Supplementary information

Attomolar Detection of Extracellular MicroRNAs Released from Living Prostate Cancer Cells by Plasmonic Nanowire Interstice Sensor

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Author Contribution

‡These authors contributed equally to this work.

Table S1. All miRNA and LNA sequences used in the experiments.

Name		Sequence (5' → 3')	Length (-mer)
miRNA	miR141	UAACACUGUCUGGUAAAGAUGG	22
	miR141 A	UAACACUGUCUGGUAAAGAUGG	22
	miR141 B	UAACACCGUCUGGUAAAGAUGG	22
	miR375	UUUGUUCGUUCGGCUCGCGUGA	22
	miR375 A	UUUGUUCGUUCGGCUCGCGAGA	22
	miR375 B	UUUAUUCGUUCGGCUCGCGUGA	22
	Let-7a	UGAGGUAGUAGGUUGUAUAGUU	22
	Let-7b	UGAGGUAGUAGGUUGUGUGGUU	22
	Let-7c	UGAGGUAGUAGGUUGUAUGGUU	22
	Cel-miR-39	UCACCGGGUGUAAAUCAGCUUG	22
Probe LNA	miR141	Thiol/C6/CCATCTTTACC	11
	miR375	Thiol/C6//TCACGCGAGCC	11
	Let-7a	Thiol/C6/AACTATACAACC	12
	Let-7b	Thiol/C6/AACCACACAACC	12
	Let-7c	Thiol/C6/AACCATACAACC	12
	Cel-miR-39	Thiol/C6/CAAGCTGATTTAC	13
Reporter LNA	miR141	Cy5/AGACAGTGTTA	11
	miR375	Cy5/GAACGAACAAA	11
	Let-7a, Let-7b, Let-7c	Cy5/TACTACCTCA	10
	Cel-miR-39	Cy5/ACCCGGTGA	9

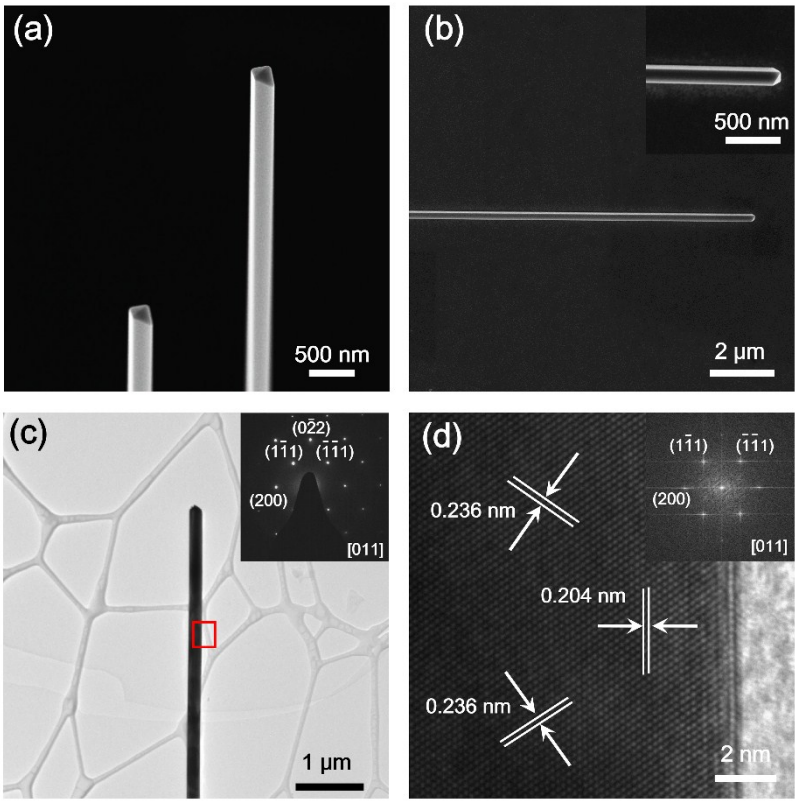

Fig. S1 (a) 30° tilted SEM image of Au NWs on sapphire substrate. (b) SEM image of PNI sensor which constructed by transferring the probe LNA-modified Au NW onto Au film. Inset is magnified SEM image of the Au NW. (c) TEM image of Au NW. Inset is corresponding SAED pattern of the Au NW. (d) HRTEM image of Au NW. Inset is corresponding FFT pattern of the Au NW.

