Supporting Information

Synthesis of Porous Pd Nanoparticles by Therapeutic Chaga Extract for Highly Efficient Tri-Modal Cancer Treatment

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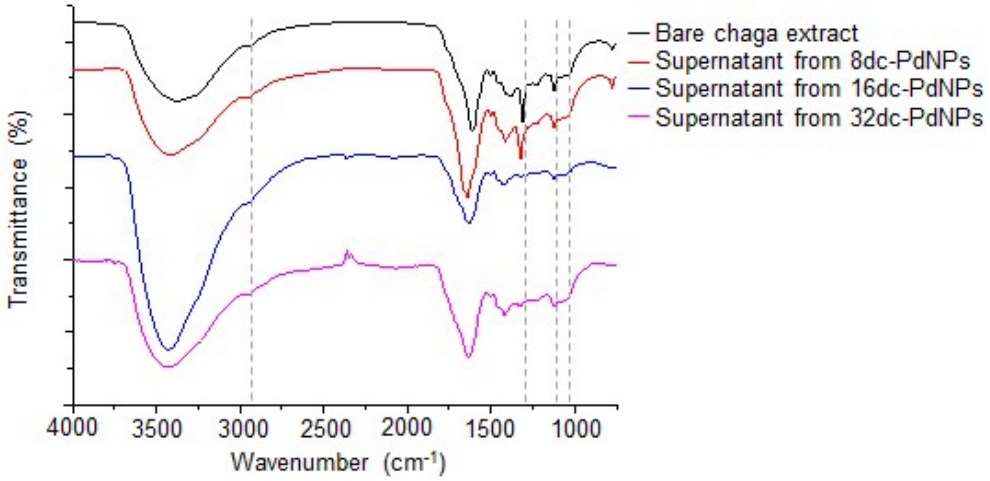

Figure S1. FT-IR spectra of chaga extract and supernatants from the reaction mixtures of 3dc-, 16dc-, and 32dc-PdNPs. FT-IR spectrum of chaga extract exhibited typical peaks at 1126 cm^{-1} (C-O-C stretching of glycocidic bond), 1311 cm^{-1} (C-N stretching of aromatic amines), 1612 cm^{-1} (C=O vibration of amide I groups), 2935 cm^{-1} (aliphatic C-H stretching) and 3376 cm^{-1} (O-H vibration of hydroxy groups). For collecting chaga extract after the synthesis of PdNPs, the reaction mixtures of 8dc-, 16dc- and 32dc-PdNPs were centrifuged and collected for FT-IR analysis. FT-IR spectrum of supernatant from 32dc-PdNPs showed disappearance of C-N stretching peak and this result suggested that the amine containing compounds were removed during the synthesis and separation of 32dc-PdNPs. By contrast, FT-IR spectrum of 8dc-PdNPs exhibited strong C-N stretching peak, implying that there were still amine containing compounds, owing to existence of excess concentration of chaga extract (8dc has 4 times higher concentration than 32dc). These results are in agreement with the FT-IR analysis results of PdNPs and further supported that the amine containing compounds of chaga extract played an important role in the shape- and surface-controlled synthesis of PdNPs.

