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Electronic Supplementary Information:

Synthesis of the magnetic Fe_3O_4-Au hybrids for sensitive SERS detection of cancer cells at low abundance

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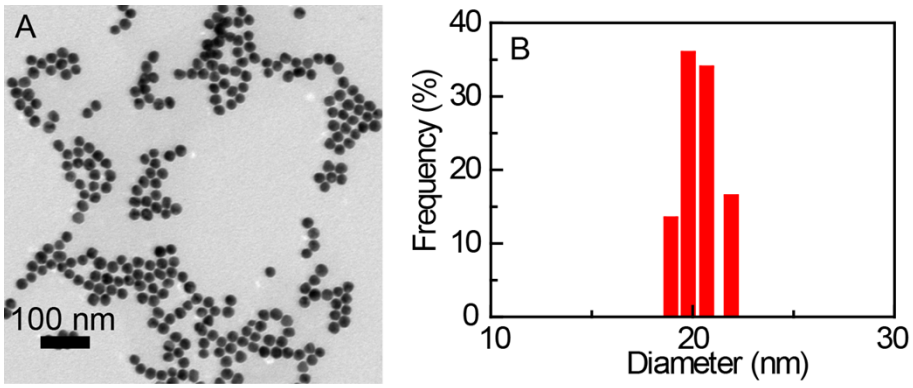

Fig. S1 (A) Typical TEM image of the prepared Au NPs. (B) Size distribution of the prepared Au NPs.

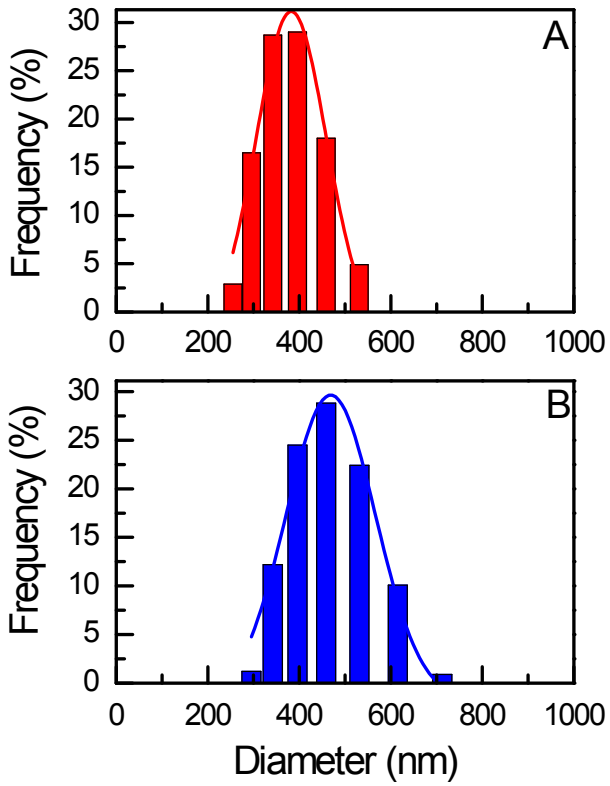

Fig. S2 Size distribution of the Fe_3O_4 (A) and Fe_3O_4-Au NPs (B).

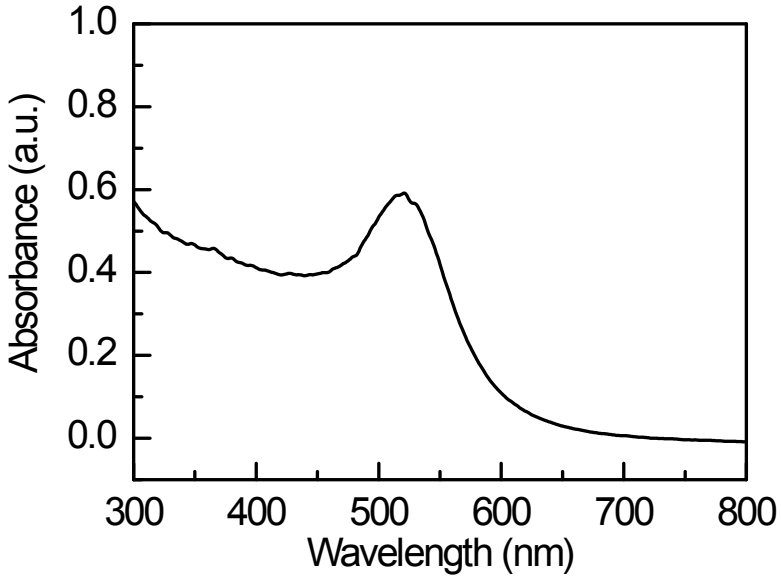

Fig. S3 UV–vis spectrum of the prepared Au NPs.

