

## Supplementary Information

# Multifunctional Hybrid Nanozymes for Magnetic Enrichment and Bioelectrocatalytic Sensing of Circulating Tumor RNA during Minimal Residual Disease Monitoring

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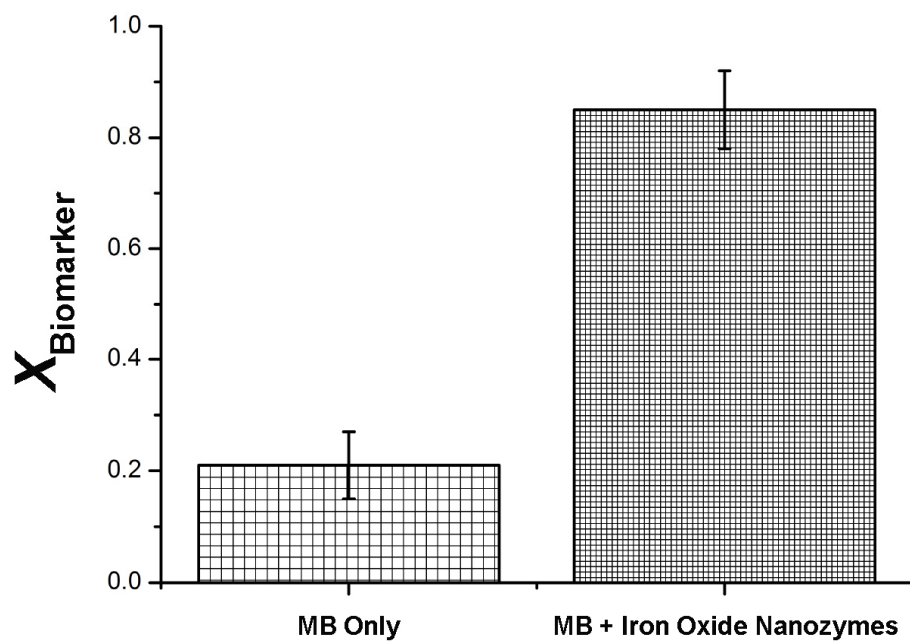
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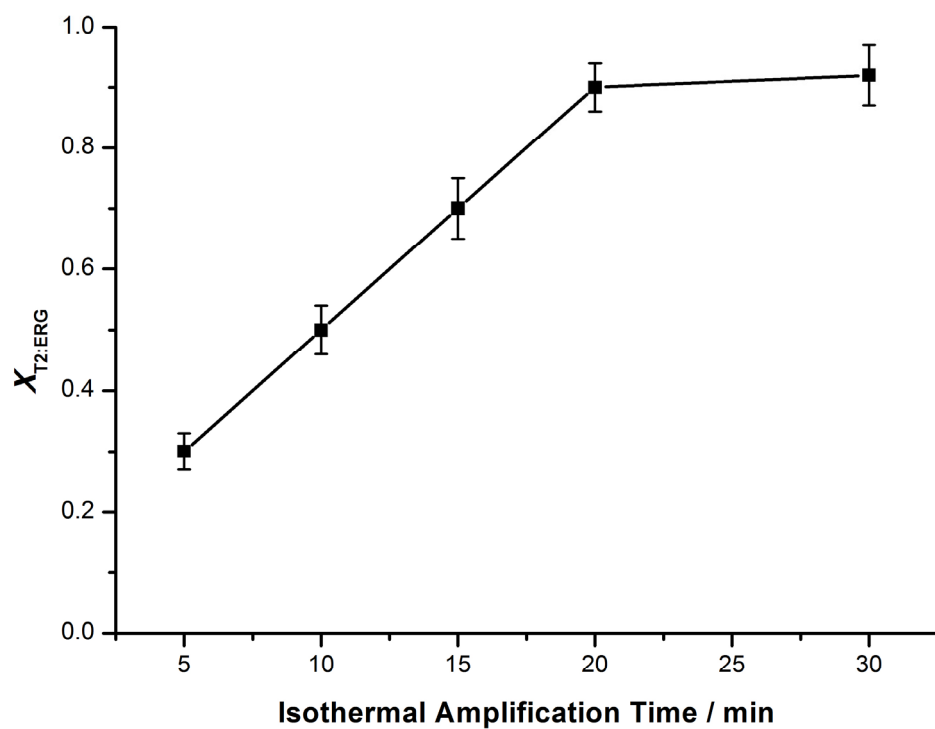
**Table S1** Primer sequences.