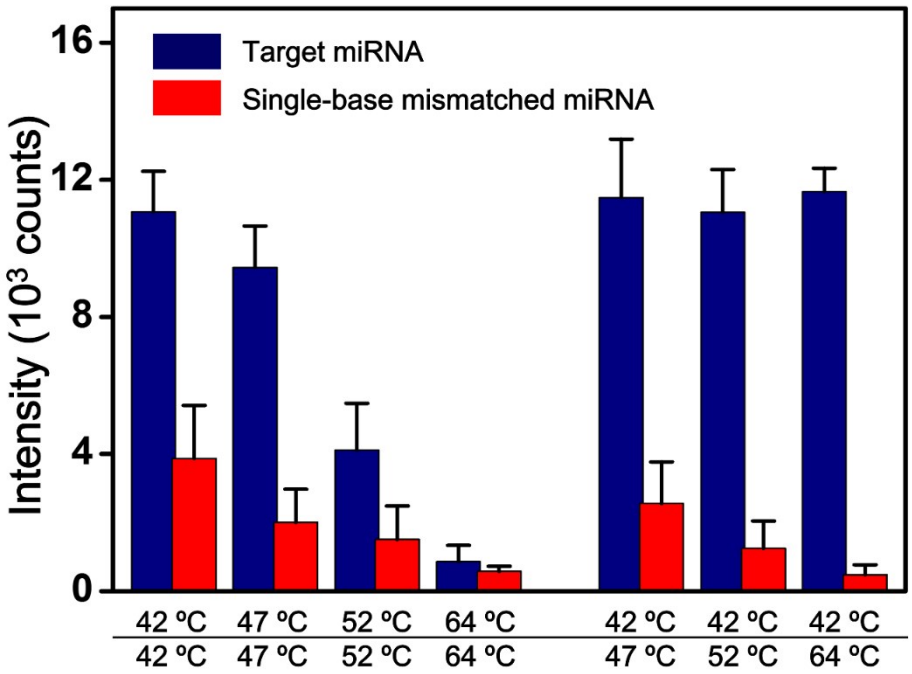

Fig. S2 Plots of 1580 cm^{-1} band intensity measured from target miRNAs (miR141) and single base mismatched miRNAs (miR141 A) in concentration of 100 pM after single- and bi-temperature hybridization procedures. Upper denoted temperatures are target hybridization temperatures and below denoted temperatures are reporter LNA hybridization temperatures. The data represent the mean plus standard deviation from ten measurements.

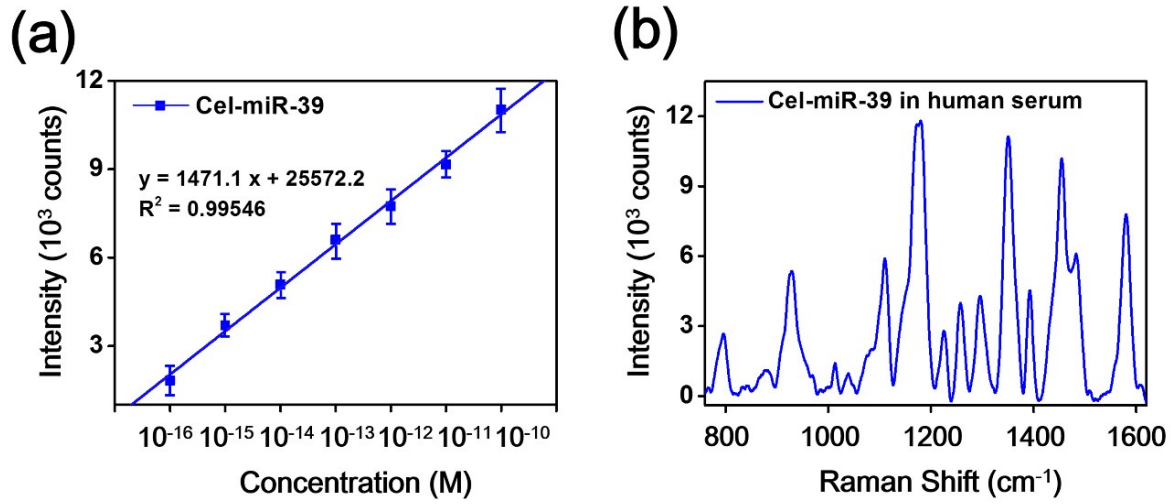

Fig. S3 (a) Plot of 1,580 cm^{-1} band intensity versus the concentration of Cel-miR-39 in a buffer solution. The data represent the mean plus standard deviation from ten measurements. The line represents linear fitting. (b) SERS spectrum of Cy5 obtained from Cel-miR-39 spiked in human serum. The concentration of spiked Cel-miR-39 was 100 pM.

