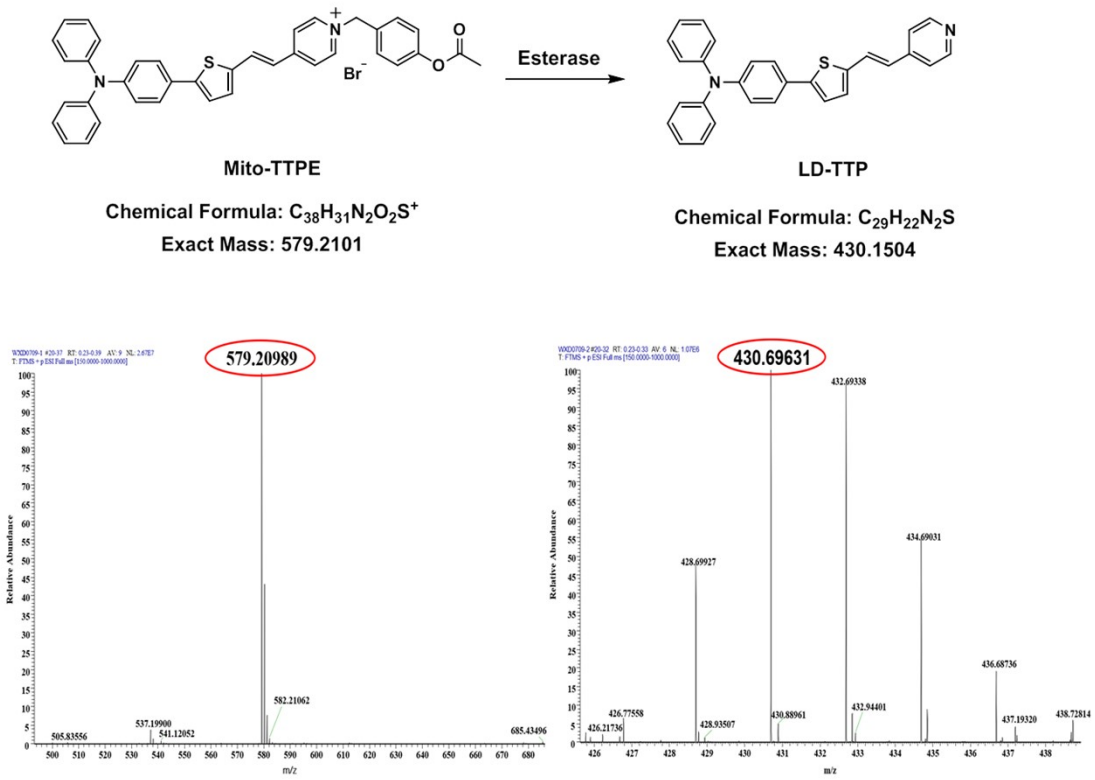


Fig. S4 Mass spectra of **Mito-TTPE** and **Mito-TTPE** reacted with CES2.

