Electronic Supplementary Material (ESI) for Nanoscale.

Supporting information

Screening and multiple detection of cancerous exosomes using a SERS-based method

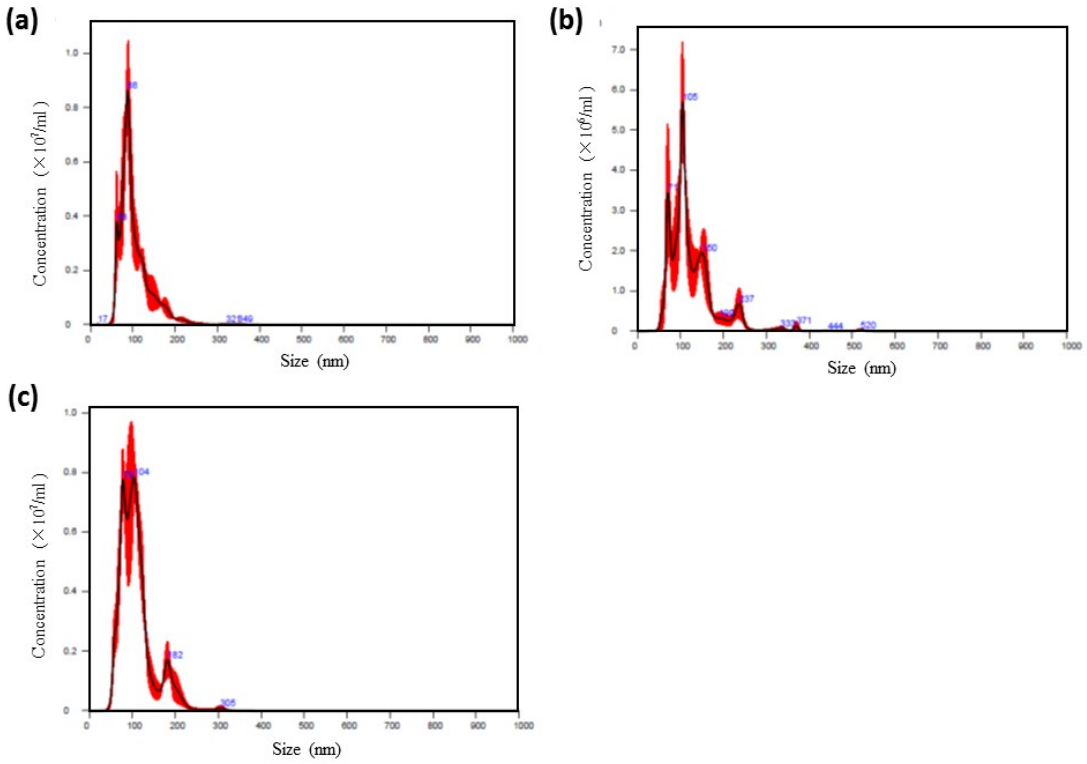

Fig. S1 Averaged Concentration / Size graphs for the NTA experiments of (a) SKBR3 exosomes, (b) T84 exosomes and (c) LNCaP exosomes. Error bars indicate + / -1 standard error of the mean (shown in red).

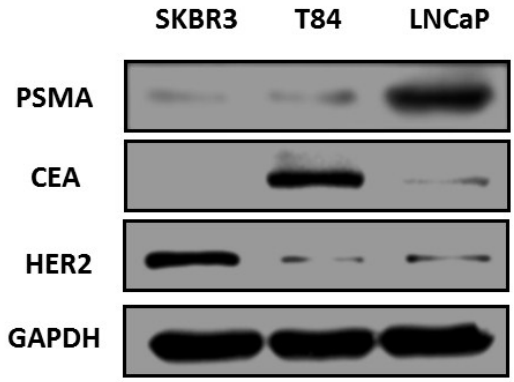

Fig. S2 Western blot analysis of PSMA, CEA and HER2 expression in SKBR3, T84 and LNCaP exosomes. GAPDH is selected as control.

