

**Supplementary Information For**

**Highly sensitive microRNA detection by duplex-specific nuclease  
amplification triggered three-dimensional DNA machine**

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## Calculation of the surface coverage of F-DNA on AuNPs

The fluorescence intensity calibration curves of F-DNA were shown in Figure S2

Fluorescence intensity of F-DNA in the supernatant: 3078

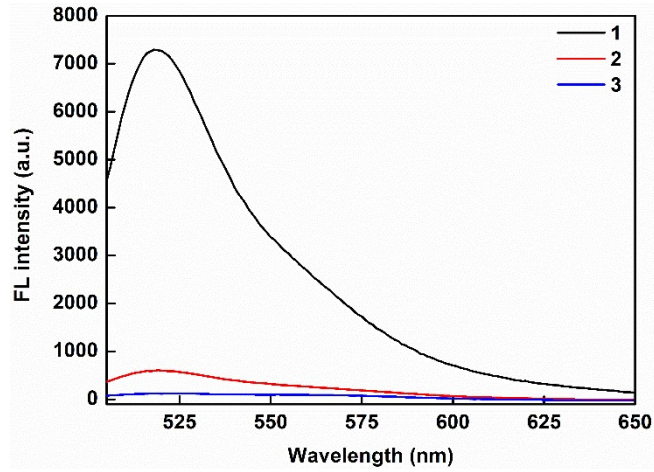
Moles of F-DNA immobilized on AuNPs:  $(3078 - 128.6)/618.6 \times 10^{-8} \times 300 \times 10^{-6} = 1.43 \times 10^{-11}$   
mol

Moles of AuNPs:  $6.88 \times 10^{-9} \times 20 \times 10^{-6} = 1.38 \times 10^{-13}$  mol

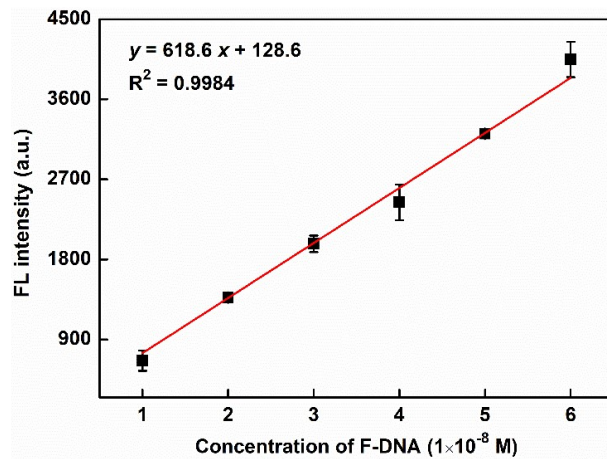
Coverage of F-DNA on AuNPs:  $1.43 \times 10^{-11}/1.38 \times 10^{-13} = 103.6$