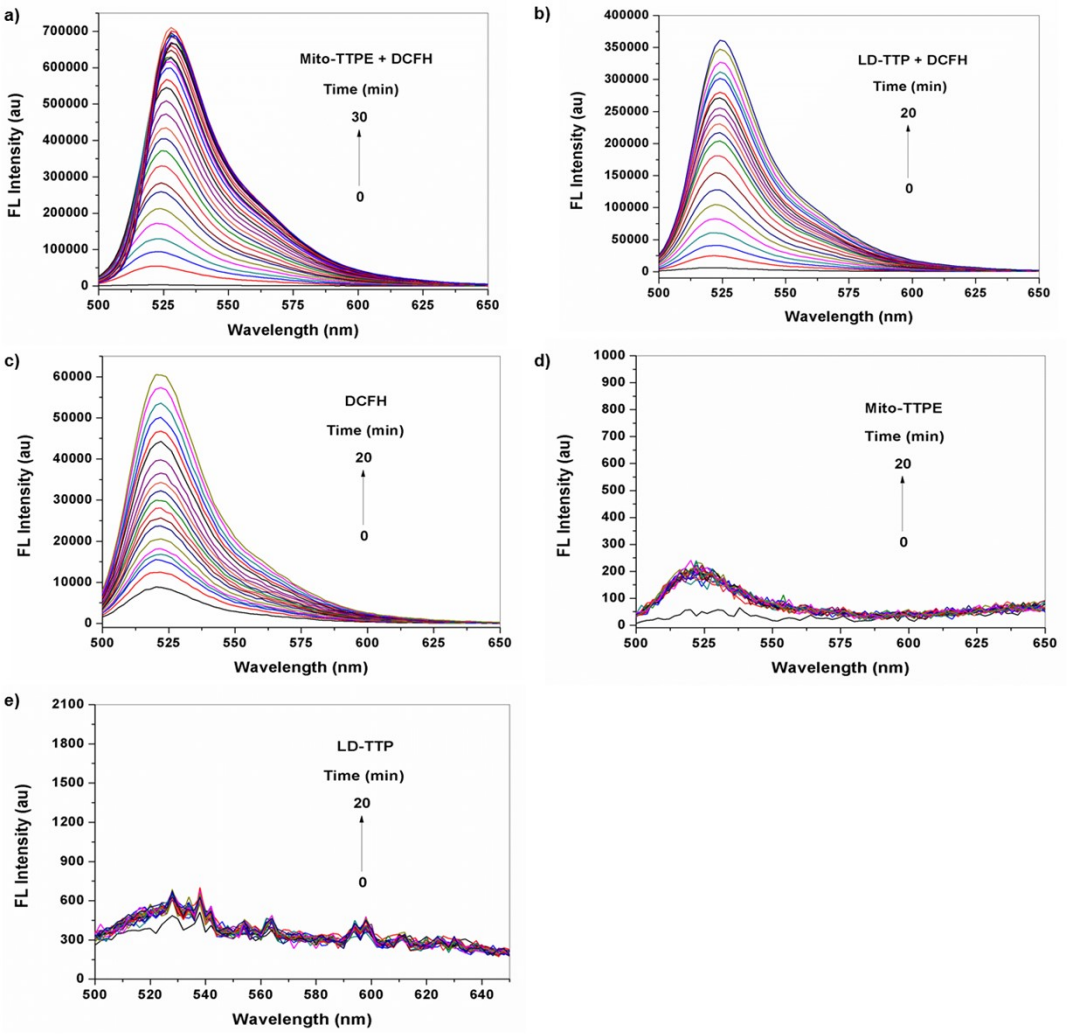


Fig. S5 Fluorescence spectra of **Mito-TTPE**+DCFH (a), **LD-TTPE**+DCFH (b), DCFH (c), **Mito-TTPE** (d), **LD-TTPE** (e) in PBS after white light irradiation for different times.

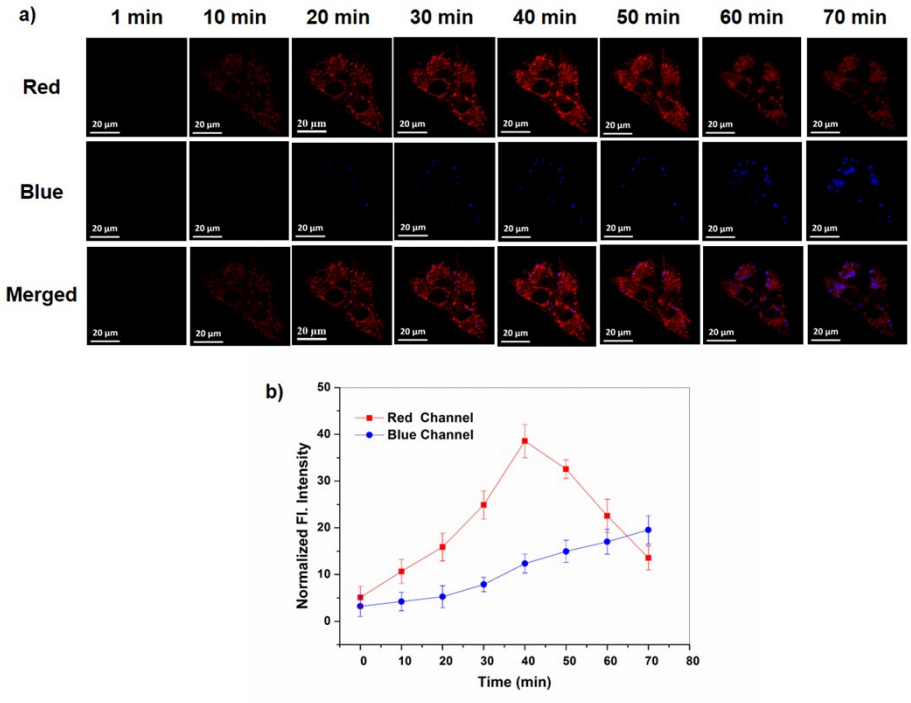


Fig. S6 (a) Time-dependent fluorescence images of living A549 cells stained with 5 μM **Mito-TTPE**. Red channel: λ_{ex} = 488 nm, λ_{em} = 600 - 710 nm; blue channel: λ_{ex} = 405 nm, λ_{em} = 540-600 nm. Scale bar: 20 μm. (b) FL intensity changes in red and blue channel in living HeLa cells incubated with **Mito-TTPE** at different time points (± S. D., n = 3).