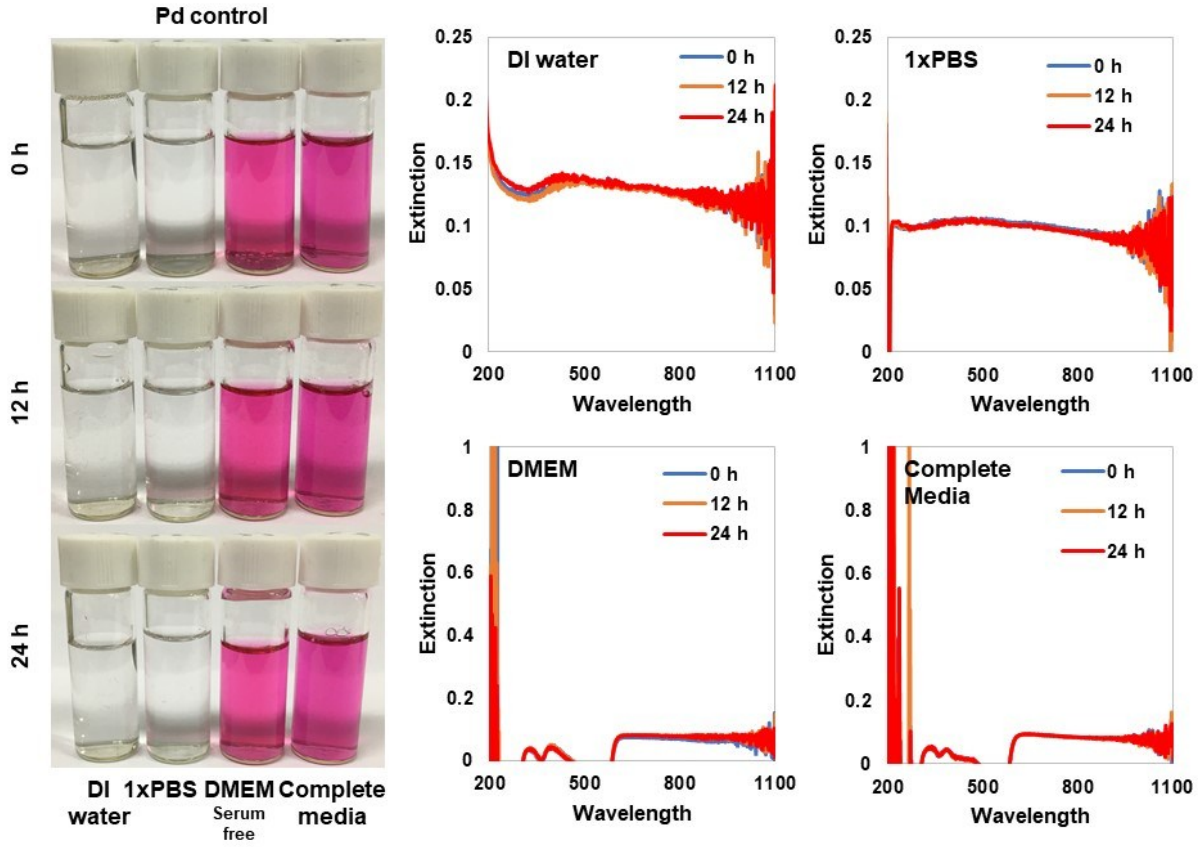

Figure S2. Colloidal stability test of control PdNPs against DI water, 1xPBS, serum free DMEM and complete cell culture media.

