Electronic Supplementary Material (ESI) for Analytical Methods.
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Electronic supporting information

Table S1. Sequences of nucleic acid oligonucleotides used in this work

Name	Sequences (5'-3')
miRNA-21	UAG CUU AUC AGA CUG AUG UUG A
H1 probe	TCC TCA ACA TCA GTC TGA TAA GCT AAT GTT GAT TGG ATG CTC TAG CTT ATC AGA CTG AGA CTG GC
H2 probe	ATG CGT TCC ATC AGT CTG ATA AGC TAT TAC TAA GA C TGA TGT TG
H3 probe	CAA CAT CAG TCT TAG TAG CTT ATC AGA CTG ATG TTG A
U6-F	GGTCGGGCAGGAAAGAGGGC
U6-R	GCTAATCTTCTCTGTATCGTTCC

Supplemented experimental section

Detection in blood samples

In order to verify the detection ability in actual samples, experiments were carried out on the collected clinical samples. Serum samples from healthy individuals and patients were obtained from People's Hospital Of Chong Qing Liang Jiang New Area, with the permission of the local regulatory authority and the consent of the serum sample donor. The average age of the three patients was 49.52 ± 6.21, and were pathological diagnosis with gastric cancer of stage IA. The patients received no treatment before providing serum samples for clinical study.

The method: The clinical samples were added to 10 μL of mixture solution containing H1 probe (100 nM), H2 probe (100 nM), and H3 probe (100 nM), and Tris-HCl (pH 7.4) buffer. The mixture was then incubated 37 ^{o}C for 40 min. After incubation at 37 ^{o}C for 40 min, ThT (5 μM) and 300 mM KCl were added to the mixture. The mixture was incubated for 10 min at 37 ^{o}C, the fluorescence was measured by RF5301PC (Shimadzu) fluorospectro photometer.

PCR method:

Reverse transcriptase reactions were performed with 10 μL of RNA samples, 50 nM of primer, RT buffer, 0.25 mM of each dNTP, 3.33 U/mL MultiScribe reverse transcriptase, and 0.25 U/ml RNase inhibitor. The Applied Biosystems 9700 Thermocycler was used to incubate the 7.5 mL reactions in a 96 plate for 30 min at 16 ^{o}C, 30 min at 42 ^{o}C, 5 min at 85 ^{o}C, and finally 4 ^{o}C. The TaqMan PCR kit methodology for real-time PCR was followed as recommended. In a 10 μL PCR, we used 0.67 μL of RT product, TaqMan Universal PCR Master Mix, 0.2 mM of TaqMan probe, 1.5 mM of forward primer, and 0.7 mM of reverse primer. The reactions were carried out in a 384-well plate at 95 ^{o}C for 10 min, followed by 40 cycles of 95 ^{o}C for 15 s and 60 ^{o}C for 1 min. The reactions were each performed three times. The point at which the fluorescence exceeds the predetermined threshold is referred to as the threshold cycle (CT). TaqMan CT values were converted into absolute copy numbers using a standard curve from synthetic lin-4 miRNA.

Relative miR-21 expression:

The 1st miRNA-21 detection result (P1) by the PCR method was selected as control (100), and all detection results by the two methods were compared with the 1st miRNA-21 detection result [1].

Ref:

1. Zhao, X., Zhang, L., Gao, W., Yu, X., Gu, W., Fu, W. and Luo, Y. (2020). Spatiotemporally Controllable MicroRNA Imaging in Living Cells via a Near-Infrared Light-Activated Nanoprobe. *ACS Appl Mater Interfaces,* **12,** 35958-35966.