Electronic Supplementary Material (ESI) for Journal of Materials Chemistry B

Supporting Information for:

Plasmonic Liposomes for Synergistic Photodynamic and Photothermal Therapy

Jeongmin Oh,[§] Hwan-Jun Yoon,[§] and Ji-Ho Park[*]

[§]These authors contributed equally to this work.

[*]Email: jihopark@kaist.ac.kr

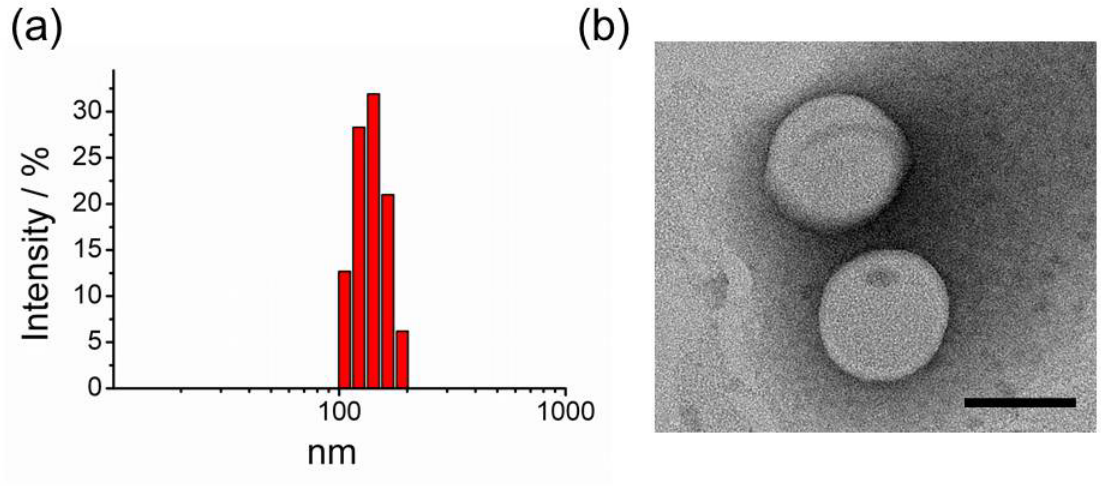

Figure S1. (a) Hydrodynamic diameter of liposomes measured by dynamic light scattering. (b) TEM image of liposomes. The scale bar is 100 nm.

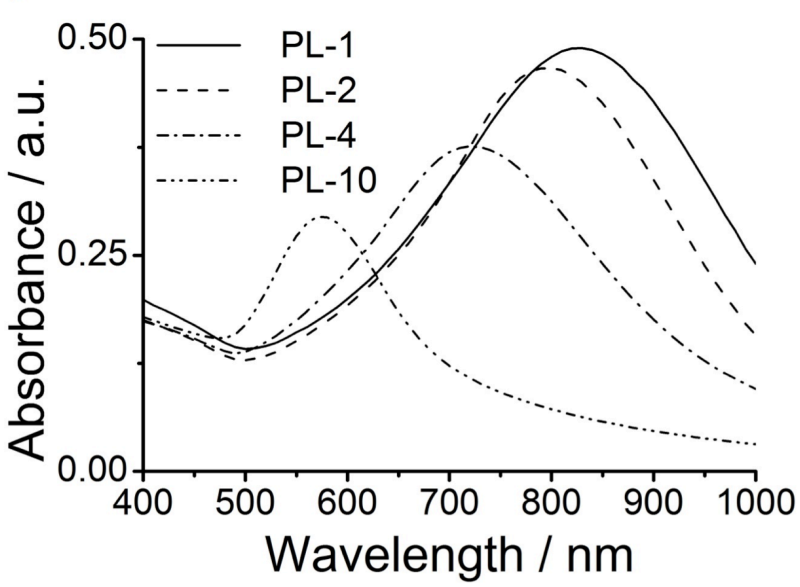

Figure S2. Optical spectra of plasmonic liposomes with different thicknesses of gold coating. Relative thickness from 1 to 10 is referred to in the sample labels as PL-1 to PL-10.

