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Biomimetic Immunomagnetic Gold Hybrid Nanoparticles Coupled with Inductively Coupled Plasma Mass Spectrometry for the Detection of Circulating Tumor Cells

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Materials and Reagents

The chemicals iron (III) chloride anhydrous ($FeCl_3$), Tetrachloroauric acid ($HAuCl_4 \cdot 3H_2O$), polyacrylic acid (PAA), diethylene glycol (DEG), 3-Mercaptopropyltrimethoxysilane (MPTMS, 95%), Hoechst 33258, and Sulforhodamine B (SRB) were bought from the Sigma-Aldrich Co. (St Louis, MO, USA). The antibody of epithelial cell adhesion molecule (EpCAM) (PE594 labeled) was obtained from Novus Biologicals. Phycoerythrin-conjugated anti-cytokeratin (PE-anti-CK) and fluorescein isothiocyanate-conjugated anti-human CD45 (FITC-anti-CD45) were purchased from BD Biosciences (USA).

Characterization

Transmission electron microscopy (TEM) images were obtained with a JEM-2100F transmission electron microscope (JEOL Ltd, Japan) with a 200 kV voltage. The size of nanoparticles was measured on a Zeta PALS + BI-90Plus system. Magnetic properties were measured by VSM at 300 K. The UV-visible absorption spectra were obtained on a U-3310 spectrophotometer (Hitachi, Japan).

Figure Caption

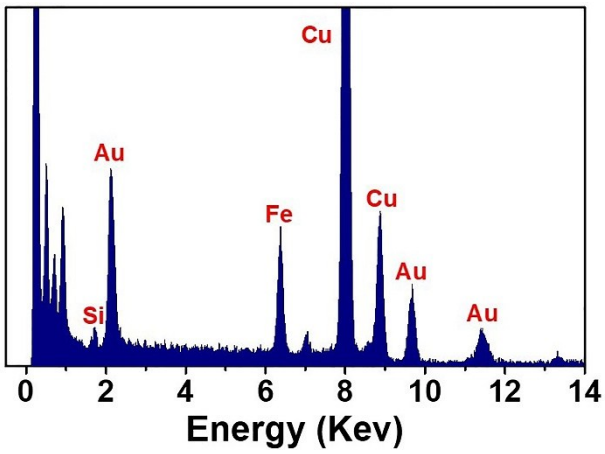

Figure S1. The energy-dispersive X-ray spectrum of Fe_3O_4@Au.

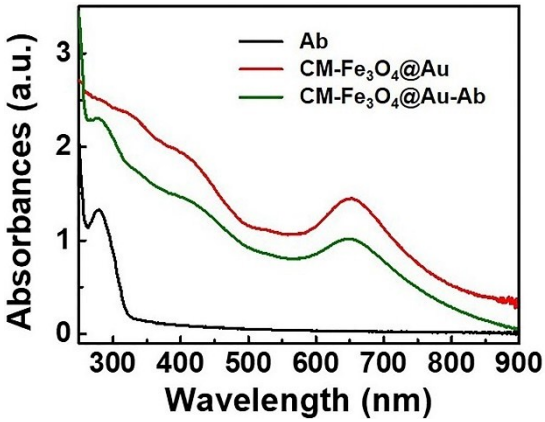

Figure S2. UV-vis-NIR spectra of Ab, CM-Fe_3O_4@Au and CM-Fe_3O_4@Au-Ab.

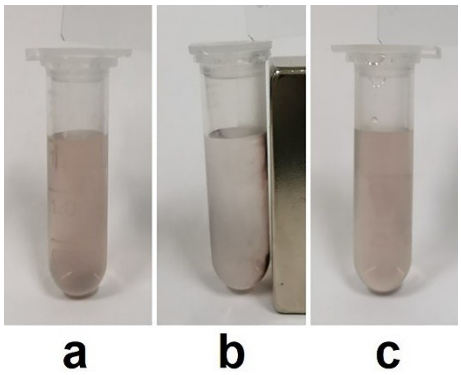

Figure S3. Photographs of CM-Fe_3O_4@Au-Ab before (a) and after (b) magnetic separation and the removal (c) of the extra magnet.

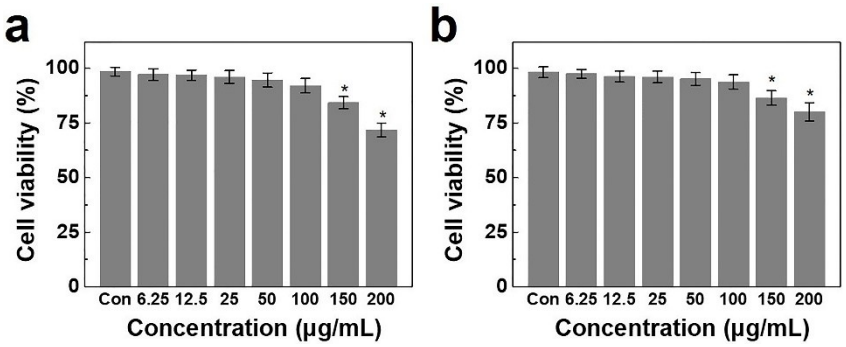

Figure S4. Cytotoxicity of various concentrations of CM-Fe_3O_4@Au-Ab towards MCF-7 cells (a) and leukocytes (b). Data represent the mean ± s.d. (n = 6). $^{*}P < 0.05$ vs con.

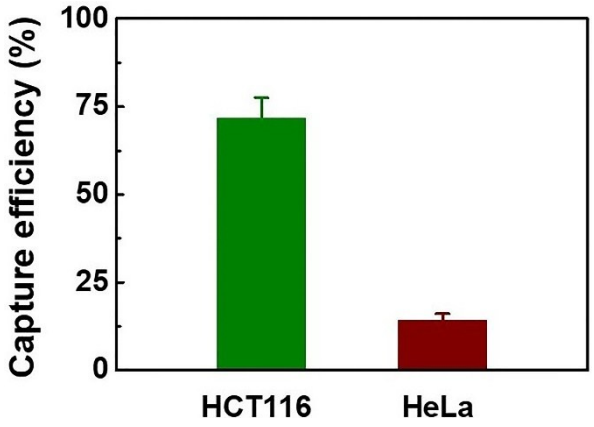

Figure S5. The capture efficiency of HCT116 cells and HeLa cells in PBS by CM-Fe_3O_4@Au-Ab.