NIR Absorbing Au nanoparticles decorated Layered Double Hydroxide Nanohybrids for Photothermal Therapy and Fluorescence Imaging of Cancer Cells

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S1. Reagents and materials

Magnesium nitrate hexahydrate ($Mg(NO_3)_2.6H_2O$, 99%), aluminium nitrate nonahydrate ($Al(NO_3)_3.9H_2O$, 99%), sodium hydroxide (NaOH, 99.5%), sodium bicarbonate ($NaHCO_3$, 99%), sodium nitrate (NaNO3, 99%), nitric acid (HNO_3, 99%), sodium borohydrate ($NaBH_4$, 99%) from Merck, India. hydrogen tetrachloro aurate trihydrate ($HAuCl_4.3H_2O$, 99.9%), and sulforhodamine B were procured from Sigma Aldrich. Hydrochloric acid (HCl, 37%), trichloroacetic acid, paraformaldehyde and glycerol were purchased from Merck, India. Minimum essential medium, fetal bovine serum, penicillin/streptomycin antibiotics, trypan blue, PBS tablets and tris buffer were procured from HiMedia, India. Absolute ethanol was purchased from Changshu Yangyuan Chemicals, China and MilliQ water (18.2MΩ, pH 7.2) was used from the Millipore water purification unit. All the chemicals and solvents were of analytical grade and were used without further purification.

S2. Characterization techniques

The powder X-ray diffraction (XRD) patterns were recorded on Philips powder diffractometerPW3040/60 with $Cu_{K\alpha}$(1.5406Å) radiation. Electron microscopy images and selected area diffraction patterns were obtained with field emission gun transmission electron microscope (FEG-TEM),JEOL JEM 2100F, operating at an accelerating voltage of 200 kV and using field emission gun transmission electron microscope (FEG-SEM, JSM-7600F (0.1 to 30 kV). The elemental analysis was carried out using EDS analysis (FEG-SEM) and CHNS (O) (Thermo Finnigan) analyser. Fourier transform infrared (FTIR) spectra were recorded on a JASCO spectrometer (6100 type-A) instrument in the range of 400–4000 cm^{-1}. The extinction spectra of the nanohybrid were recorded on Horiba Fluoromax-4 spectrophotometer.Thephotothermal ability of the nanohybrid suspension under visible and NIR laser was carried outusing514.5 nm (400 mW), 750 and 808 nm (500 mW). The confocal laser scanning images were captured by inverted confocal microscope, Olympus, model IX81.

S3. Cell Culture Techniques

Dulbecco's medium (DMEM, HiMedia) supplemented with 10% fetal bovine serum (FBS, HiMedia) solution and 1% Antimycotic antibiotic solution (Penicillin/streptomycin, HiMedia) is used as a biological culture medium for Human cervical cancer (HeLa), breast cancer (MCF-7) and normal mouse fibroblast (L929) cell lines. These cells were incubated at appropriate cell culture environment (~5% CO_2, 37 °C, Humidifier Incubator).