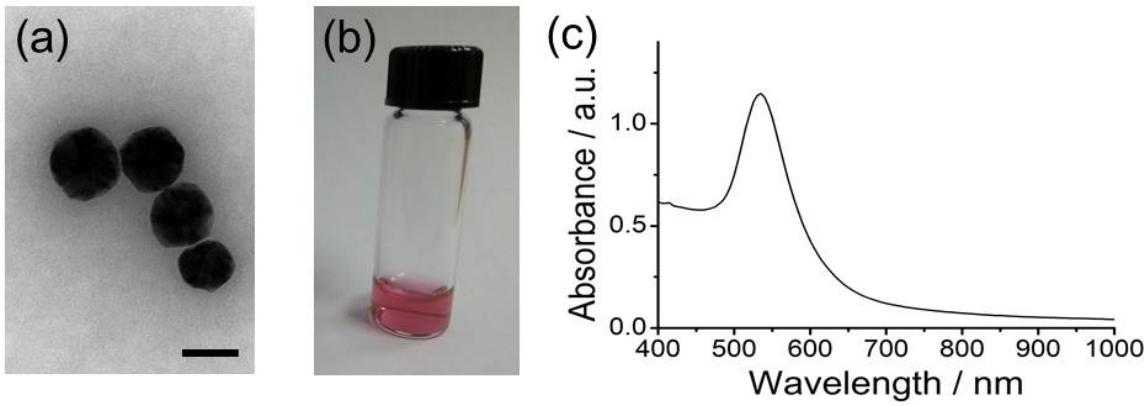

Figure S3. (a) Transmission electron microscopic (TEM) image of gold nanoparticles synthesized without liposome templates using the synthesis condition of ZnPc-PL with negative staining by 2% phosphotungstic acid at pH 8. Scale bar is 50 nm. (b) Photo of gold nanoparticles synthesized without liposome templates. (c) Absorption spectra of of gold nanoparticles synthesized without liposome templates.

