Electronic Supplementary Information (ESI) for Analyst
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Strand displacement activated peroxidase activity of hemin for fluorescent DNA sensing†

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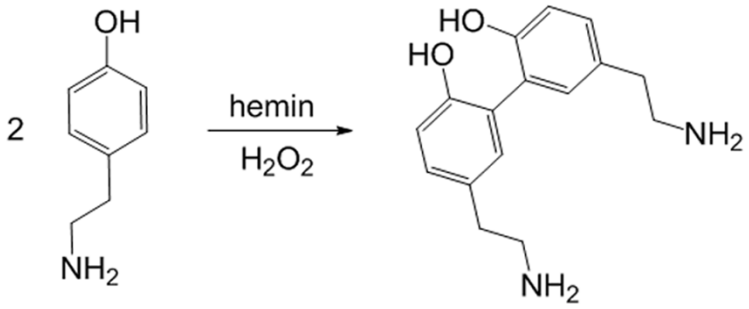
Catalytic reaction of hemin



Scheme S1 Catalytic oxidation reaction of non-fluorescent tyramine in the presence of hemin and H_2O_2 to form fluorescent dityramine.

Mass spectra of hemin labelled oligonucleotides

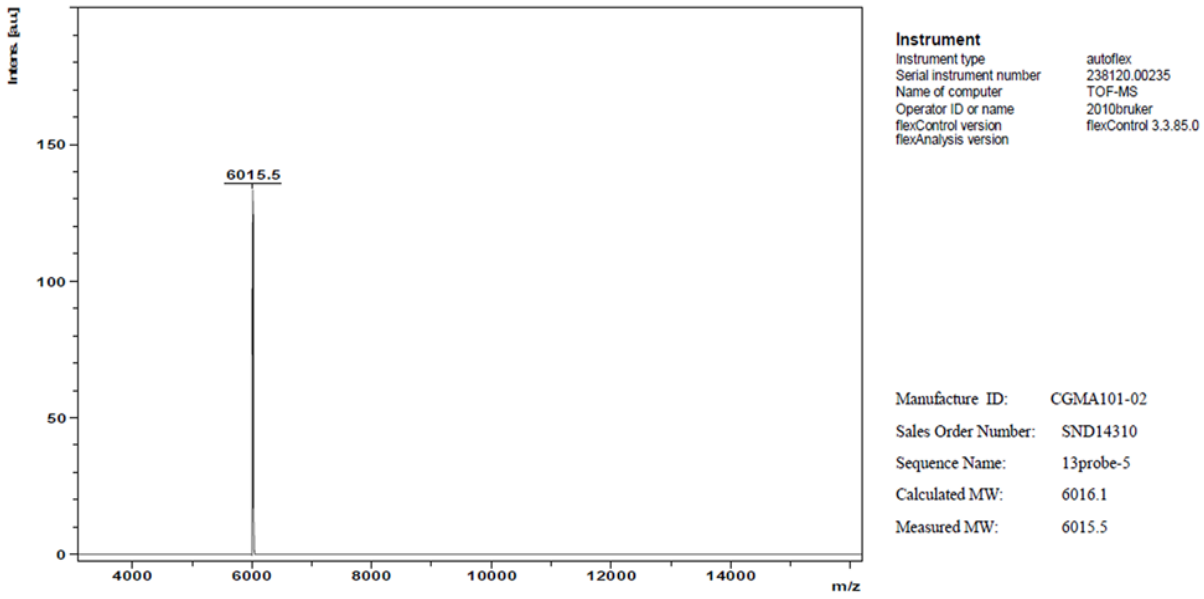


Fig. S1 Mass spectrum of oligo 1. Calculated MW: 6016.1, measured MW: 6015.5.