Oligos	5'-Sequence-3'
T2:ERG Forward Primer	Bio-C6-CGGCAGGAAGCCTTATCA
T2:ERG Reverse Primer	GTTACATTCCATTTTGAT
<i>PCA3</i> Forward Primer	Bio-C6-CCTGATGATACAGAGGTGAG
<i>PCA3</i> Reverse Primer	GCACAGGGCGAGGCTCATCG
<i>KLK2</i> Forward Primer	Bio-C6-GGGGGTCCACTTGTCTGTAA
<i>KLK2</i> Reverse Primer	GGTGAGTTCCAAGCTTCAGG

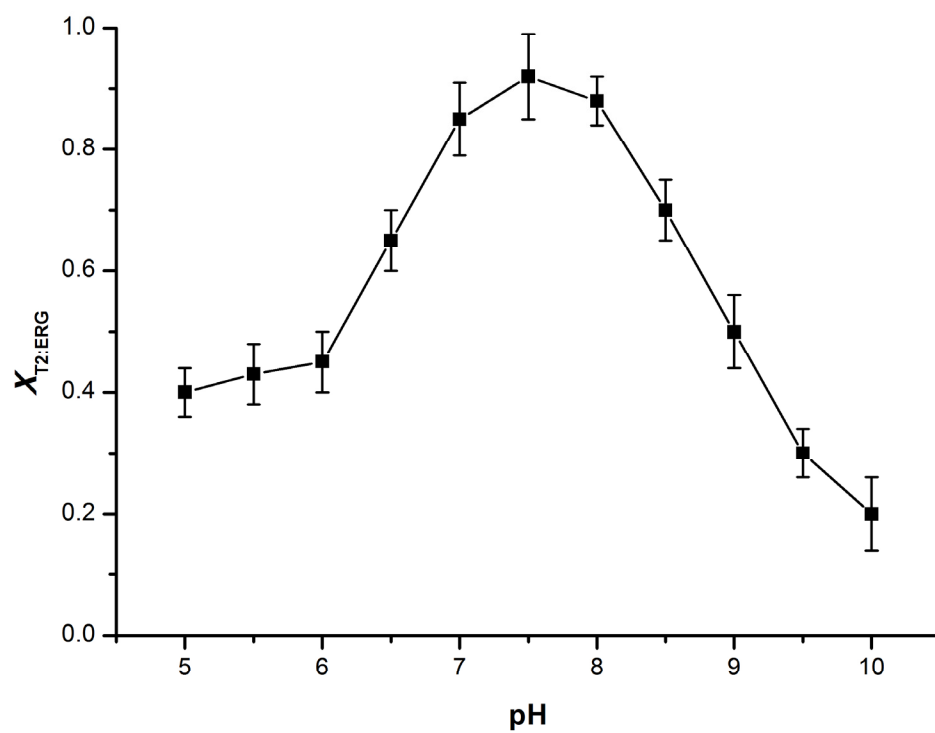
**Key:** Bio-C6-, Biotin modification with 6-carbon spacer.



**Figure S1.** Current measurements using only DNA-intercalating methylene blue (MB) or dual DNA-intercalating MB/iron oxide nanozymes bioelectrocatalytic cycling. Error bars represent standard deviations of three technical replicates.



**Figure S2.** Optimization of isothermal amplification times (5, 10, 15, 20, and 30 min). Error bars represent standard deviations of three technical replicates.



**Figure S3.** Optimization of electrolyte buffer pH 5.0 – 10.0. Error bars represent standard deviations of three technical replicates.

**Table S2.** Validation of detection outcomes of assay against gold standard quantitative polymerase chain reaction (qPCR).

Contrived Urine Samples with Cell Line Input	Our Assay		Gold Standard qPCR Analysis	
	Normalized Signal	Detection Outcome	qPCR Cycle Threshold (C <sub>t</sub> )	Detection Outcome
<b>DuCap</b> T2:ERG	0.90	Positive	15	Positive
<b>DuCap</b> <i>PCA3</i>	0.02	Negative	40	Negative
<b>DuCap</b> <i>KLK2</i>	0.70	Positive	23	Positive
<b>LnCap</b> T2:ERG	0.01	Negative	40	Negative
<b>LnCap</b> <i>PCA3</i>	0.78	Positive	18	Positive
<b>LnCap</b> <i>KLK2</i>	0.63	Positive	25	Positive
<b>22Rv1</b> T2:ERG	0.03	Negative	40	Negative
<b>22Rv1</b> <i>PCA3</i>	0.45	Positive	28	Positive
<b>22Rv1</b> <i>KLK2</i>	0.78	Positive	18	Positive