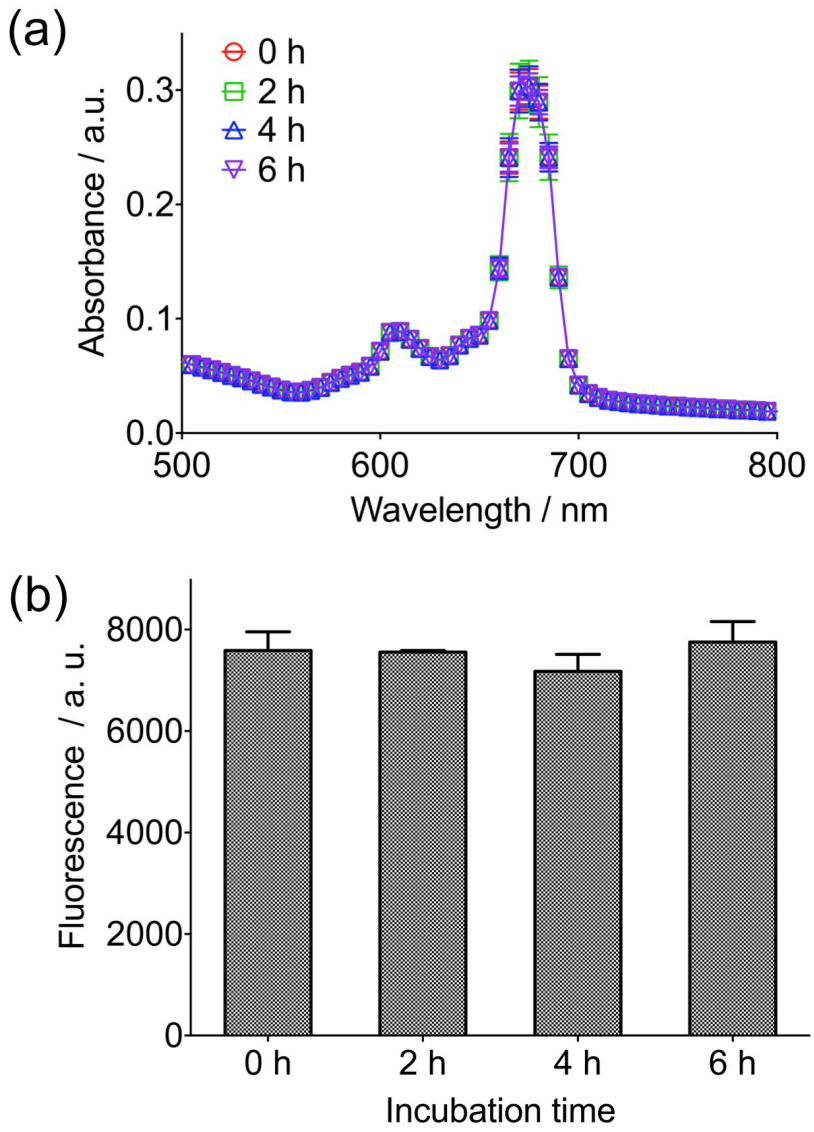

Figure S4. (a) Time-dependent absorption spectra of ZnPc-loaded liposomes (~ 10 μM ZnPc) in a cell culture medium at 37°C during the 6 h incubation period. (b) Photodynamic effect of ZnPc-loaded liposomes incubated in the culture medium over each period of time. ROS generated in the ZnPc-loaded liposomes was measured with SOSG fluorescent sensor. Values are means ± s.d.

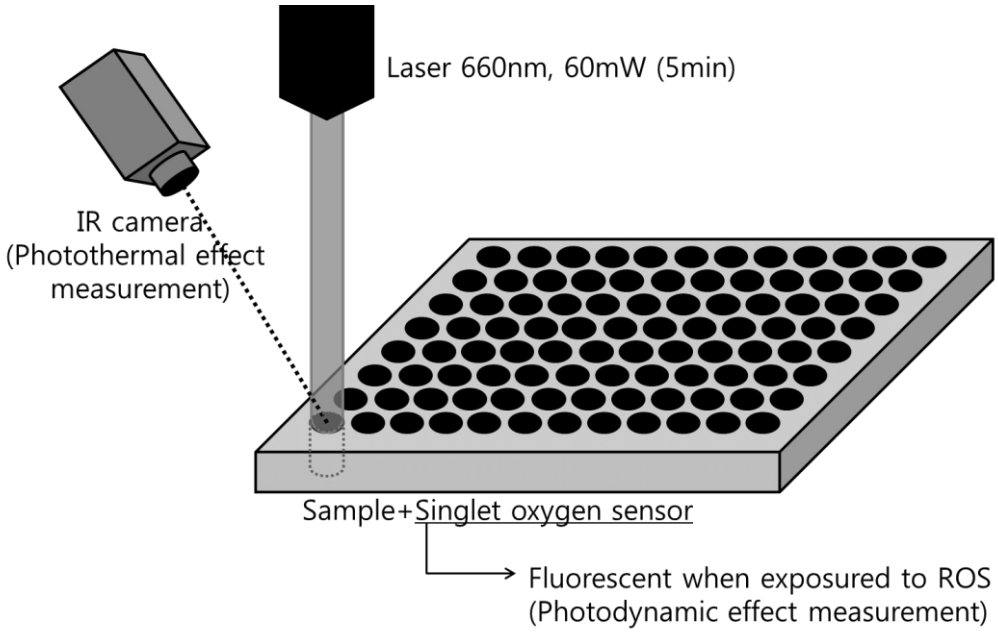

Figure S5. Schematic design for measurement of photothermal and photodynamic properties of the samples using a single laser source.