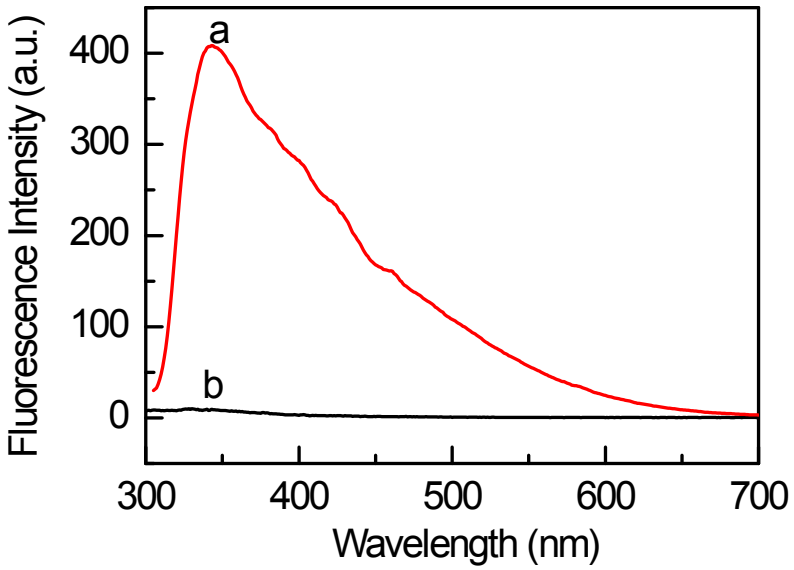

Fig. S4 Fluorescence spectra of the free 4-ATP (0.01 μM, a) and supernatant of the 4-ATP/Fe_3O_4-Au NPs nanostructures after centrifugation (b). The fluorescence spectra were obtained under excitation at 295 nm.

To check the adsorption stability on the Fe_3O_4-Au NPs, we dispersed the 4-ATP/Fe_3O_4-Au NPs (2 mg) into water (1 mL) and stirred for 2 h at 250 rpm, and then the suspension was centrifuged at 10000 rpm. The supernatant was collected and its fluorescence spectrum was recorded. As shown in curve (b), no fluorescence signal of 4-ATP was detected, indicating that almost no 4-ATP molecule was desorbed from the surface of Fe_3O_4-Au NPs. These results demonstrate that the adsorption of 4-ATP on the Fe_3O_4-Au NPs is stable.

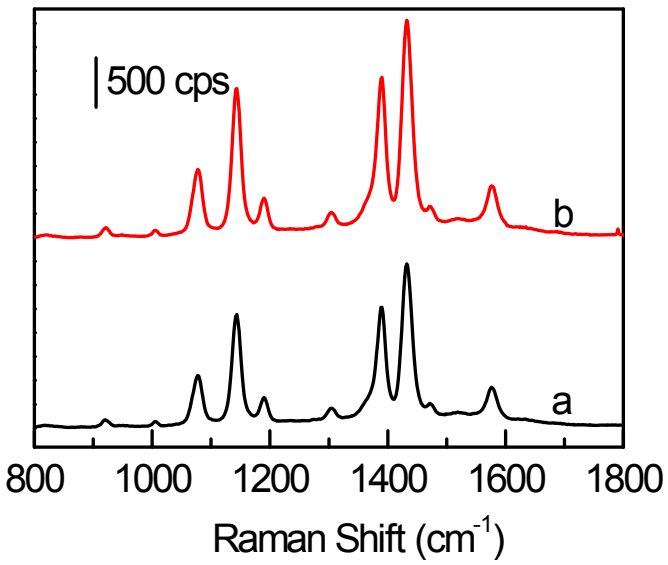

Fig. S5 SERS spectra of 4-ATP labeled at the surface of Fe_3O_4-Au NPs before (a) and after (b) the nanostructures were conjugated with the anti-CEA.

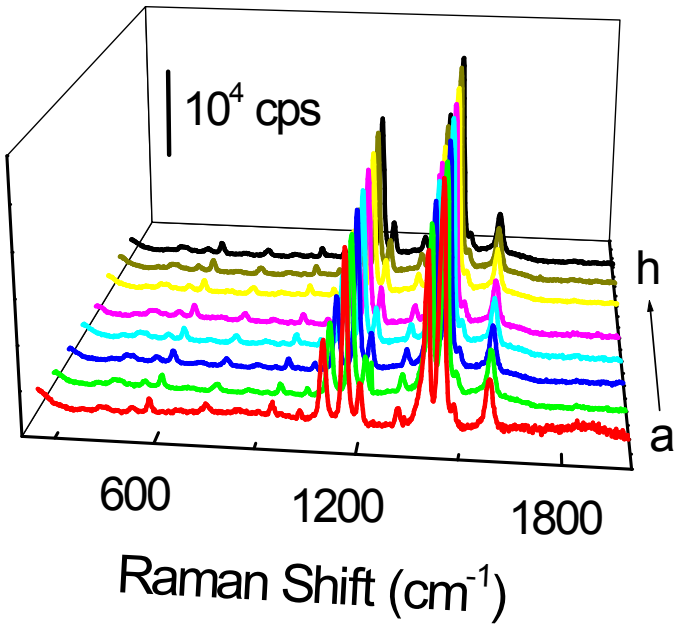

Fig. S6 SERS spectra for the 8 independent measurements of A549 cells (1×10^5 cells mL^{-1}) after binding of the anti-CEA/4-ATP/Fe_3O_4-Au tags and anti-CEA/Au substrates.