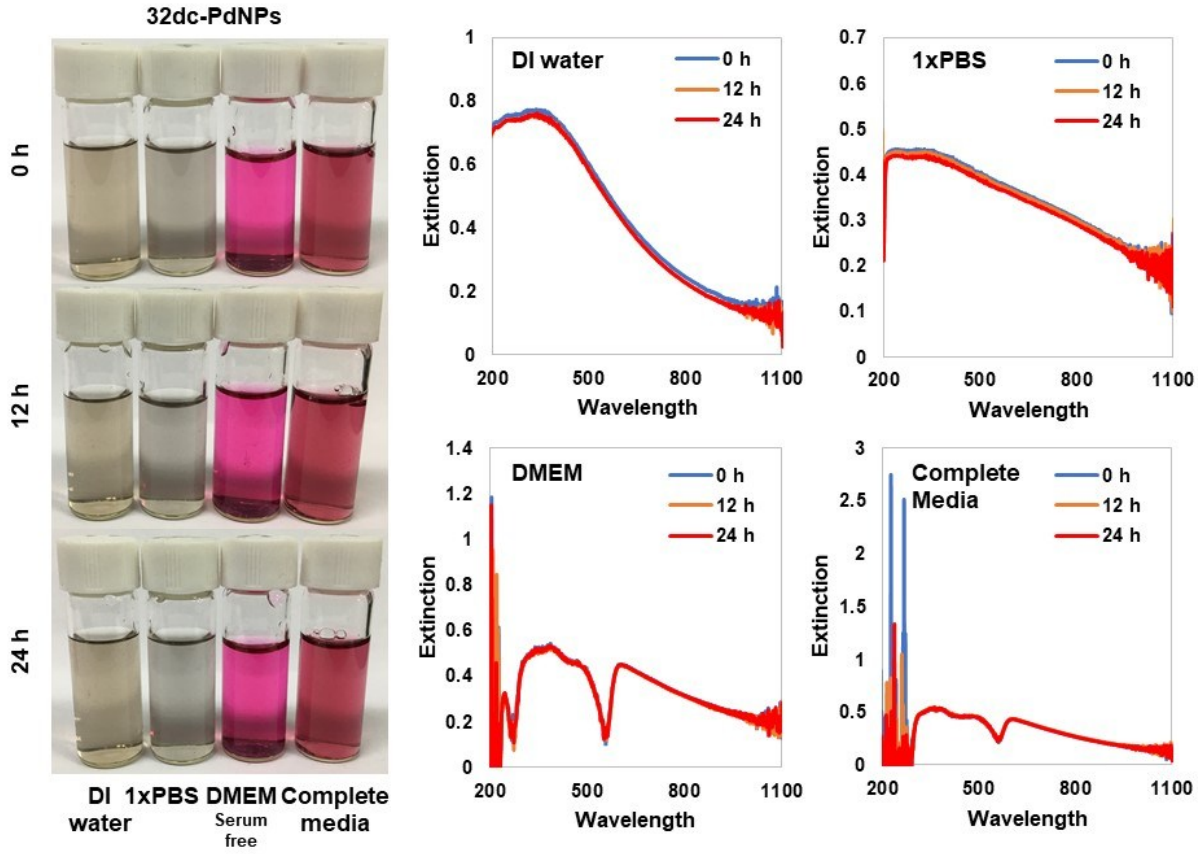

Figure S3. Colloidal stability test of 32dc-PdNPs against DI water, 1xPBS, serum free DMEM and complete cell culture media.

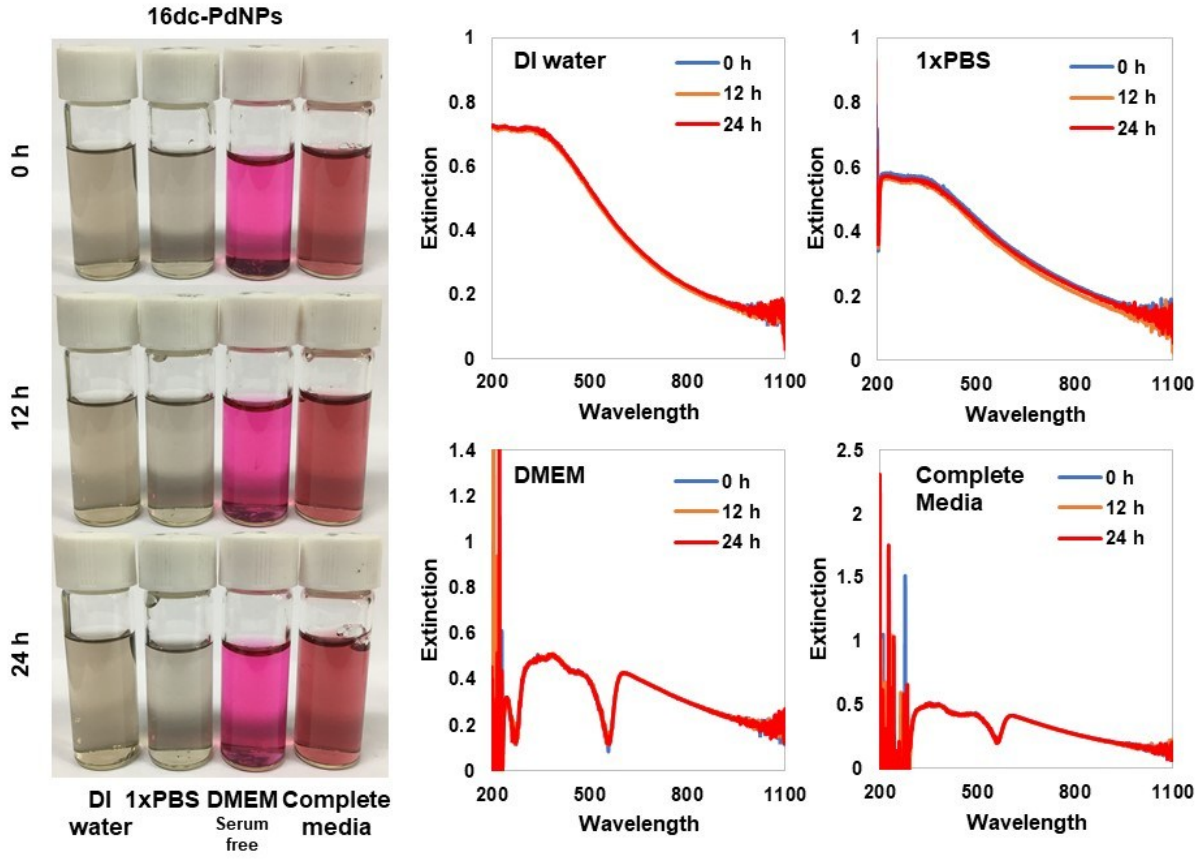

Figure S4. Colloidal stability test of 16dc-PdNPs against DI water, 1xPBS, serum free DMEM and complete cell culture media.