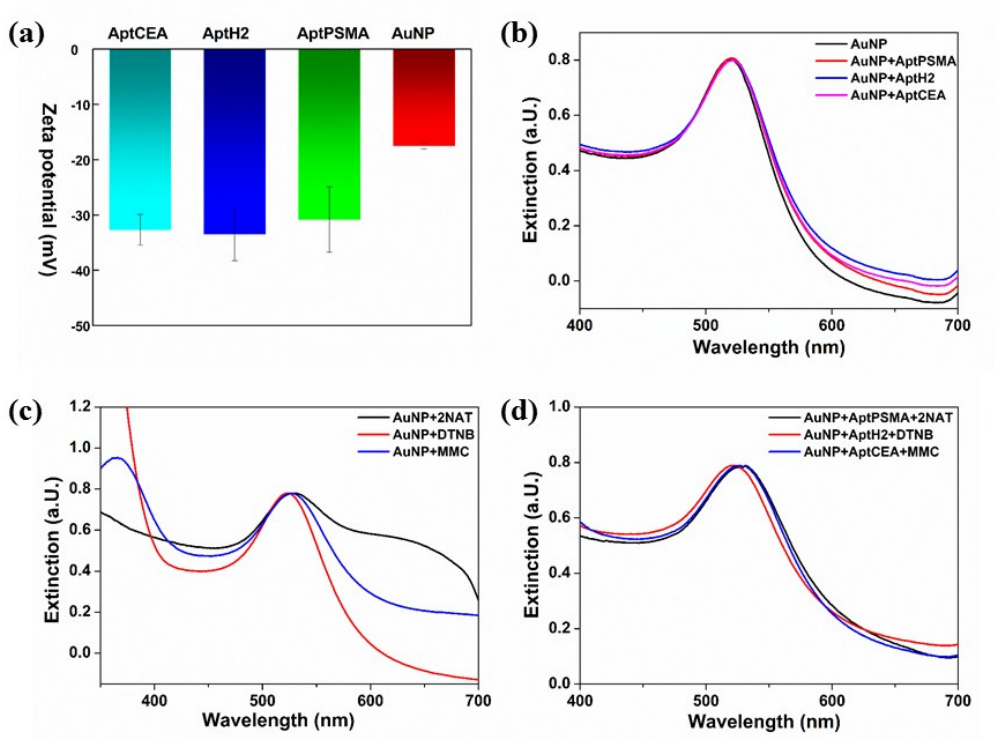

Fig. S3 (a) Zeta potential of of gold nanoparticles and gold nanoparticles@aptamer. (b) The extinction spectra of gold nanoparticles and gold nanoparticles@aptamer.The extinction spectra of (c) gold nanoparticles and (d) gold nanoparticles@aptamer after adding Raman reporter.