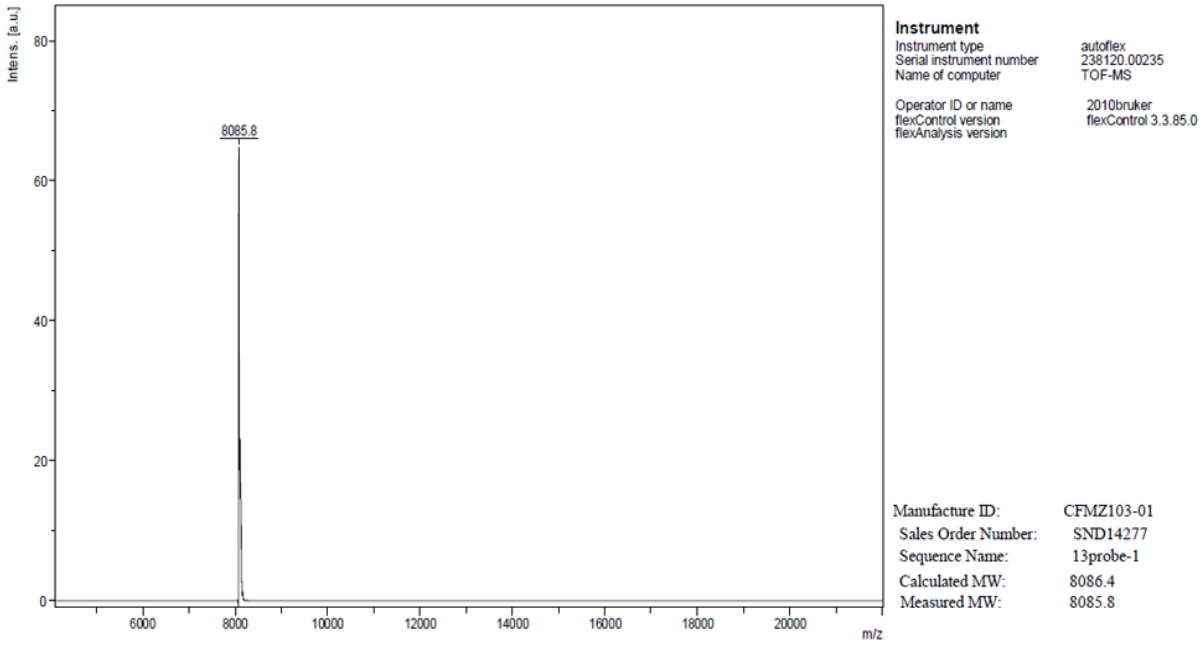


Fig. S2 Mass spectrum of oligo 2. Calculated MW: 8086.4, measured MW: 8085.8.

