

Electronic Supplementary Information

Quantitative SERS detection of multiple breast cancer miRNAs based on duplex specific nuclease-mediated signal amplification

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S1 Experimental section

Table S1. The oligonucleotide sequences used in this experiment.

Name	Sequences (5'-3')
CP-21	NH2-TTTTTTCAACATCAGTCTGATAAGCTATTTTTT-SH
CP-155	NH2-TTTTTTCCCCTATCACGATTAGCATTATTTTTT-SH
CP-let 7b	NH2-TTTTTTAACCACACAACCTACTACCTCATTTTTTT-SH
miR-21	UAGCUUAUCAGACUGAUGUUGA
miR-155	UUA AUGCUAAUCGUGAUAGGGG
let-7b	UGAGGUAGUAGGUUGUGUGGUU
miR-141	UAACACUGUCUGGUAAGAUGG
miR-21 forward	ACACTCCAGCTGGGTAGCTTATCAGACTGA
miR-21 reverse	CTCAACTGGTGTCGTGGAGTCGGCAATTCAGTTGAGTCAAC ATC
miR-155 forward	TAATACCGTCTTAAAACCGT
miR-155 reverse	TTCTCGGGAACGTGAAACCT
Let 7b forward	ACACTCCAGCTGGGTGAGGTAGTAGGTTGT
Let 7b reverse	CTCAACTGGTGTCGTGGAGTCGGCAATTCAGTTGAGAACCA CAC
U6 forward	CTCGCTTCGGCAGCACA
U6 reverse	AACGCTTCACGAATTTGCGT

Table S2. SERS analysis for miR-21, miR-155 and let 7b in spiked healthy human serum sample (n=3).

Sample	Added (pM)	Detected (pM)	Recovery (%)	RSD (%)
miR-21	10	9.71	97.1	3.17
miR-155	10	10.35	103.5	3.53
Let 7b	10	10.64	106.4	5.45

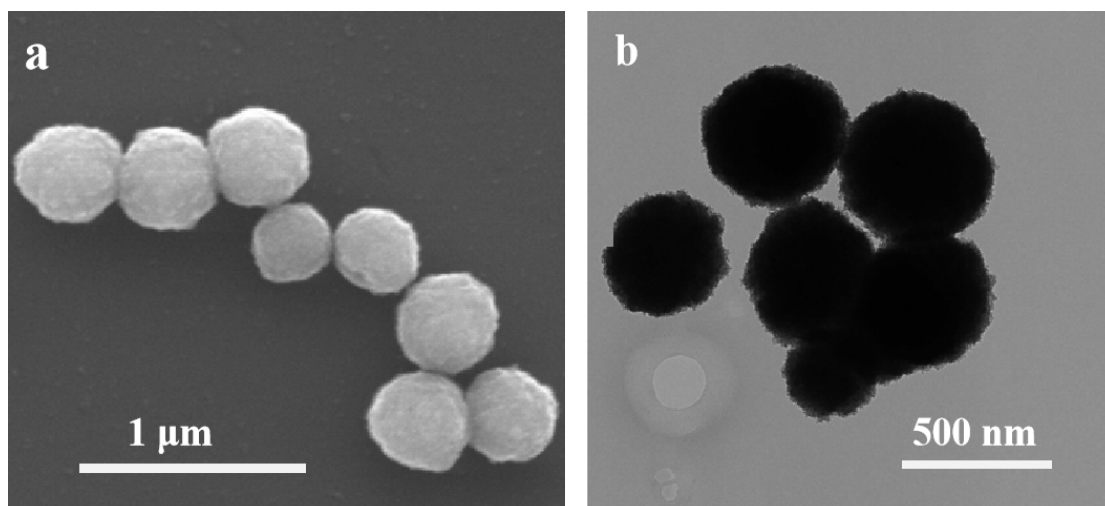


Fig. S1. SEM images of (a) Fe₃O₄ NPs and TEM images of (b) Fe₃O₄ NPs.

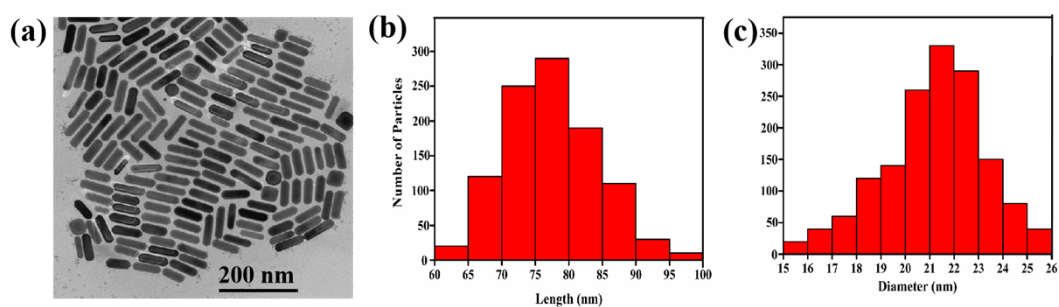


Fig. S2. (a) TEM images of the Au NPs. The length (b) and width (c) of gold nanorods (Au NRs).

