Supporting Information

A Potential Assay towards Rapid miRNA Detection from Skin Interstitial Fluid Using a Hydrogel Microneedle Patch Integrated with DNA Probe and Graphene Oxide

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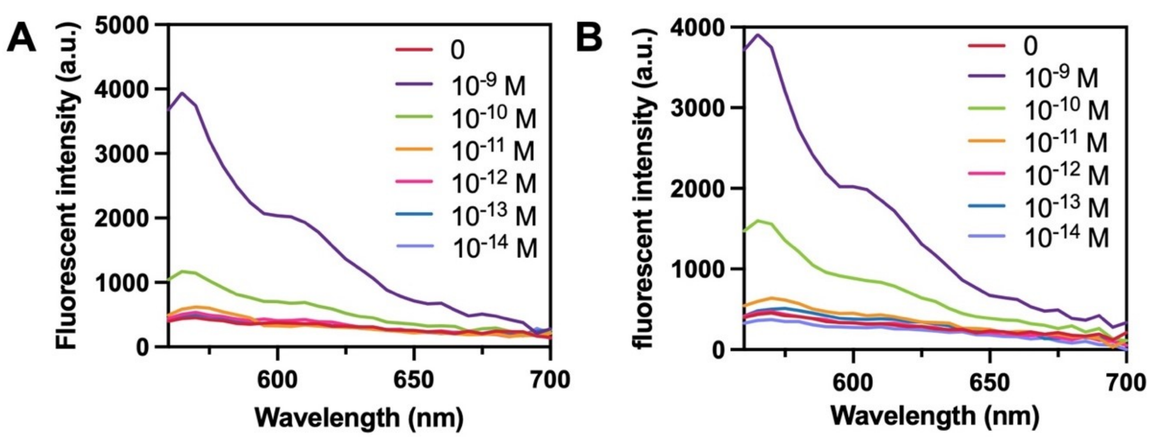

Figure S1. The Fluorescent spectra of (A) GO.pDNA210 and (B) GO.pDNA21 when tried with 10^{-9}, 10^{-10}, 10^{-11}, 10^{-12}, 10^{-13}, 10^{-14} and 0 M of miR-210 and of miR-21, respectively.

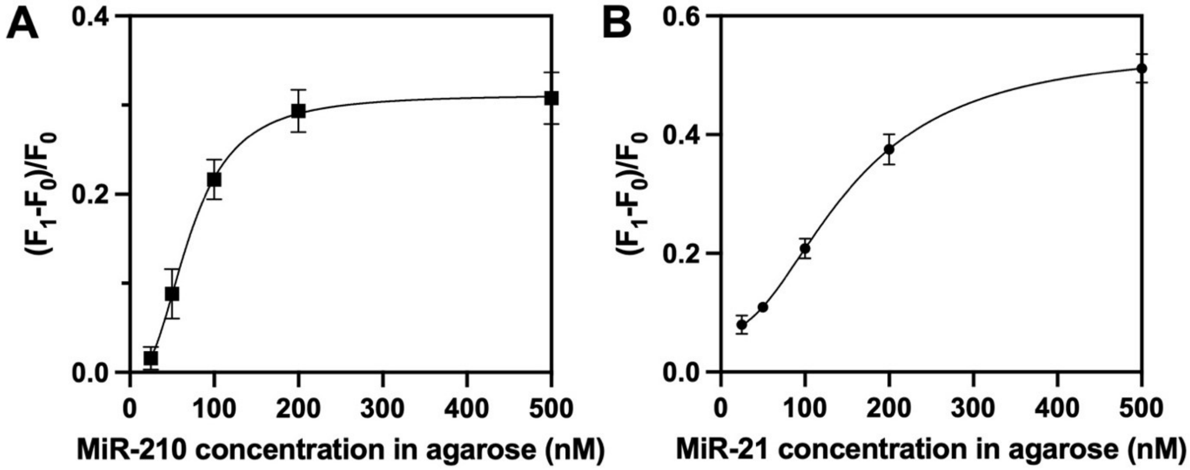

Figure S2. The calibration curve of (A)HMN-miR-210 sensor and (B)HMN-miR-21 sensor on agarose hydrogel.

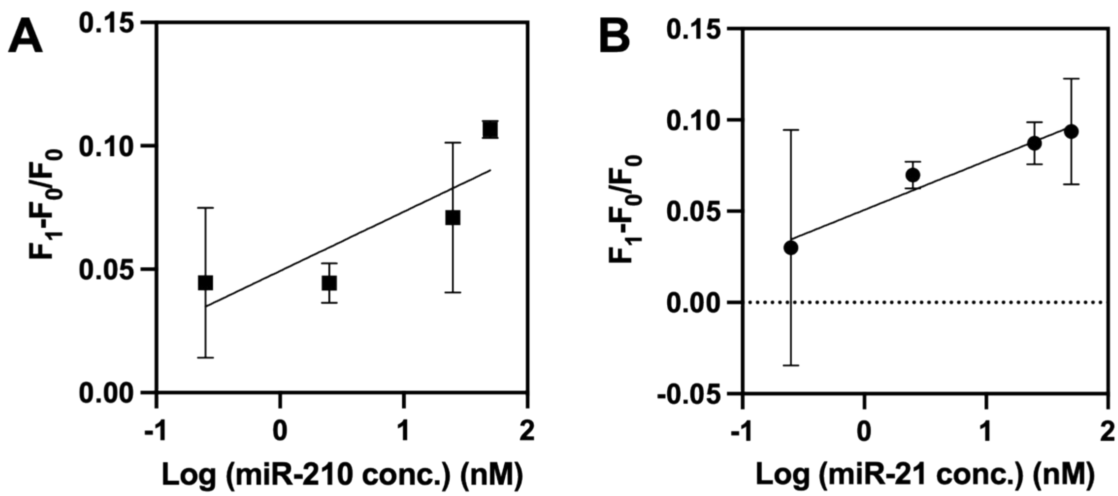

Figure S3. The zoom-in *ex vivo* calibration curves for (A) HMN-miR-210 and (B) HMN-mi-R21 sensor with a concentration range from 0.25 nM to 50 nM.

Table S1. Sequence and modification of probe DNA (pDNA) and miRNA targets

Name	Sequence (5' to 3')
pDNA 210	Cy3-TCAGCCGCTGTCACACGCACAG-NH_2
pDNA 21	Cy3-TCAACATCAGTCTGATAAGCTA-NH_2
miR-210 (non-comp for pDNA 21)	CUGUGCGUGUGACAGCGGCUG[1,2]
miR-21 (non-comp for pDNA 21)	UAGCUUAUCAGACUGAUGUUGA[1–3]
miR-210-mis	CUGUGCGUGUGACAGCG**A**CUG
miR-21-mis	UAGCUUAUCAGACUG**G**UGUUGA

Table S2. Comparison of the recently reported HMN based miRNA sensor and HMN-miR sensor

Ref	***In vitro* target detection range**	**LOD of *in vitro* study**	***Ex vivo* target detection range**	**LOD of *ex vivo* study**
[4]	0.1 pM to 1 nM	159.09 fM	500 nM & 1 μM	n/a
[5]	10 pM to 25 nM	48 pM	500 nM to 500 pM	n/a
[6]	n/a	n/a	10–200 nM	6 nM
HMN-miR sensor	10 fM to 1 nM	2.28 pM (miR210) and 1.23 pM (miR21)	0.25 nM to 500 nM	2.49 nM (miR210) and 2.23 nM (miR21)

References

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