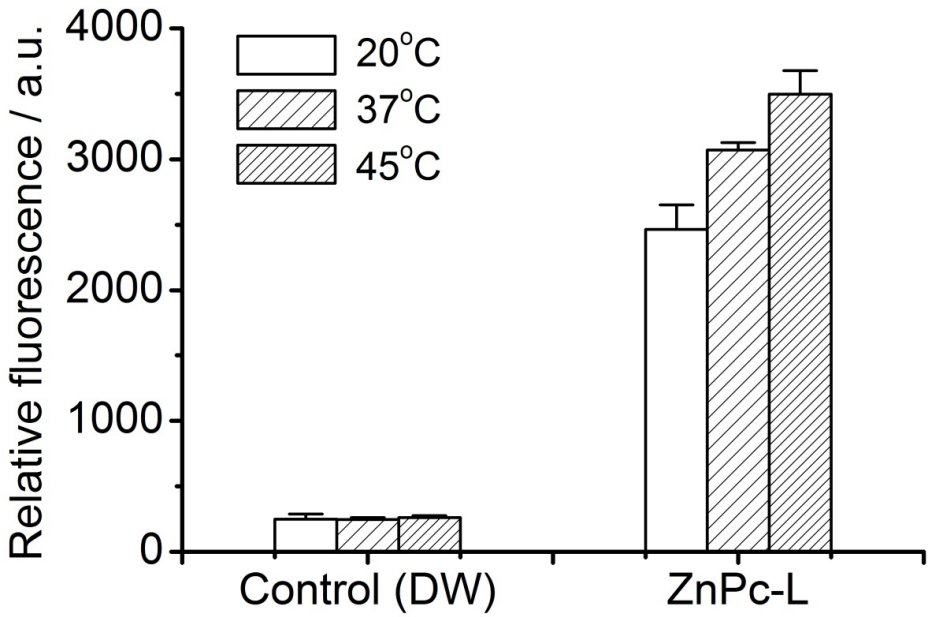

Figure S6. Thermal effect on singlet oxygen generation of ZnPc-L (1μM ZnPc) upon irradiation. Values are means ± s.d.