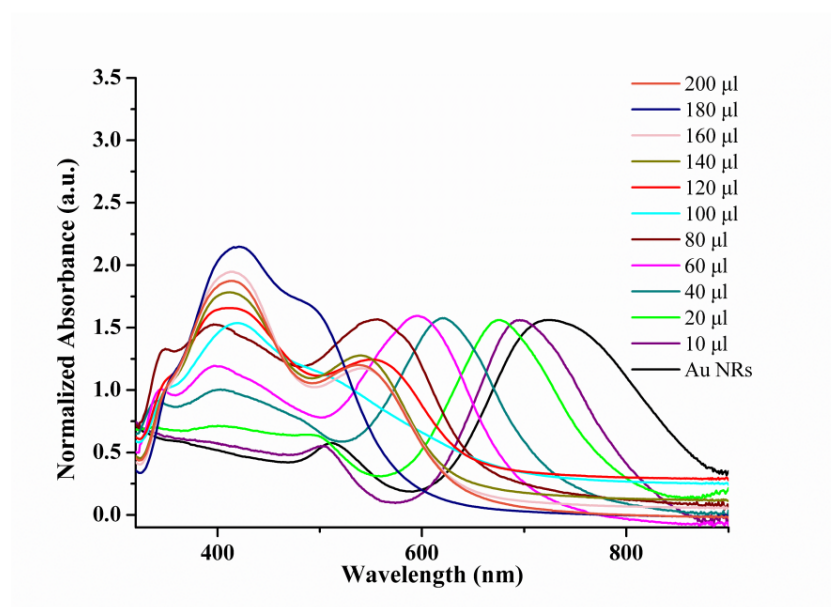


Fig. S3. The UV-vis spectra of Au@Ag NRs with increasing Ag-shells (AgNO₃ volume from 0 μL to 200 μL).

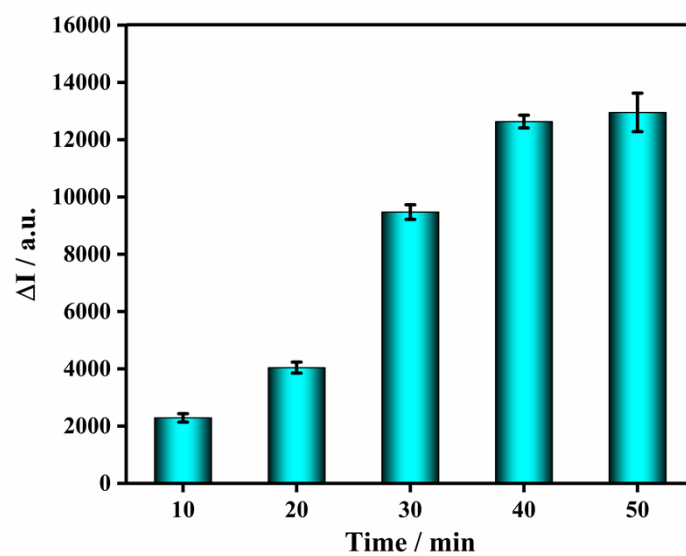


Fig. S4. Raman signal response of the SERS sensor plus miRNA-21 for different reaction time (0, 10, 20, 30, 40, and 50 min). Error bars were calculated based on the standard deviation of three measurements.

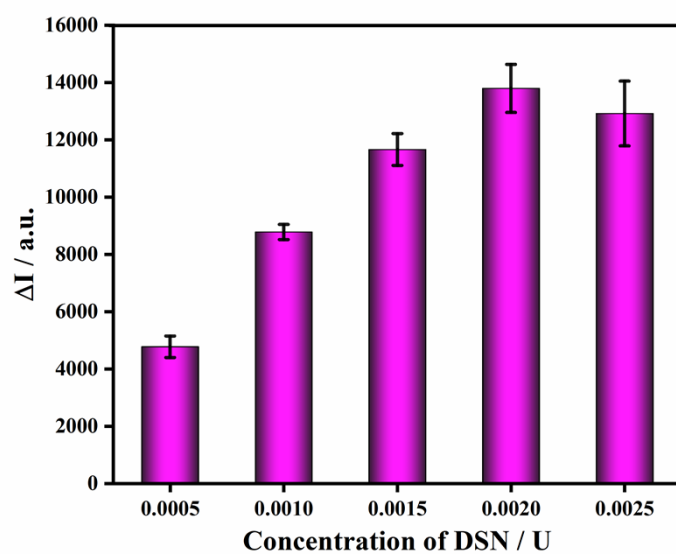


Fig. S5. Plots of the Raman intensity of the peak at 1332 cm^{-1} with various concentrations of DSN (0, 0.005, 0.01, 0.015, 0.02, and 0.025 U). Error bars were calculated based on the standard deviation of three measurements.

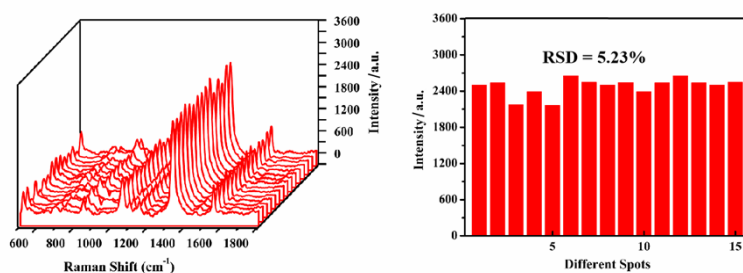


Fig. S6. (A) SERS spectra of the sandwich SERS sensor in the detection of 10 pM miRNA and (B) corresponding histogram collected from 15 different spots.