Electronic Supplementary Information (ESI)

Targeted Delivery of Doxorubicin to Mitochondria Using Mesoporous Silica Nanoparticle Nanocarriers

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Material: Absolute ethanol (EtOH, >99.9%), 3-aminopropyltriethoxysilane (APTS), cetyltrimethylammonoium bromide (CTAB, 90%), (4-carboxybutyl) triphenylphosphonium bromide (98%), 4',6-diamidino-2-phenylindole (DAPI), (3-(4,5-dimethylthiazol-2-yl)-2,5-diphenyltetrazolium bromide (MTT), doxorubicin (DOX), dulbecco's modified eagle's medium (DMEM), 1-ethyl-3-(3-dimethylaminopropyl) carbodiimide (EDC), fetal bovine serum (FBS), fluorescein isothiocyanate (FITC), hydrochloride (HCl, 37%), intracellular ATP determination kit (Invitrogen), Lyso-Tracker Green DND-26 (Invitrogen), mitochondria isolation kit for cultured cells (Thermo Scientific), Mito-Tracker Deep Red (Invitrogen), Mito-Tracker Green (Invitrogen), *N*-hydroxysulfosuccinimide (NHS), methanol (MeOH, 99.5%), phosphate buffered saline (PBS), sodium hydroxide (NaOH), and tetraethylorthosilicate (TEOS, 99%) were purchased commercially. Nanopure water (18.2 M Ω, Millipore Co., USA) was used in all experiments and buffer preparations.

Instrument: Transmission electron microscopy (TEM) images were collected by using a JEOL JEL-1400 at 100 kV. Field emission electron microscopy (FE-SEM) images were obtained by using a FE-SEM 6340 (JEOL) at 5 kV. Specific surface areas and pore size distributions of the as-fabricated MSNPs were measured by using ASAP-2020 Mircomeritics. X-Ray diffraction patterns were collected by using a X'Pert Powder X-ray diffractometer. Zeta potentials were measured by using a Mavern Nanosizer. FT-IR spectra were measured by using a Fourier Transformed Infrared Spectrometer. UV/Vis absorption intensities were recorded by using a UV/Vis 2501 Spectrometer. A micro-plate reader (infinite 200 PRO, Tecan) was employed for the MTT assay, luminescence and fluorescence analysis. Confocal laser scanning microscopy images were taken by using a confocal microscope (Leica TCS SP5, 63× oil objective).

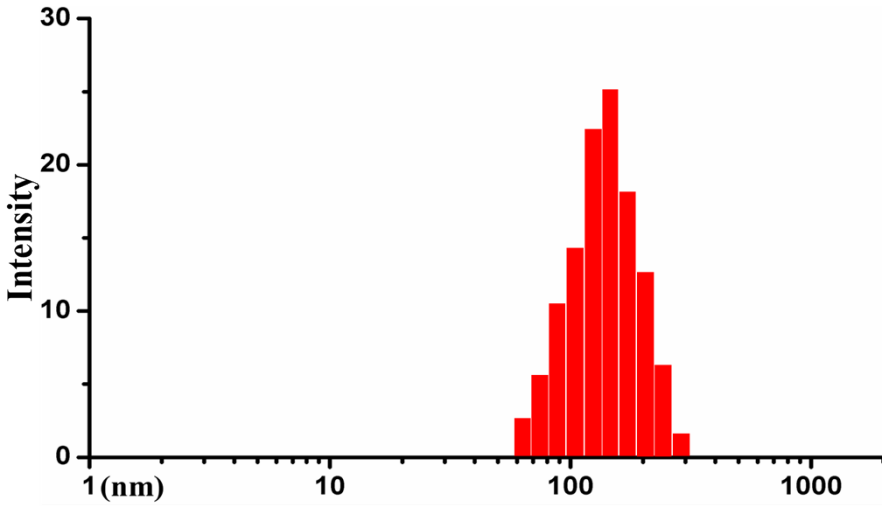

Fig. S1 Dynamic light scattering (DLS) analysis of MSNP-PPh_3 in PBS solution.