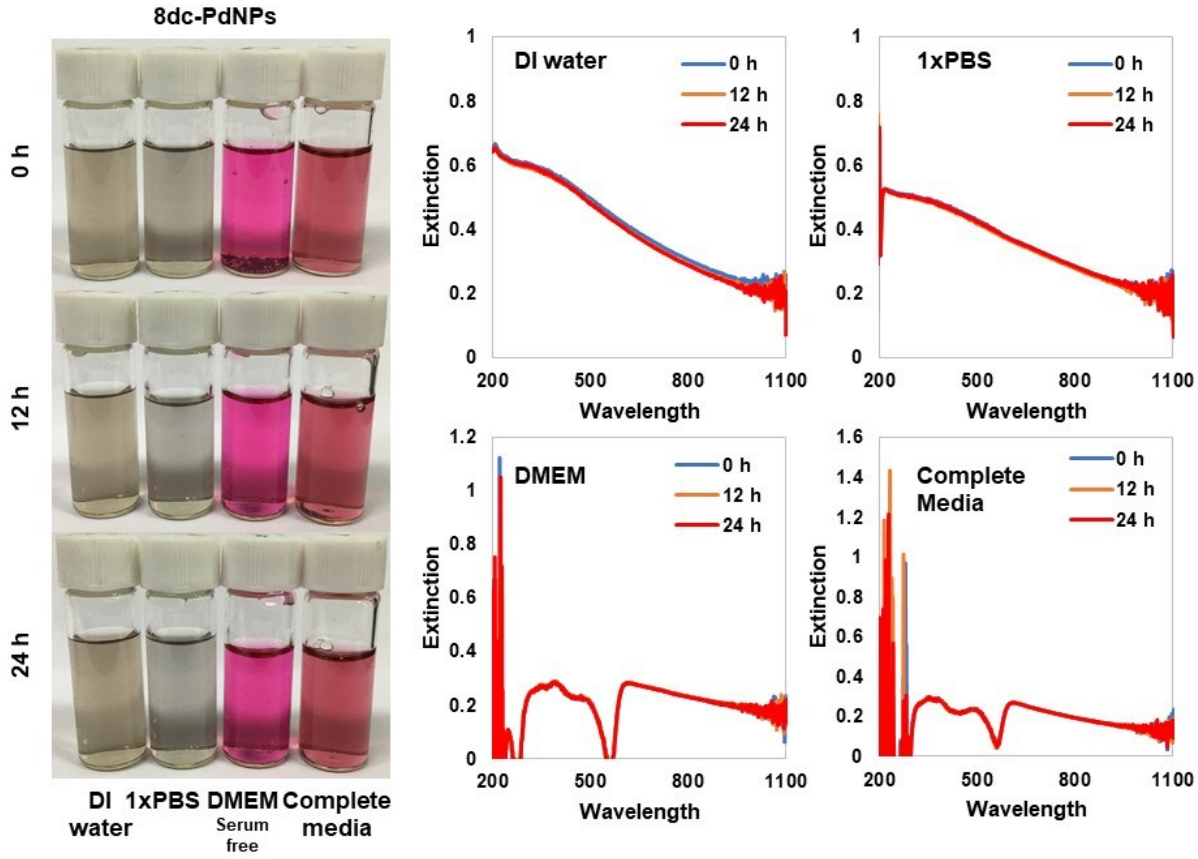

Figure S5. Colloidal stability test of 8dc-PdNPs against DI water, 1xPBS, serum free DMEM and complete cell culture media.