**Table S1** Sequence information for oligonucleotides used in this work

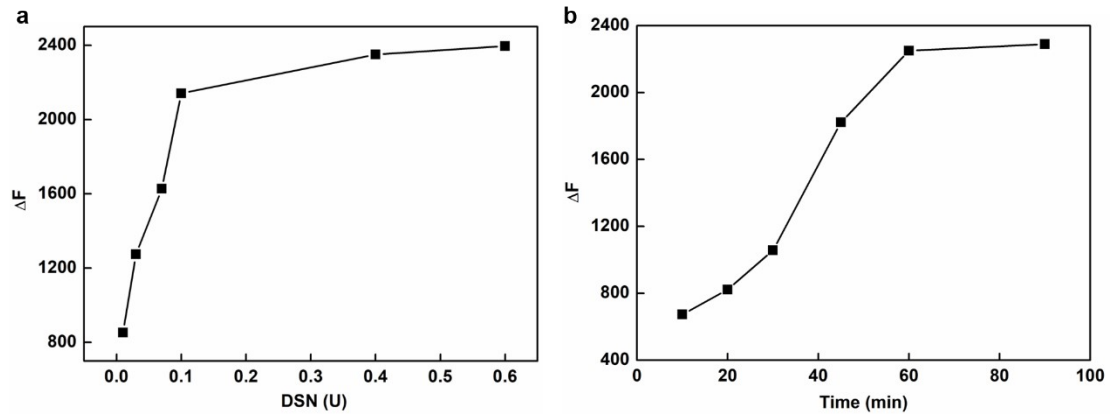
Oligonucleotides	Sequence (from 5' to 3')
SH-DNA	SH-TTTTTTTTTTGTGCTGAGGTT-FAM
F-biotin-DNA	Biotin-TTTTTTTTTTCAACATCAGTCTGATAAGCTAACCTCAGCACTTTTT TTTTTTTTTTTTAACCTCAGCAC-FAM
Biotin-DNA	Biotin-TTTTTTTTTTCAACATCAGTCTGATAAGCTAACCTCAGCACTTTTT TTTTTTTTTTTTAACCTCAGCAC
Bipedal walking DNA	AACCTCAGCACTTTTTTTTTTTTTTTTTTTTTAACCTCAGCAC
miRNA 21	UAGCUUAUCAGACUGAUGUUGA
Let 7a	UGAGGUAGUAGGUUGUAUAGUU
miRNA 199a	ACAGUAGUCUGCACAUUGGUUA
miRNA 155	UUA AUGCUAAUCGUGAUAGGGGU
miRNA 141	UAACACUGUCUGGUAAGAUGG



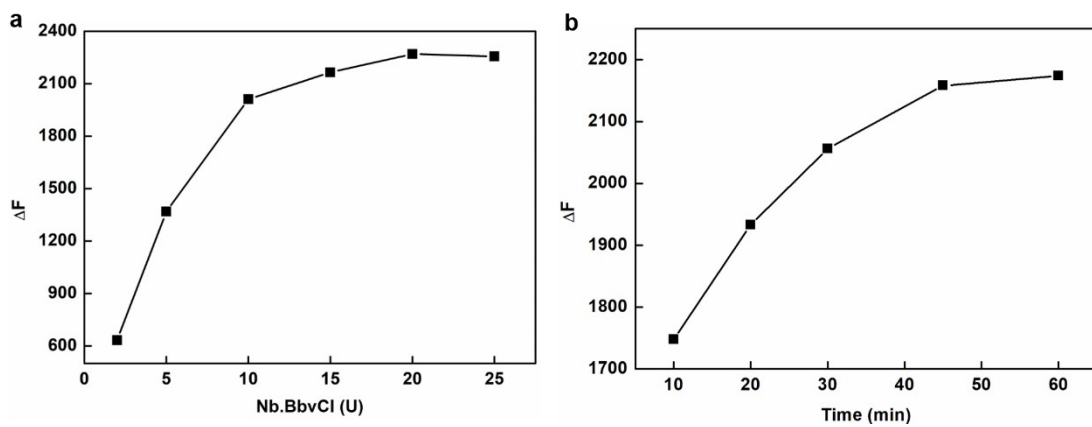
**Fig. S1** Fluorescence intensity of dissociated oligonucleotides after washing F-DNA-AuNPs at different times



**Fig. S2** Fluorescence intensity calibration curve of standard F-DNA solution



**Fig. S3** Effects of (a) the amount and (b) digestion time of DSN on the relative fluorescence intensity of this sensing system



**Fig. S4** Effects of (a) the amount and (b) digestion time of Nb.BbvCI on the relative fluorescence intensity of this sensing system

**Table S2** Recovery of miRNA 21 in 1% human serum samples

<b>Sample</b>	<b>Added (pM)</b>	<b>Founded (pM)</b>	<b>Recovery (%)</b>	<b>RSD (% , n = 3)</b>
1	1	0.97	97.0	3.72
2	5	4.53	90.6	2.21
3	10	9.14	91.4	0.71