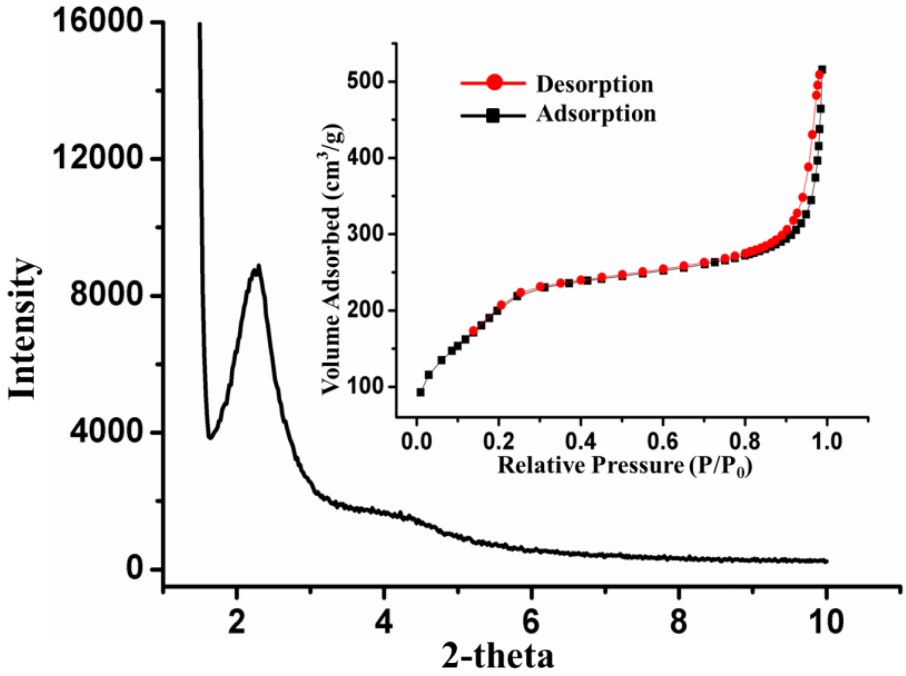

Fig. S2 Powder XRD pattern and BET isotherm curve (insert) of MSNP-PPh_3.

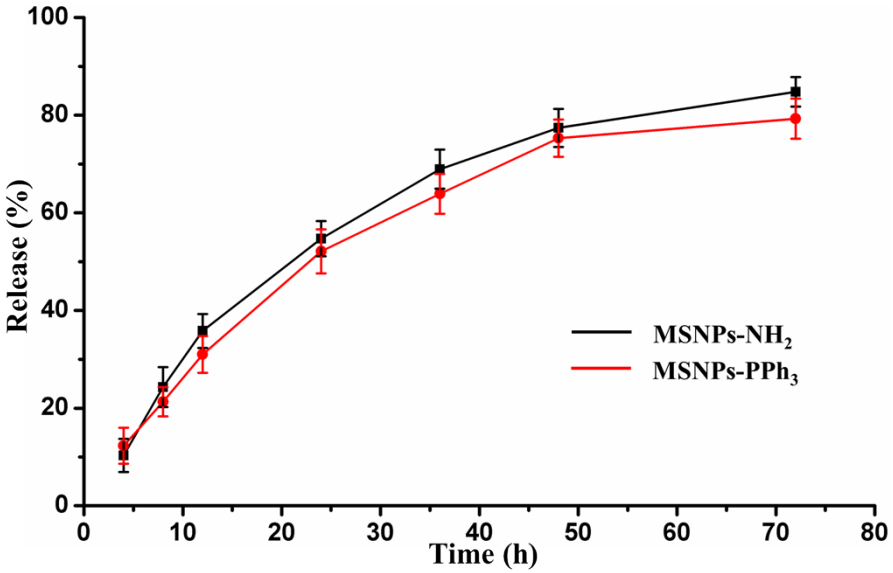

Fig. S3 In vitro time-dependent DOX release profile of MSNP-NH_2 and MSNP-PPh_3 in PBS solution (PH=7.0).