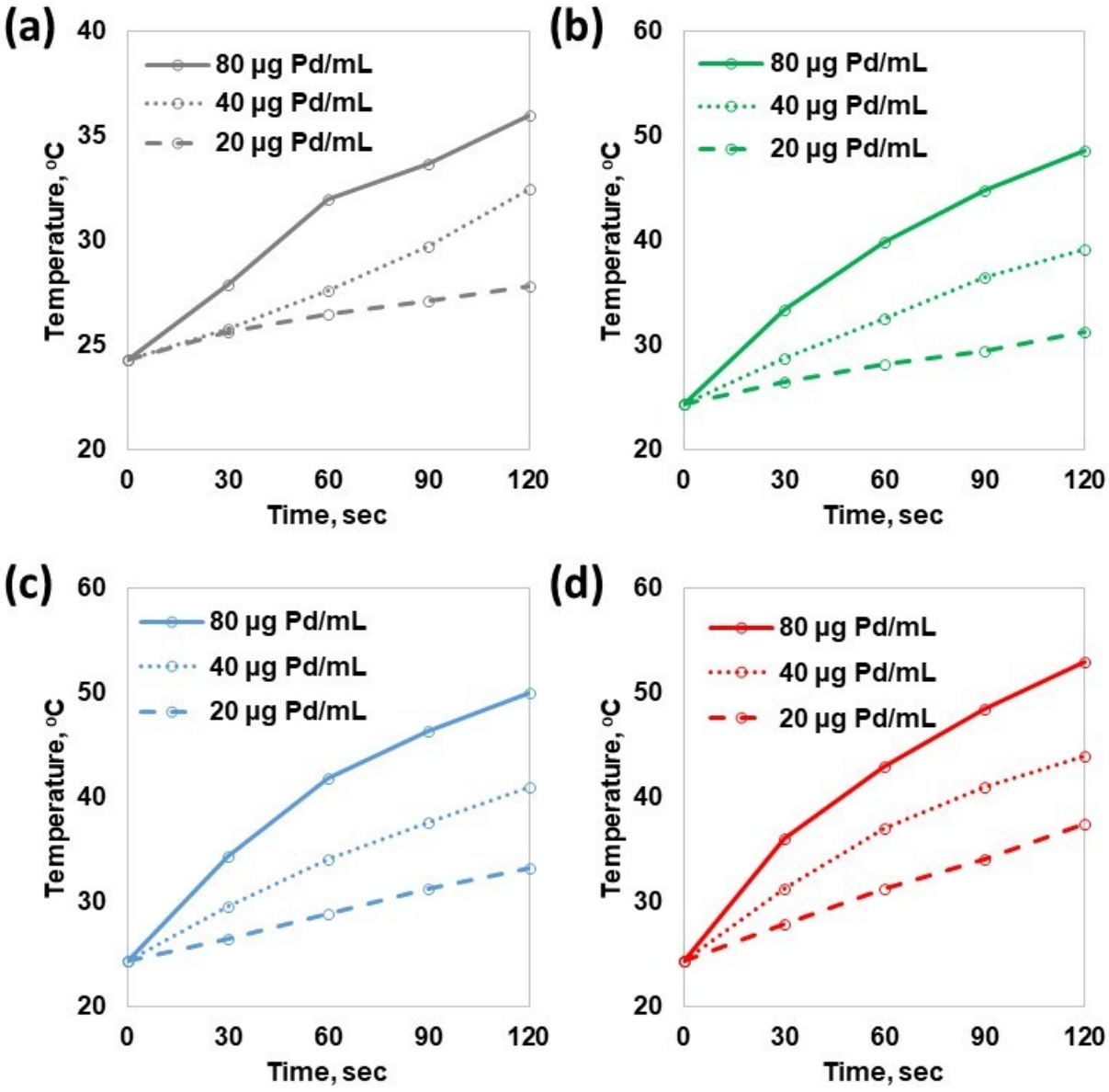

Figure S6. Photothermal conversion mediated temperature elevation under the 4 W/cm^2 808 nm NIR diode laser irradiation for (a) control PdNPs, (b) 32dc-PdNPs, (c) 16dc-PdNPs, and (d) 8dc-PdNPs.