S4. Characterization of Au nanoparticles

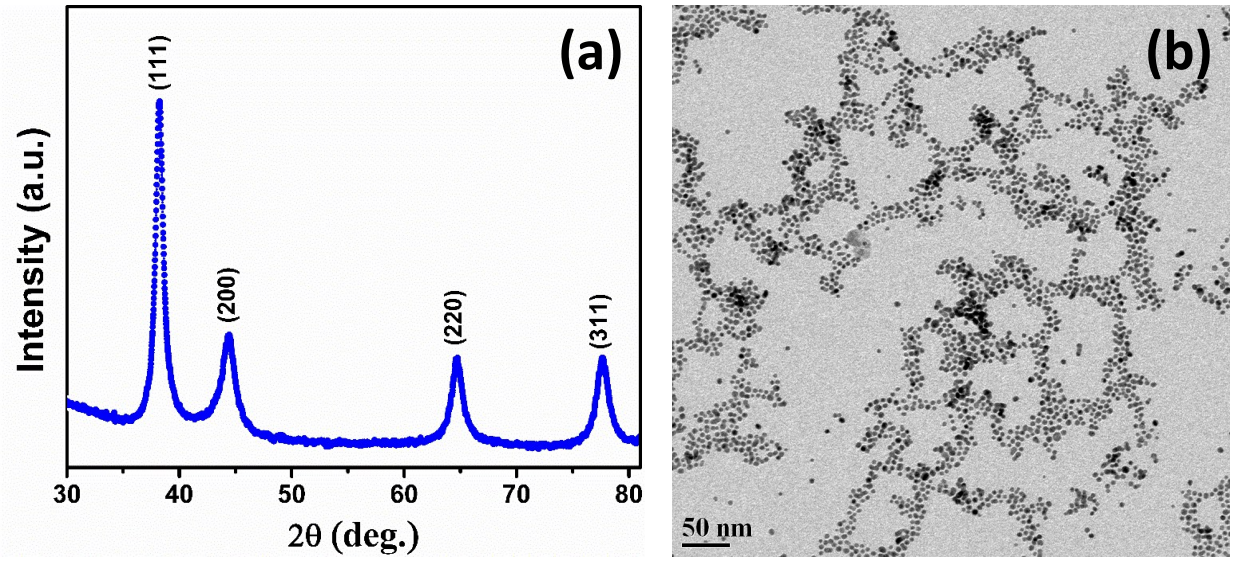

Fig. S1: (a) XRD pattern and (b) TEM images of Au nanoparticles.

S5. Optimization of Photothermal Studies

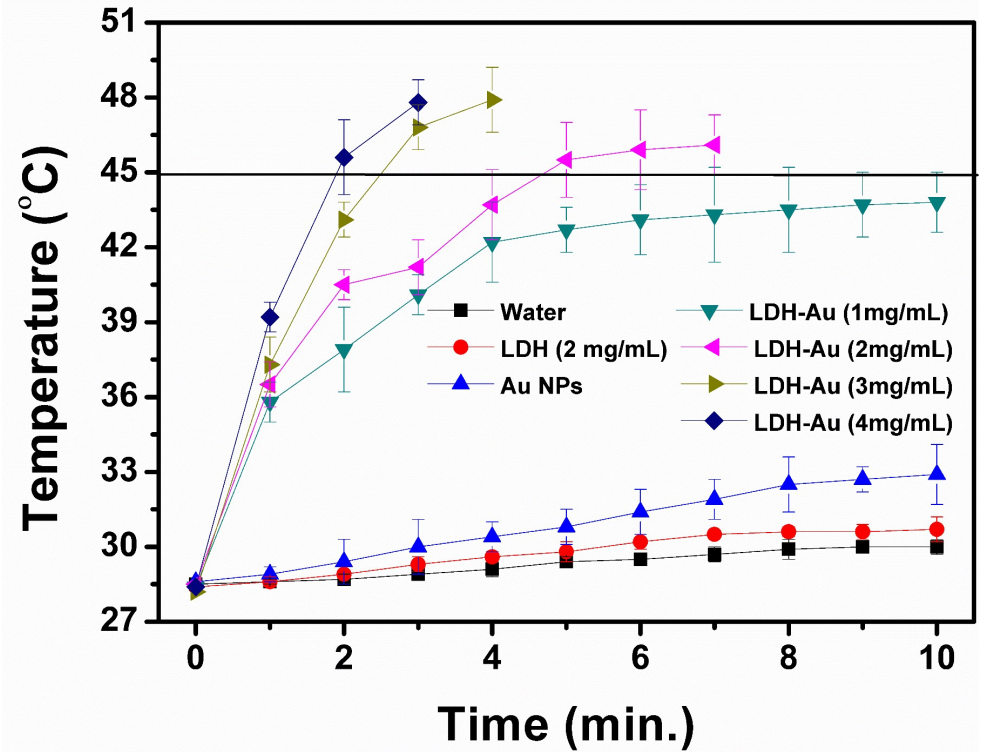

Fig. S2: Optimization of time and concentration dependent photothermal activity of LDH, Au nanoparticles and LDH-Au nanohybrid illuminated with NIR laser (808 nm, 500 mW).Both water and LDH were used as negative control and Au NPs was used as positive control. All experiments were repeated three times (*n*=3).