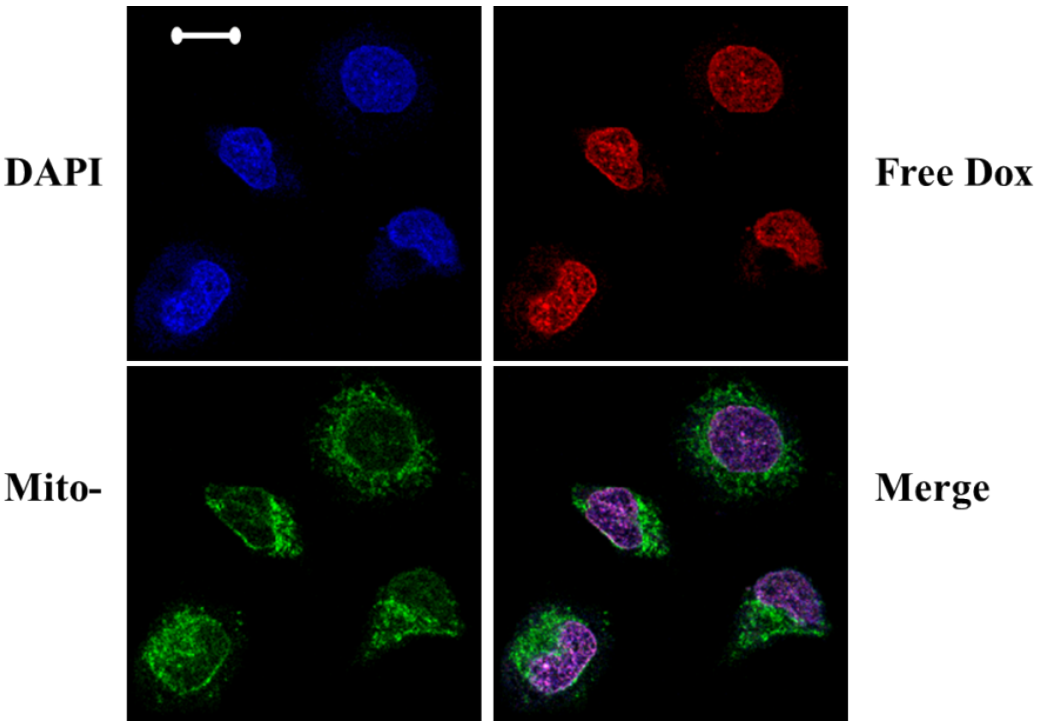

Fig. S4 Confocal microscope images of HeLa cells after being treated with free DOX (4 μg/mL) for 6 h. Mitochondria were stained by Mito-Tracker Green (50 nM). Scar bar: 20 μm.

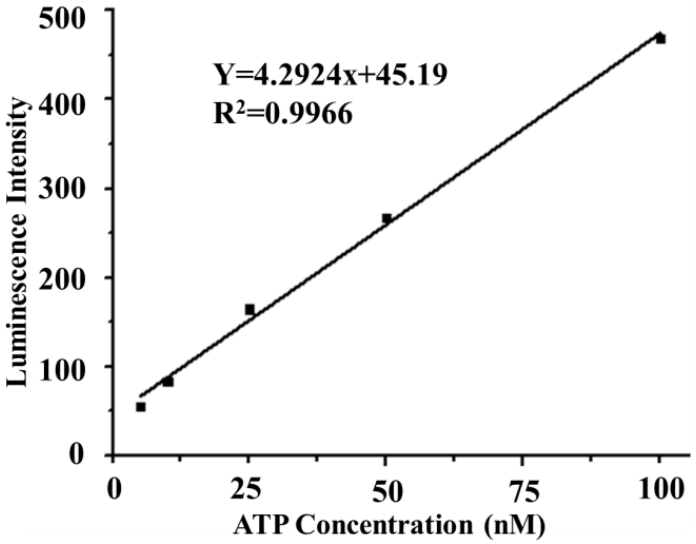

Fig. S5 Intracellular ATP concentration standard curve obtained by measuring intensities of a serious of fixed ATP concentrations.