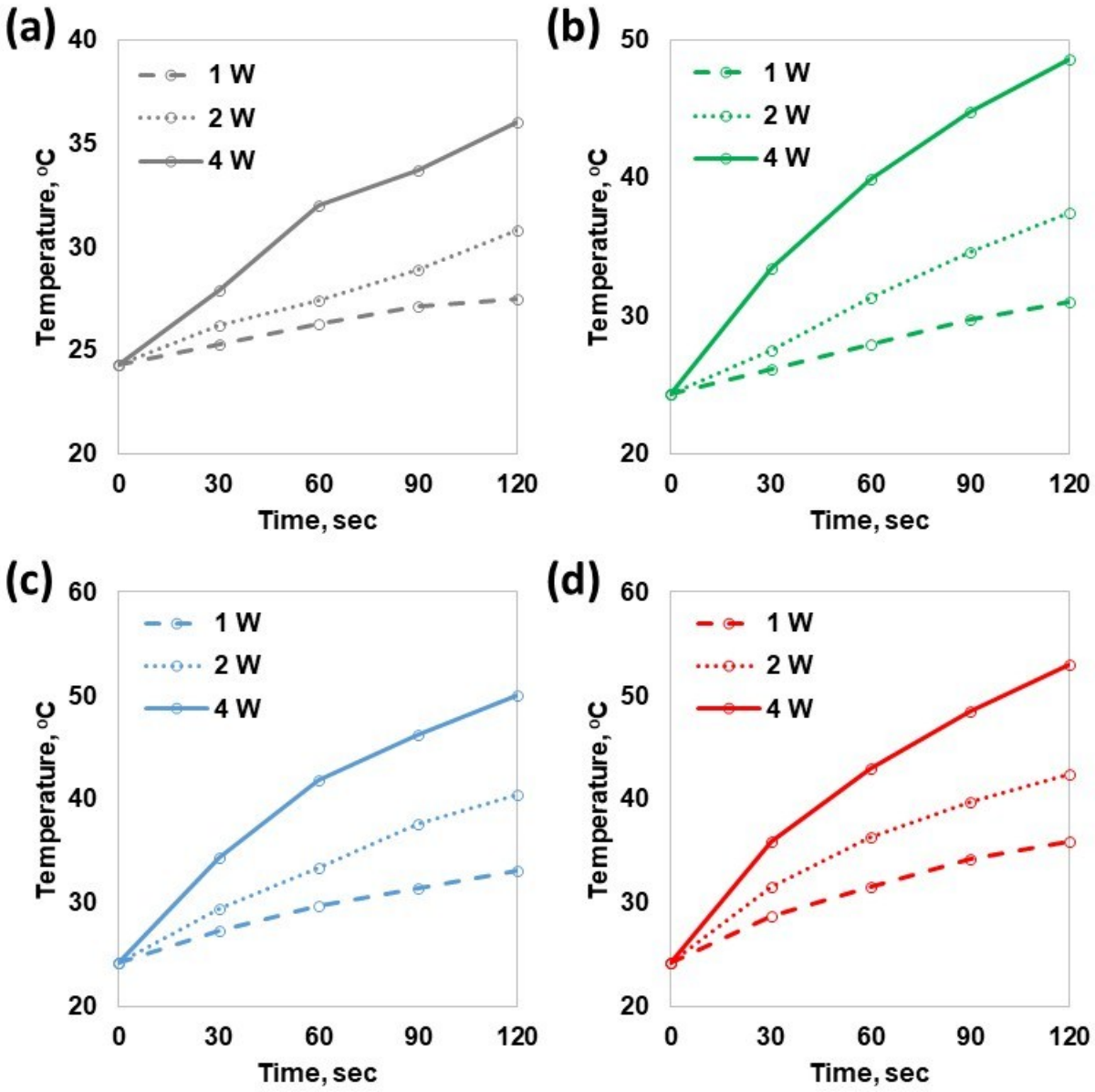

Figure S7. Photothermal conversion mediated temperature elevation against 80 μg Pd/mL concentration of (a) control PdNPs, (b) 32dc-PdNPs, (c) 16dc-PdNPs, and (d) 8dc-PdNPs under the 1, 2, and 4 W/cm^2 of 808 nm NIR diode laser irradiation.

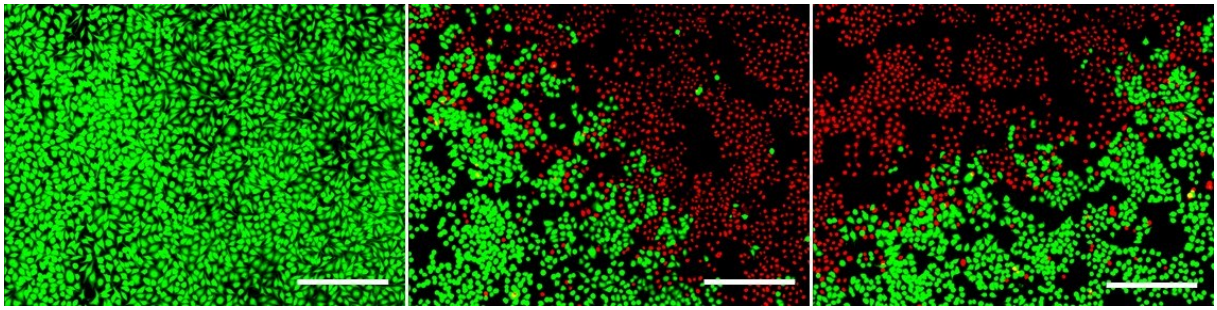

Figure S8. In vitro hyperthermic HeLa cell ablation test under the 4 W/cm2 of 808 nm NIR diode laser irradiation for control PdNPs (left), 32dc-PdNPs (middle), and 16dc-PdNPs (right). The scale bar is 200 μm.

