Electronic Supplementary Material (ESI) for Analyst.

Supporting Information

Graphene oxide/gold nanoparticles-based amplification method for SERS immunoassay of cardiac troponin I

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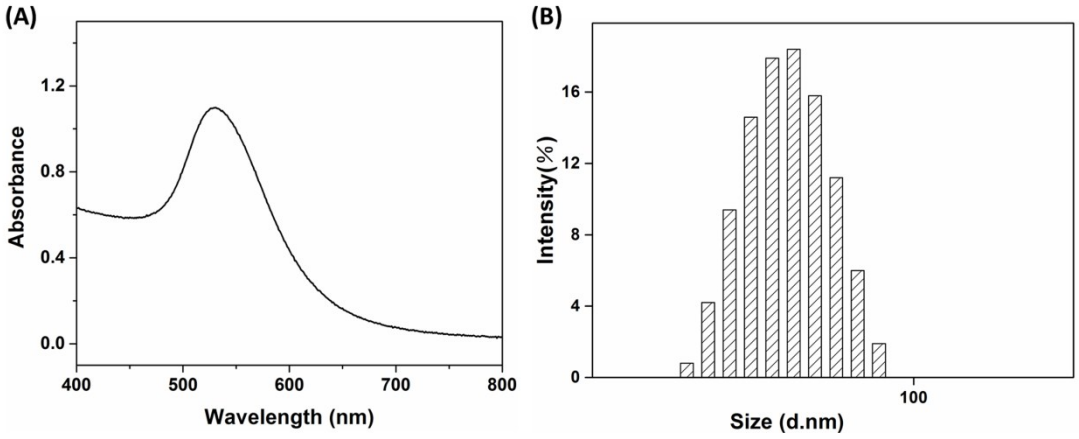

Fig. S1. (A) UV-vis spectra and (B) DLS data for the size distributions of AuNPs.