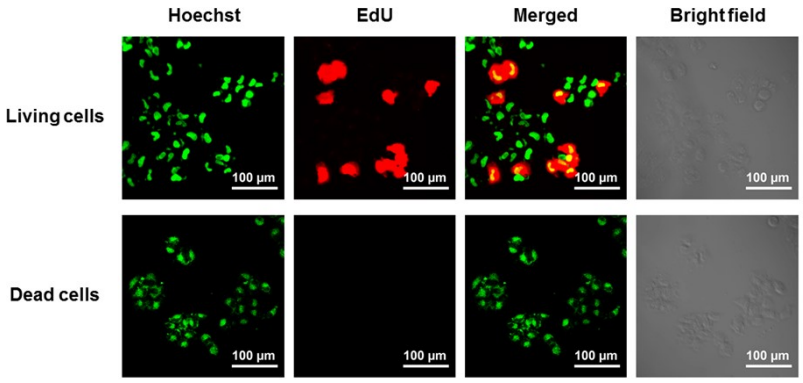


Fig. S7 EdU assay of living HeLa cells stained with 1 μM Hoechst 33342. Red channel: λ_{ex} = 633 nm, λ_{em} = 640 - 700 nm; blue channel: λ_{ex} = 405 nm, λ_{em} = 430 - 490 nm. Scale bar: 100 μm.

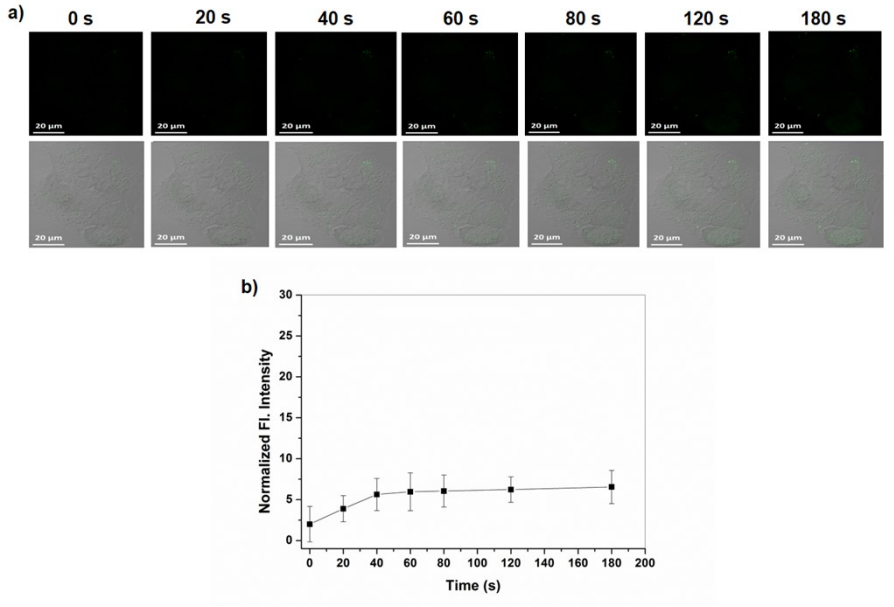


Fig. S8 Intracellular ROS level using DCFH-DA as indicator in living HeLa cells under white light irradiation (50 mW/cm^2) for different times. DCFH-DA: λ_{ex} = 488 nm, λ_{em} = 500 - 550 nm. Scale bar: 20 μm. (b) Normalized fluorescence intensity obtained from a (± S. D., n = 3).

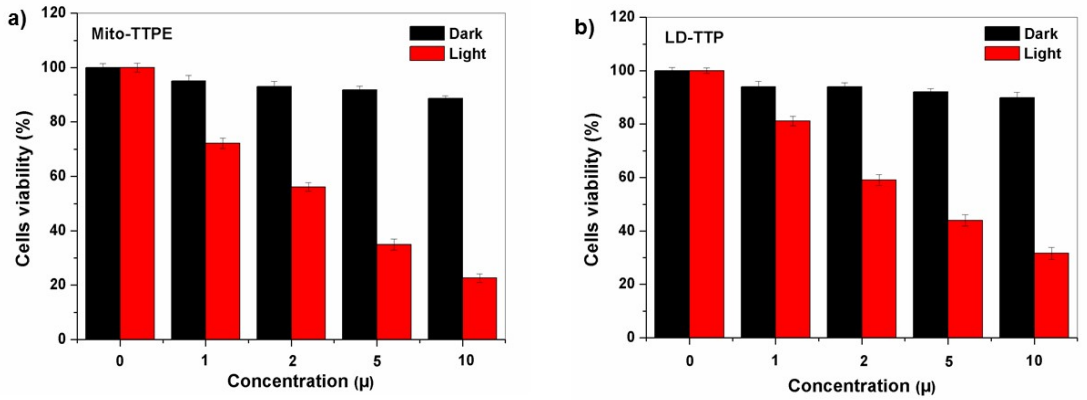


Fig. S9 Viability of HeLa cells incubated with **Mito-TTPE** (a) or LD-TTP (b) in the dark and under white light irradiation (50 mW cm^{-2}) for 20 min.

^{1}H NMR and ^{13}C NMR spectra analysis of Mito-TTPE