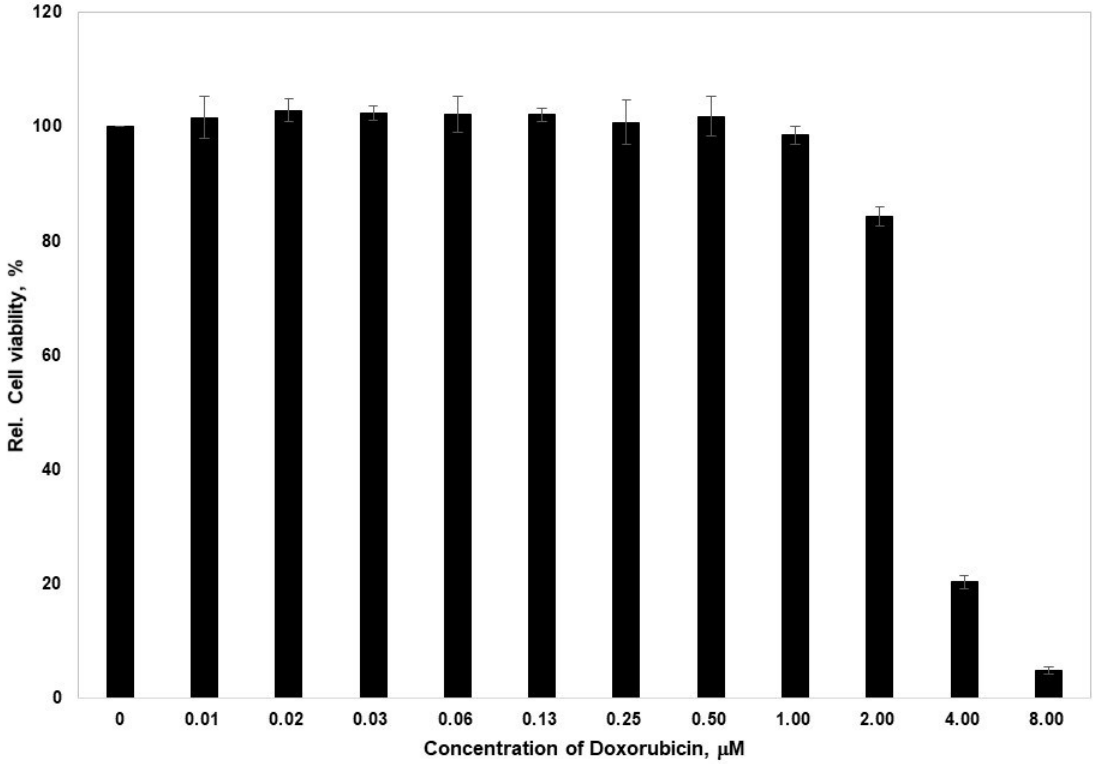

Figure S9. MTT cell viability test for free Dox treatment against HeLa cells..

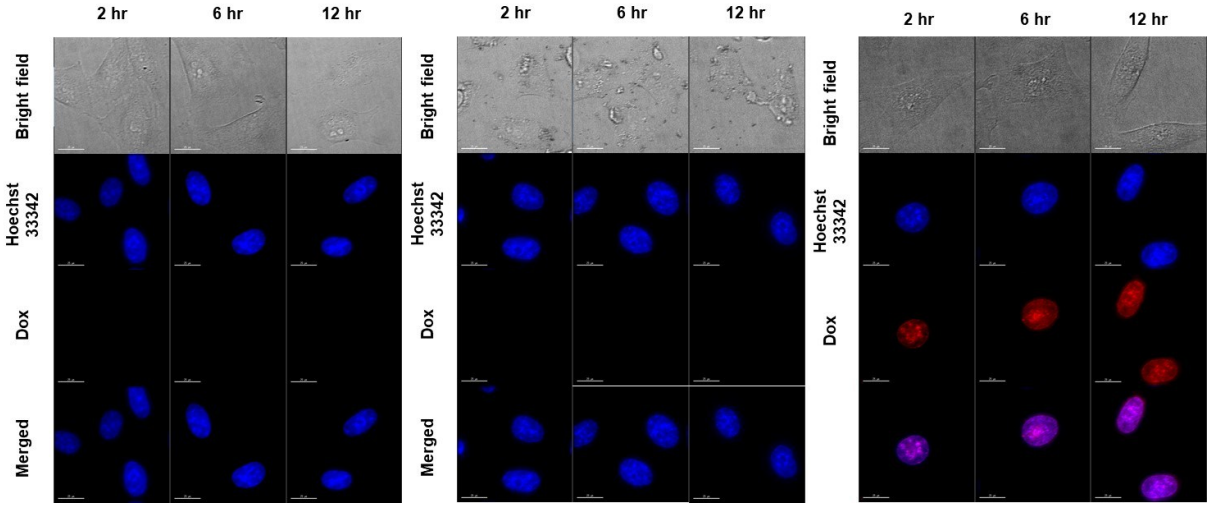

Figure S10. Intracellular distribution of delivered Dox. Untreated cells (control, left) and only 8dc-PdNPs treated cells (NPs only, middle) did not exhibited any fluorescence signal from Dox. In case of free Dox treated cells (free Dox, right) represented nuclear accumulated Dox signal by red fluorescence. The scale bar is 25 μm.