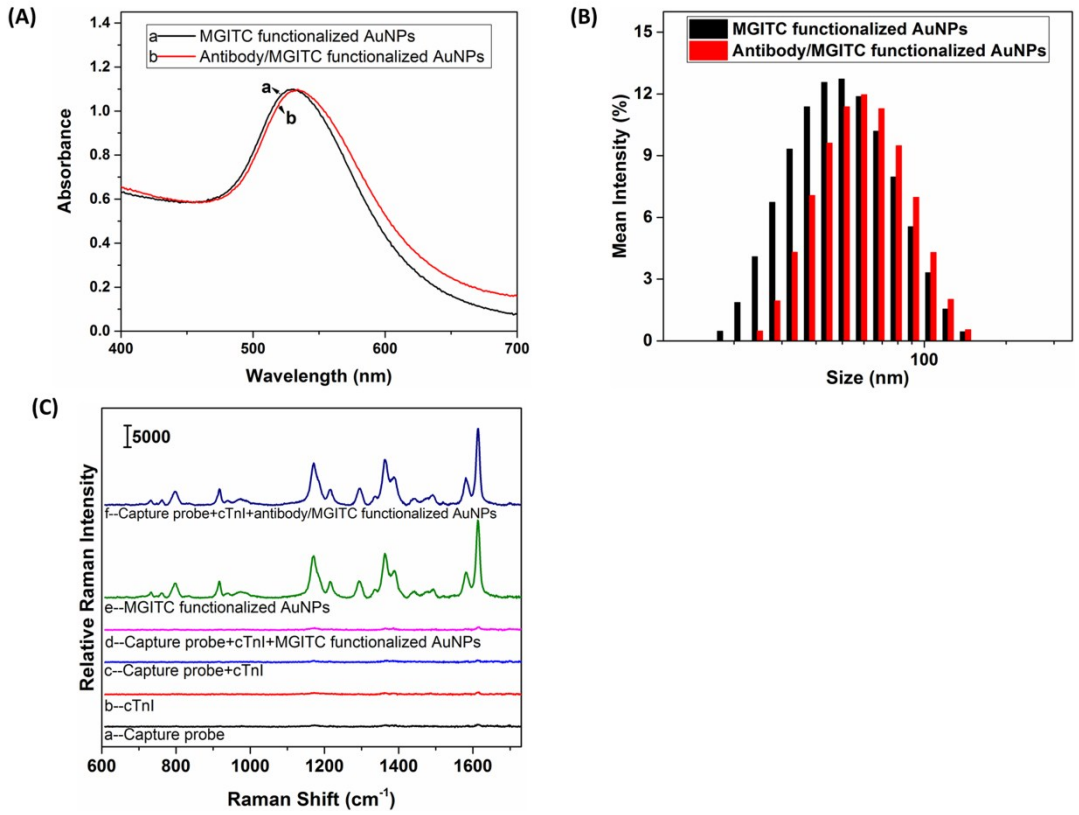

Fig. S2. (A) UV-vis spectra of MGITC functionalized AuNPs (a) and antibody/ MGITC functionalized AuNPs (b); (B) DLS data for the size distributions of MGITC functionalized AuNPs (a) and antibody/ MGITC functionalized AuNPs (b); (C) SERS spectra for different conditions: (a) capture probe, (b) cTnI, (c) capture probe and cTnI, (d) capture probe, cTnI and MGITC functionalized AuNPs, (e) MGITC functionalized AuNPs, (f) capture probe, cTnI and antibody/ MGITC functionalized AuNPs.

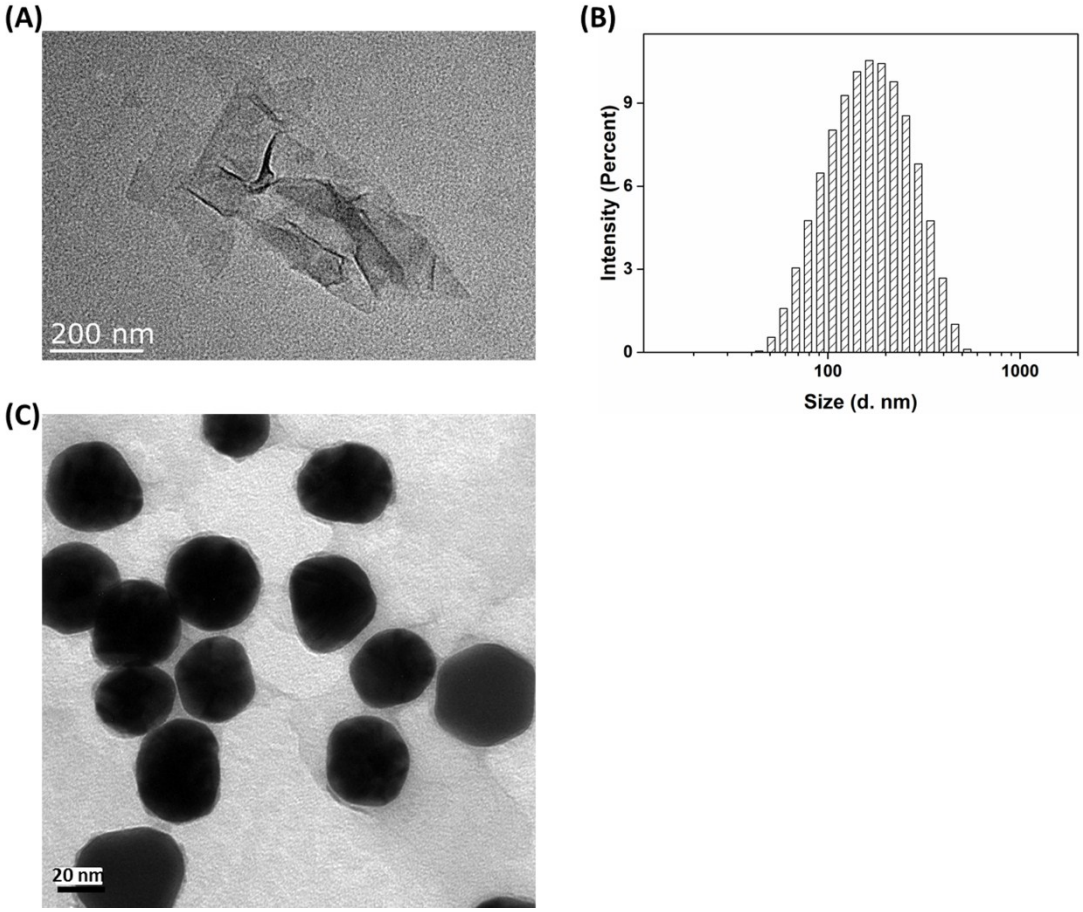

Fig. S3. TEM images of GO (A), DLS data of the GO (B), and TEM images of SERS nanotags (C).