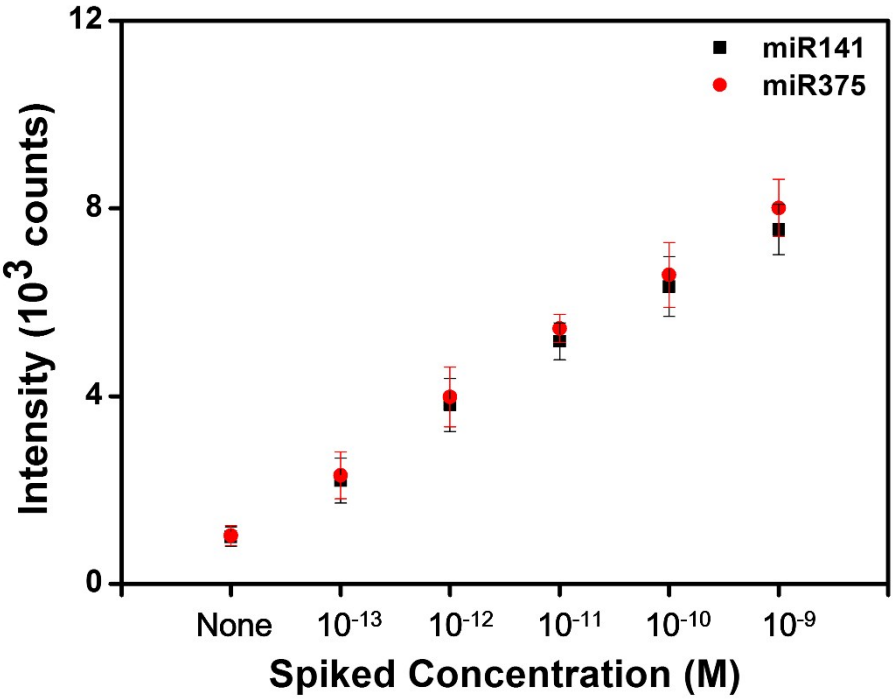

Fig. S4 Plots of 1,580 cm^{-1} band intensity versus the spiked concentration of miR141 and miR375 in human serum. The data represent the mean plus and minus standard deviation from ten measurements.

The 20 μl of miR141 and miR375 from 1 nM to 100 fM were spiked into human serum. Total RNAs were purified from 200 μl of human serum containing 20 μl of target miRNAs using miRNeasy serum/plasma kit according to the manufacturer`s protocol. The final elution was diluted in 200 μl of 5×SSC buffer solution and PNI sensor was incubated in the solution.

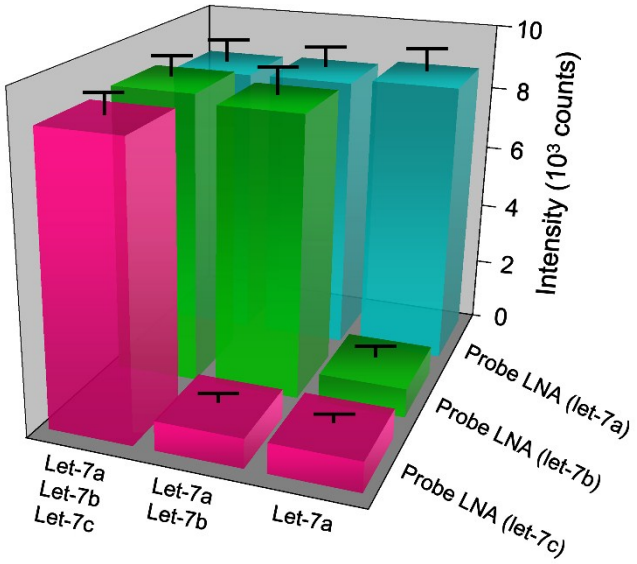

Fig. S5 1,580 cm^{-1} band intensities measured from each PNI sensor when the sample contains one, two, and three of target miRNAs (let-7 family) of which concentrations are 100 pM each. The data represent the mean plus standard deviation from ten measurements.