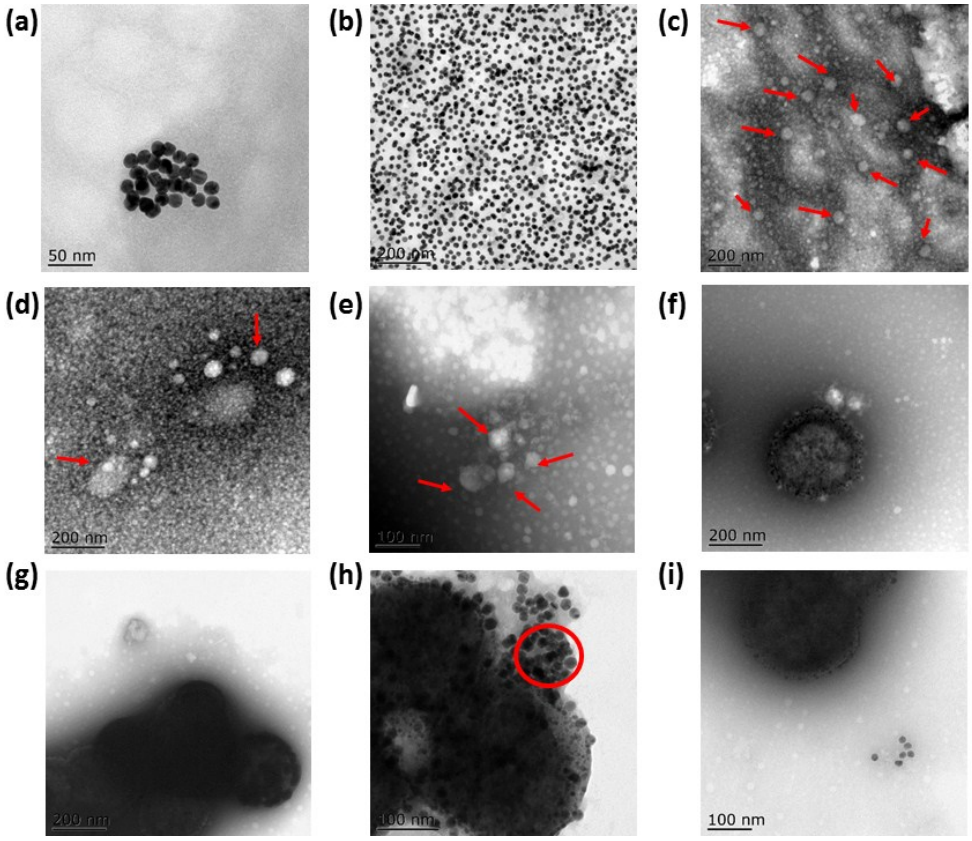

Fig. S4 (a) TEM image of SERS probes. (b) TEM image of gold nanoparticles in larger scale. (c) TEM image of SKBR3 exosomes. (d)TEM image of LNCaP exosomes. (e)TEM image of T84 exosomes. (f) TEM image of MB@Au@aptamer substrate capturing the SKBR3 exosomes. (g) TEM image of adding SKBR3 exosomes directly to MB@Au nanoparticles. The MB@Au cannot capture the exosomes without binding with the aptamer. (h) TEM image of the perfect formed sandwich-type immunocomplex. Red circles refer to the exosomes captured by the MB@Au@aptamer substrates. (i) TEM image of mixture of only MB@Au@aptamer substrates and probes. The immune reaction cannot occur without the target exosomes. All of the samples are stained by phosphotungstic acid.

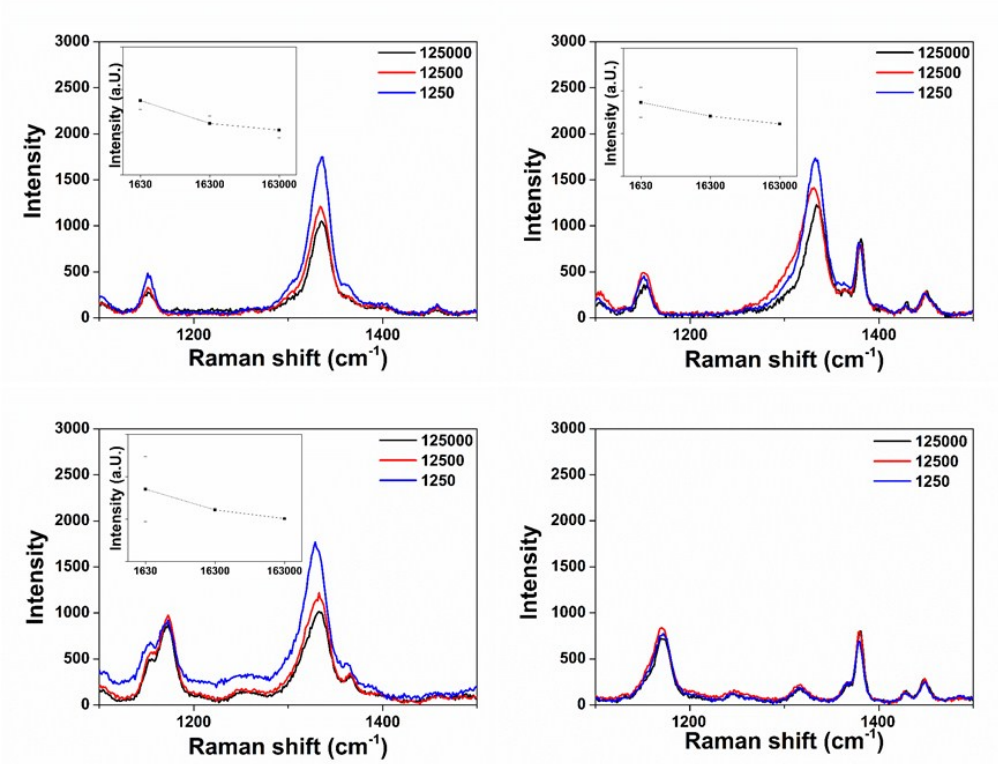

Fig. S5 SERS spectra of the supernatant after adding three different concentrations of SKBR3 exosomes to the capturing substrates and (a) only probeSKBR3, (b) probeSKBR3 and probeLNCaP, (c) probeSKBR3 and probeT84, (d) probeLNCaP and probeT84. The correlation curves (insets) of the coresponding band intensity (DTNB of the probeSKBR3) and the exosome concentration stays almost the same though adding another probe proving that the crosstalk among the different kinds of probes is little. And the band intensities at 1170 and 1378 cm^{-1} (MMC and 2NAT) stay unchanged as the SKBR3 exosome concentration increases.