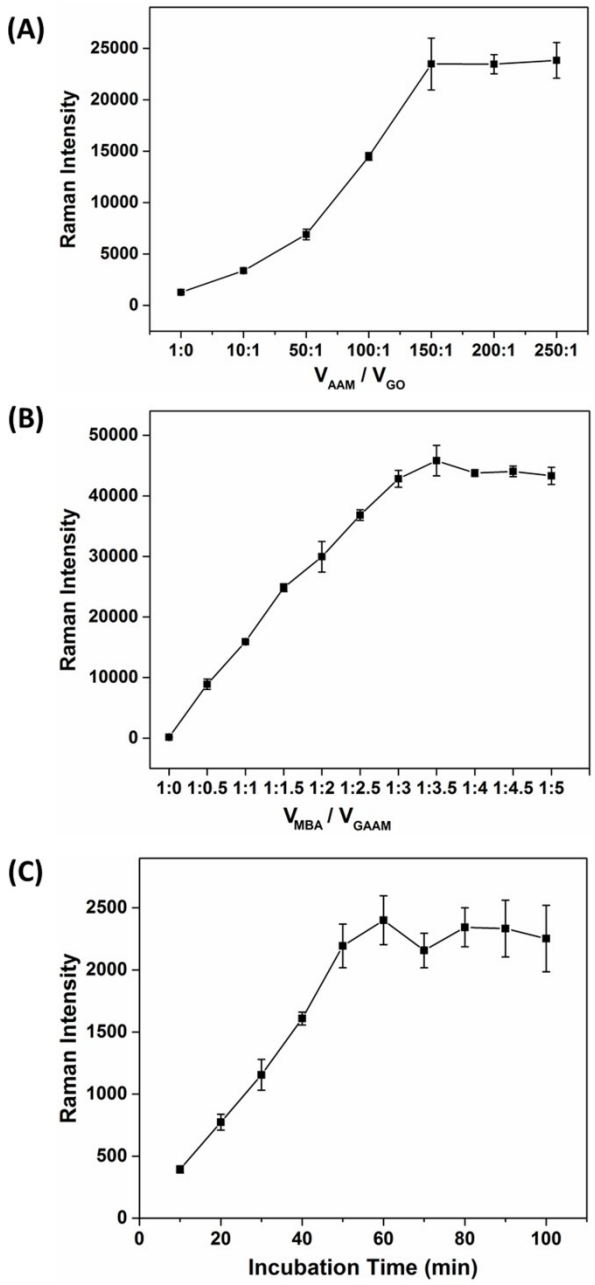

Fig. S4. (A) Effects of the volume ratio of antibody/MGTIC functionalized AuNPs (AAM) and GO on the Raman intensity changes. (B) Effects of the volume ratio of capture probe (MBA) and SERS nanotags (GAAM) on the Raman intensity changes of SERS tags. The concentration of cTnI was 1000 ng / mL. (C) Effects of incubation time of capture probe (MBA)/target and SERS nanotags (GAAM) on the Raman intensity changes of SERS tags.

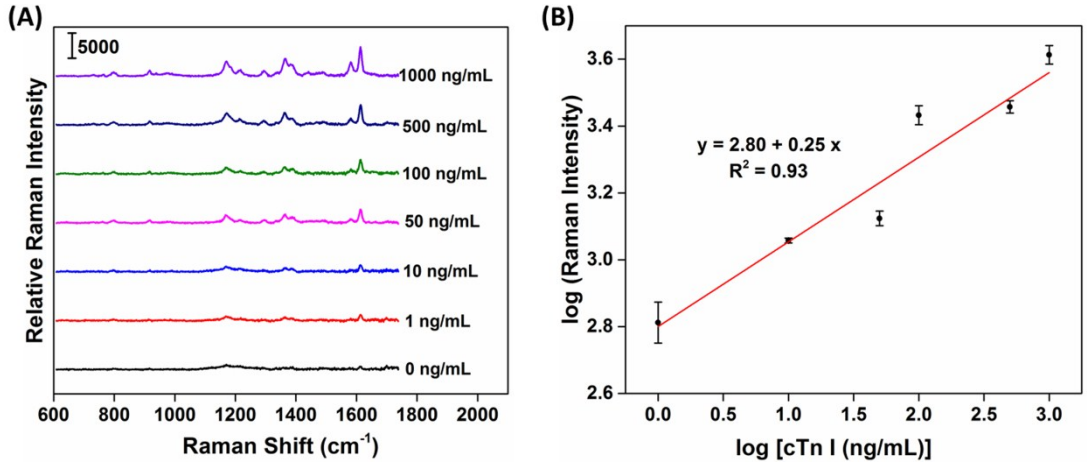

Fig. S5 (A) SERS spectra for cTnI at different concentrations and (B) the corresponding intensity of the SERS signal at 1613 cm^{-1} based on the method without GO. Error bars indicate the standard deviation from five parallel experiments.