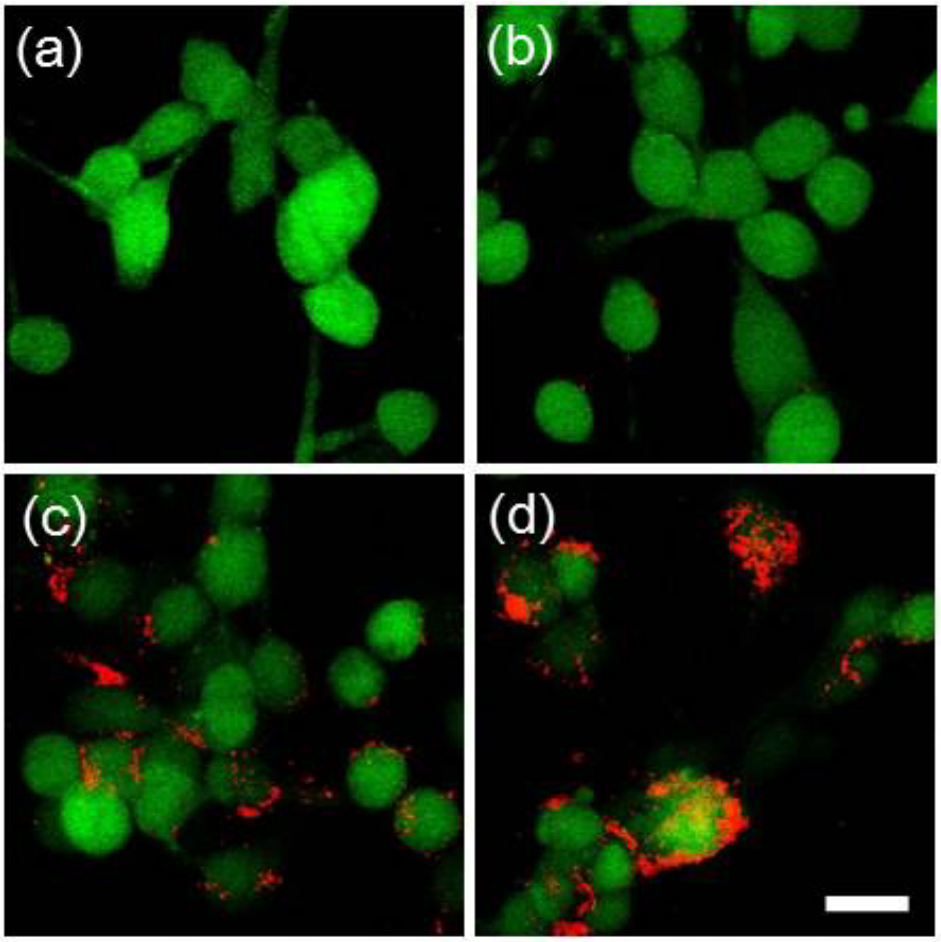

Figure S7. Confocal microscopy images of cancer cells treated with ZnPc-PLs at a concentration of (a) 0 μM ZnPc, (b) 0.0275 μM ZnPc, (c) 0.275 μM ZnPc, and (d) 2.75 μM ZnPc. The red signal indicates fluorescence of ZnPc loaded in the ZnPc-PL and the green signal indicates fluorescence of Calcein AM staining the cytosol of live cells. Scale bar is 30 μm.

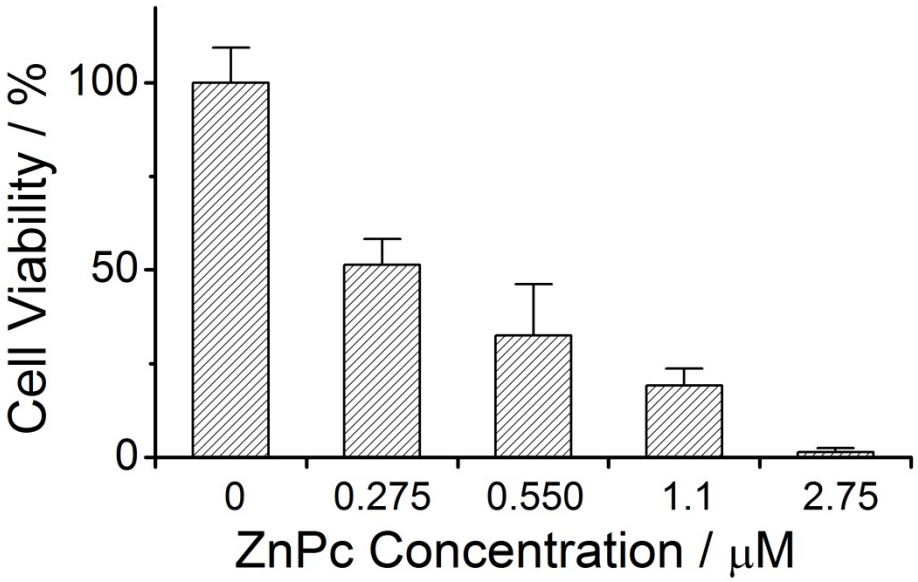

Figure S8. Dual phototherapy efficacy of ZnPc-PLs on cancer cells upon 660-nm laser irradiation for 5 min. Cell viability was measured using MTT assay 24 h after treating cells with various ZnPc-PL samples upon light irradiation. Values are means ± s.d.