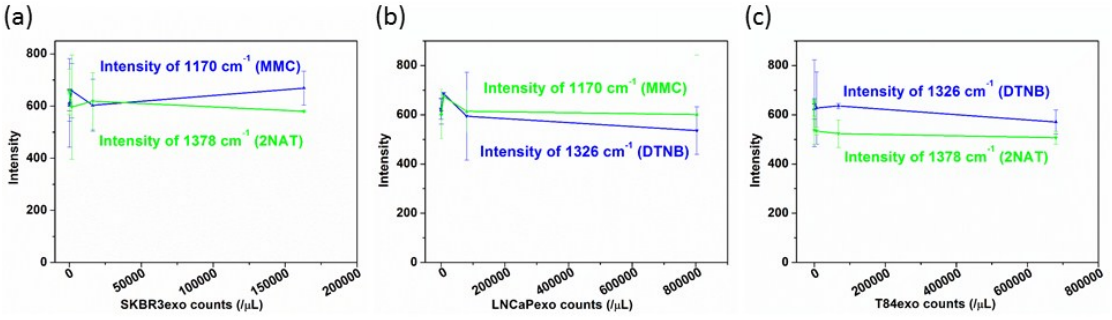

Fig. S6 (a) The calibration curves of 1170 (MMC) and 1378 (2NAT) cm^{-1} bands intensities after adding different concentrations of SKBR3 exosomes to the mixture of capturing substrates and the three kinds of SERS probes. (b) The calibration curves of 1170 (MMC) and 1326 (DTNB) cm^{-1} bands intensities after adding different concentrations of LNCaP exosomes to the mixture of capturing substrates and the three kinds of SERS probes. (c) The calibration curves of 1326 (DTNB) and 1378 (2NAT) cm^{-1} bands intensities after adding

different concentrations of T84 exosomes to the mixture of capturing substrates and the three kinds of SERS probes.

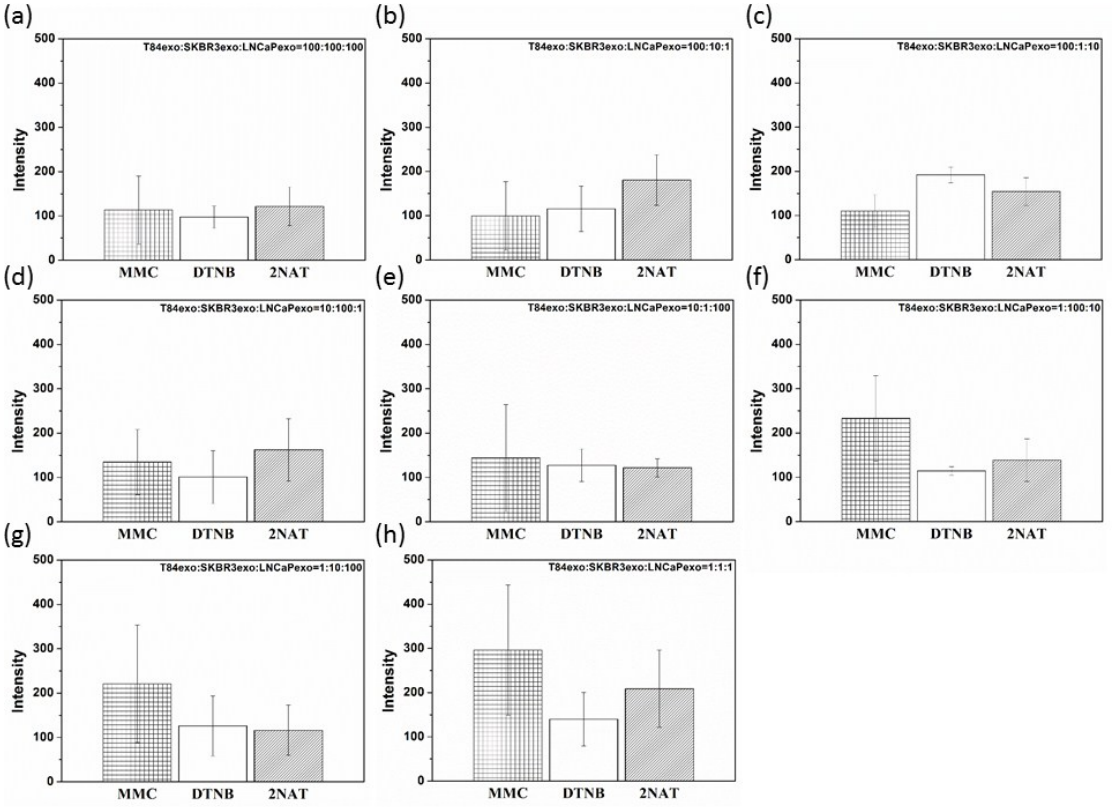

Fig. S7 SERS intensities of the dominant bands after simultaneously adding different proportion of the three kinds of exosomes. The intensity of 1170 cm^{-1} band of MMC indicates the concentration of T84exo, the intensity of 1326 cm^{-1} band of DTNB indicates the concentration of SKBR3exo and the intensity of 1378 cm^{-1} band of 2NAT indicates the concentration of LNCaPexo.