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Albumin stabilized gold nanostars: A biocompatible nanoplatform for SERS, CT imaging and photothermal therapy of cancer

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Figures



Fig.S1 Photograph of Alb-GNS on A) day 0 and B) day 42 (after 6 weeks) in 1) PBS, 2) complete media and 3) saline.



Fig.S2 EDAX spectra of Alb-GNS.



Fig.S3 XRD spectra of GNS, Alb-GNS and metallic gold from JCPDS database.

Calculation of photothermal conversion efficiency of Alb-GNS

The photothermal efficiency was determined by the following equation:

$$\eta = \frac{hS(T_{max} - T_{surr}) - Q_{dis}}{I(1 - 10^{-A_{808}})}$$

where, η , h, S denote photothermal efficiency, heat transfer coefficient and surface area of sample cell respectively. T_{max} is the maximum temperature (39.3 °C) attained by Alb-GNS, T_{surr} is the surrounding ambient room temperature (28.3 °C) and Q_{dis} is the baseline energy input from the heat generated from water and sample cell and was evaluated independently to be 36.4 mW. I denote laser power (500 mW) and A₈₀₈ is the absorbance of Alb-GNS at 808 nm (0.88).

The unknown parameter, hS can be determined from the following equation:

$$hS = \frac{\sum_{i} m_i C_i}{\tau_s}$$

where, m is the mass and C is the heat capacity of each i component of the sample. The mass of Alb-GNS solution was 2 g and its heat capacity is taken to be same as that of water (4.184 J/g/°C). Similarly, mass of quartz cuvette was 5.9974 g and its heat capacity was 0.839 J/g/°C. The thermal time constant τ_s can be determined from the plot of time versus natural logarithm of temperature during cooling period as seen in Fig.S4 where,

 $t = -\tau_s ln(\theta)$

$$\theta = \frac{T - T_{surr}}{T_{max} - T_{surr}}$$

The photothermal efficiency of Alb-GNS using the above mentioned equations was calculated to be 65.4%.



Fig.S4 A) Graphical representation of temperature variation of Alb-GNS solution in photothermal transduction experiment and B) Graph depicting time versus natural logarithm of temperature during cooling period to evaluate thermal time constant τ_s .



Fig.S5 Original intensity CT contrast image of Alb-GNS and Omnipaque with increasing concentrations.