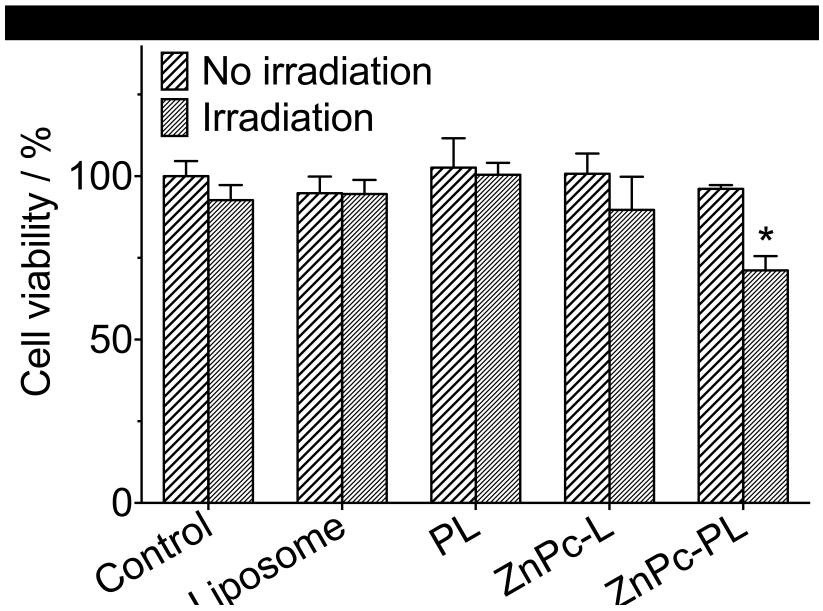

Figure S9. Dual phototherapy efficacy of ZnPc-PLs at a ZnPc concentration of 0.275 μM on MDA-MB-231 human breast cancer cells upon 660-nm laser irradiation for 5 min. Cell viability was measured using MTT assay 24 h after treating cells with various nanoparticle samples upon light irradiation. Values are means ± s.d. *$p < 0.05$ compared to ZnPc-PL without irradiation, PL with irradiation, and ZnPc-L with irradiation by independent-samples t-test.

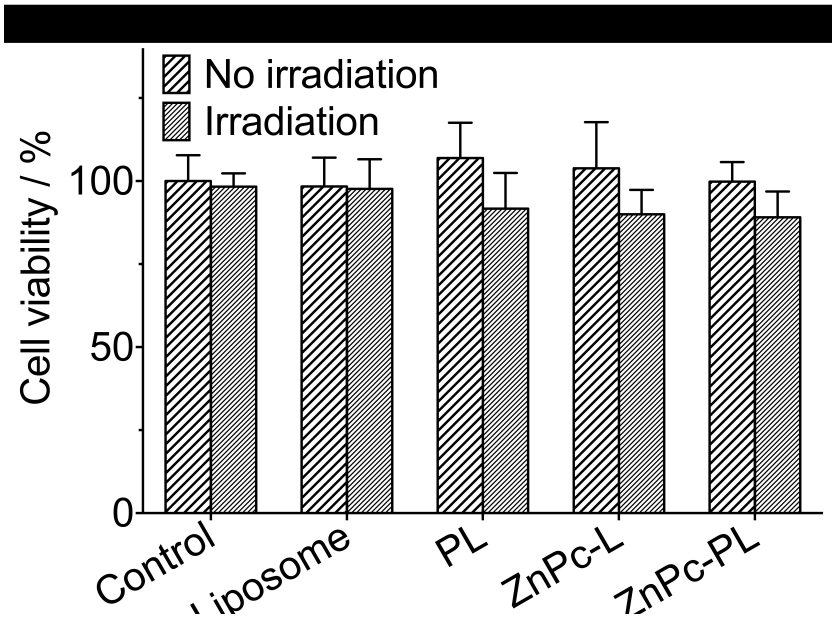

Figure S10. Dual phototherapy efficacy of ZnPc-PLs at a ZnPc concentration of 0.275 μM on mouse brain endothelial cells upon 660-nm laser irradiation for 5 min. Cell viability was measured using MTT assay 24 h after treating cells with various nanoparticle samples upon light irradiation. Values are means ± s.d.