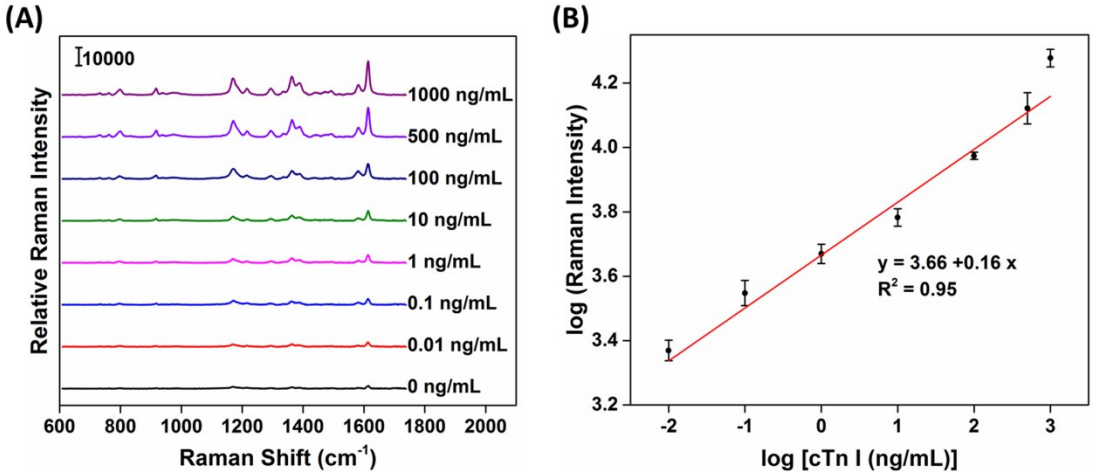

Fig. S6. (A) SERS spectra for cTnI at different concentrations in SeraSub and (B) the corresponding intensity of the SERS signal at 1613 cm^{-1}. Error bars were obtained from five parallel experiments.

Table S1. Comparisons of analytical performances of various typical techniques for cTn I analysis.

Method	Technique in detail	Detection range	The lowest detection concentration	Detection limit	Ref.
ELISA	Based on an integrated volumetric bar-chart chip (IV-Chip)	0.1–100 ng/mL	0.1 ng/mL	≤0.1 ng/mL	1
Immunochromatography	Based on magnetic nanoparticles (MNPs) quenching the fluorescence of Cy5	——	——	0.049 ng/mL	2
Fluorometry	Fluorescence determination by functionalized photon upconverting nanophosphors	250–50000 ng/mL	250 ng/mL	3.14 ng/mL	3
Fluorometry	Based on a graphene oxide platform	0.1–6.0 ng/mL	0.1 ng/mL	0.07 ng/mL	4
Chemiluminescent	Covalent conjugate of HRP and antibody on the GNPs surface	——	1.0 ng/mL	0.25 ng/mL	5
Chemiluminescent	Covalent conjugate of HRP and antibody on the GNPs surface	0.1–100 ng/mL	0.1 ng/mL	0.027n g/mL	6
Electrochemistry	Using carbon nanofiber nanoelectrode	0.25–1.0 ng/mL and 5.0–100 ng/mL	0.25 ng/mL	0.2 ng/mL	7
Electrochemistry	Based on gold nanoparticles and graphene oxide nanocomposites	0.05–3ng/mL	0.05 ng/mL	——	8
Pressure	Using functionalized dendritic platinum nanoparticles and capillary tube indicators	0.1–100 ng/mL	0.1 ng/mL	0.1 ng/mL	9
Colorimetry	Using specific aptamer labeled AuNPs	5–100 ng/mL	5 ng/mL	5 ng/mL	10
Colorimetry	Based on silver enhancement using poly(dimethylsiloxane) (PDMS)- AuNPs composite film	0.01–5 ng/mL	0.01 ng/mL L	0.01 ng/mL	11
SERS	Founctionalized graphene oxides and gold nanoparticles nanocomposites	0.01–1000 ng/mL	0.01 ng/mL	0.005 ng/mL	Present work

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