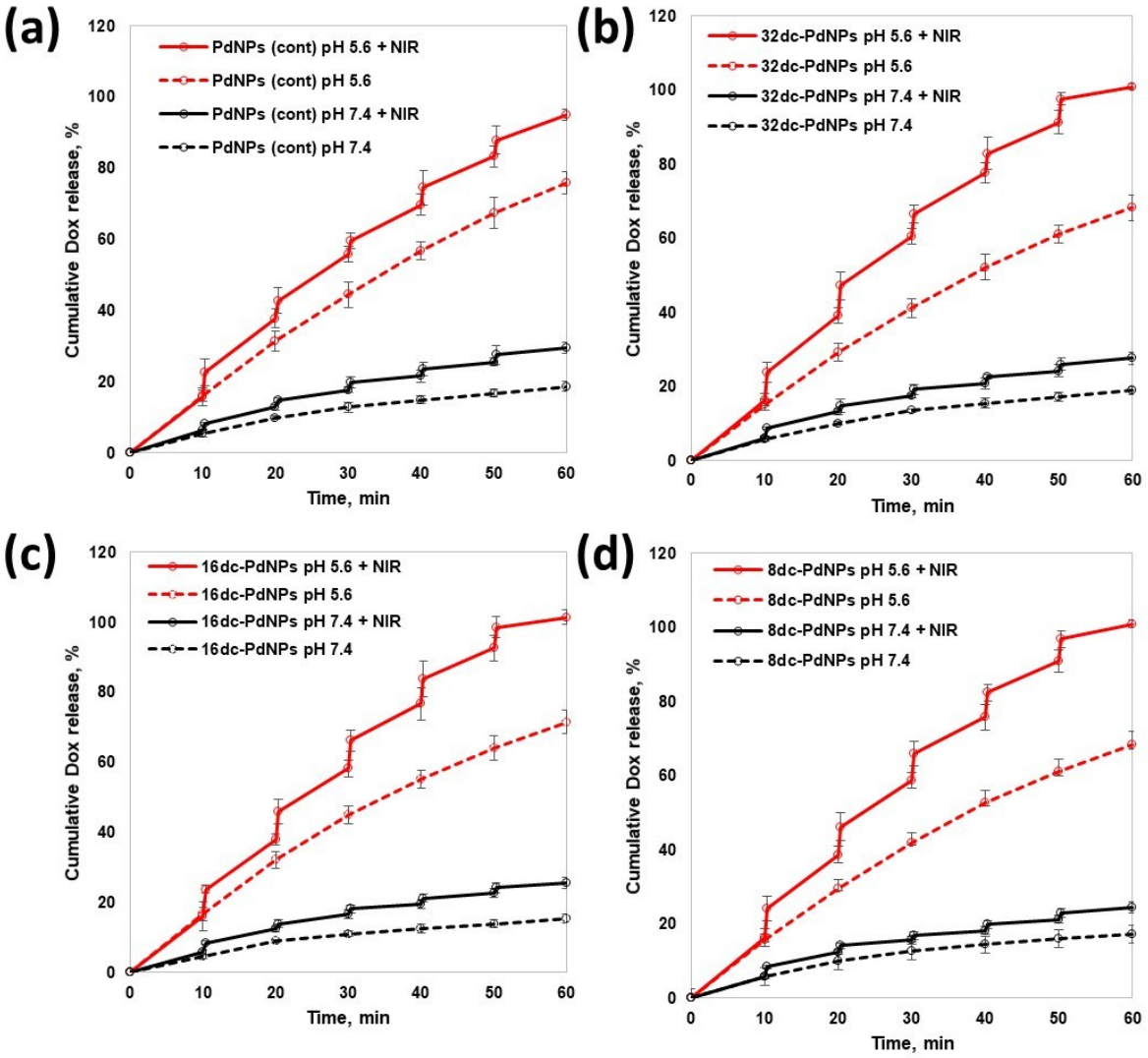

Figure S11. Cumulative Dox releasing at neutral (pH 9.4) and acidic (pH 5.6) against the existence of 808 nm NIR irradiation for (a) control PdNPs, (b) 32dc-PdNPs, (c) 16dc-PdNPs and (d) 8dc-PdNPs.