Electronic Supplementary Information

One-step Facile Synthesis of Fluorescent Gold Nanoclusters for Rapid Bio-imaging of Cancer Cells and Small Animals

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Figure S1. TEM images of the Au-BSA NCs. Inset: high resolution image with the crystallinity of the metallic structure.

Figure S2. Optical characterization of the Au-BSA NCs. Curves a, b show the UV/vis absorption spectrum and the emission spectrum (Em) of the Au-BSA NCs. Inset: photographs of (c) BSA
solution under visible, (d) Au-BSA NCs in water under visible, (e) BSA solution under UV light, and (f) Au-BSA NCs under UV light (excited at 365 nm).

Figure S3. Fluorescence decay curve of the Au-BSA NCs.

Figure S4. Representative ex vivo fluorescence images of excised MCF-7 tumors and other visceral organs in Au-BSA NCs-injected xenograft tumor mouse after 12 h treatment. (a) spleen (b) heart (c) kidney (d) liver (e) lung (f) tumor.
Figure S5. The viabilities of cells after incubation 24 h with Au-BSA NCs. Two kinds of cancer cells were tested for studying the toxicity of the as-obtained materials against the cells: (A) U87 cell, (B) A549 cell.

Fluorescence quantum yield:
The quantum yield of the as-prepared Au-BSA NCs is measured using the comparative method, which relies on the use of fluorescence standards with known fluorescence quantum yields (Rhodamine B, QY = 95% ). The formula as follows:

\[ QY_u = QY_s \times \left[ \frac{D_u}{D_s} \right] \times \left[ \frac{A_s}{A_u} \right] \times \left[ \frac{n_s}{n_u} \right]^2 \]

where the Quantum Yield of Rhodamine B in ethanol is taken as 0.95. \( A_s \) and \( A_u \) are the UV absorption of the standard s and the sample u. \( D_s \) and \( D_u \) are the integrated area of the standard s and the sample u under the corrected fluorescence emission spectrum. Meanwhile, the integrated areas under the fluorescence emission spectrum curves were calculated by means of Origin software. The n is the index of refraction with \( n_s = 1.36 \) for ethanol and \( n_u = 1.33 \) for water. Briefly, series of diluted samples Au-BSA NCs in water and Rhodamine B at specific concentration (5 μg/mL) were prepared and fluorescence emission scans and UV absorption were performed. In summary, We use the equation cited above to determine the quantum yield of Au-BSA NCs.