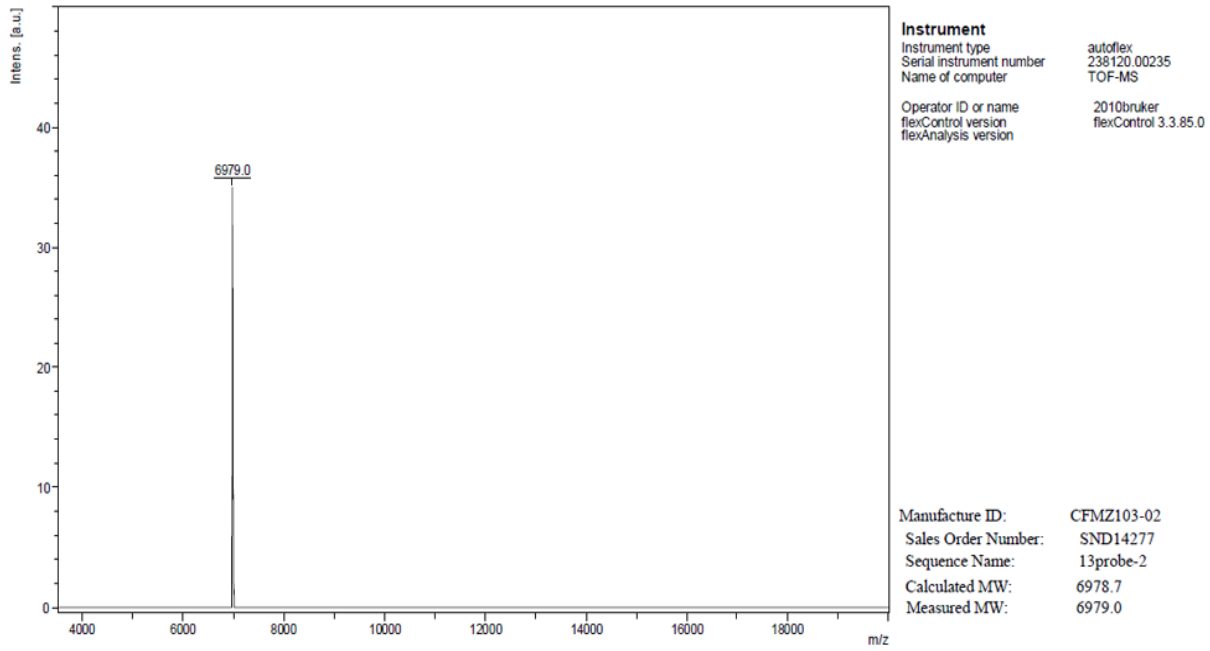


Fig. S3 Mass spectrum of oligo 3. Calculated MW: 6978.7, measured MW: 6979.0.

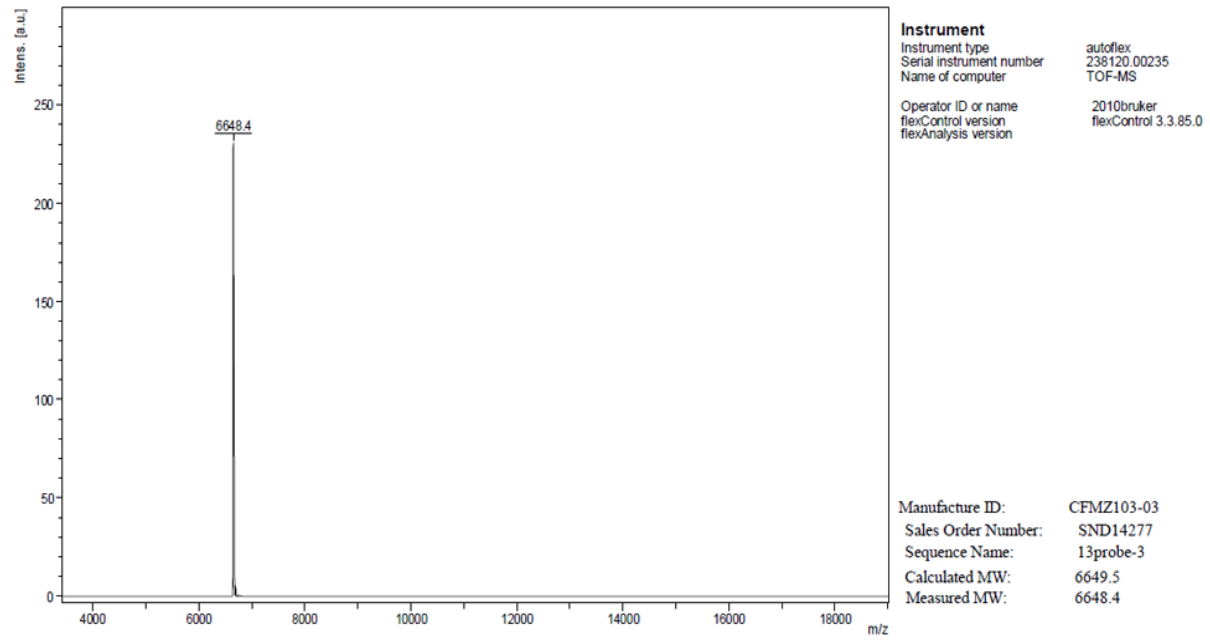


Fig. S4 Mass spectrum of oligo 4. Calculated MW: 6649.5, measured MW: 6648.4.

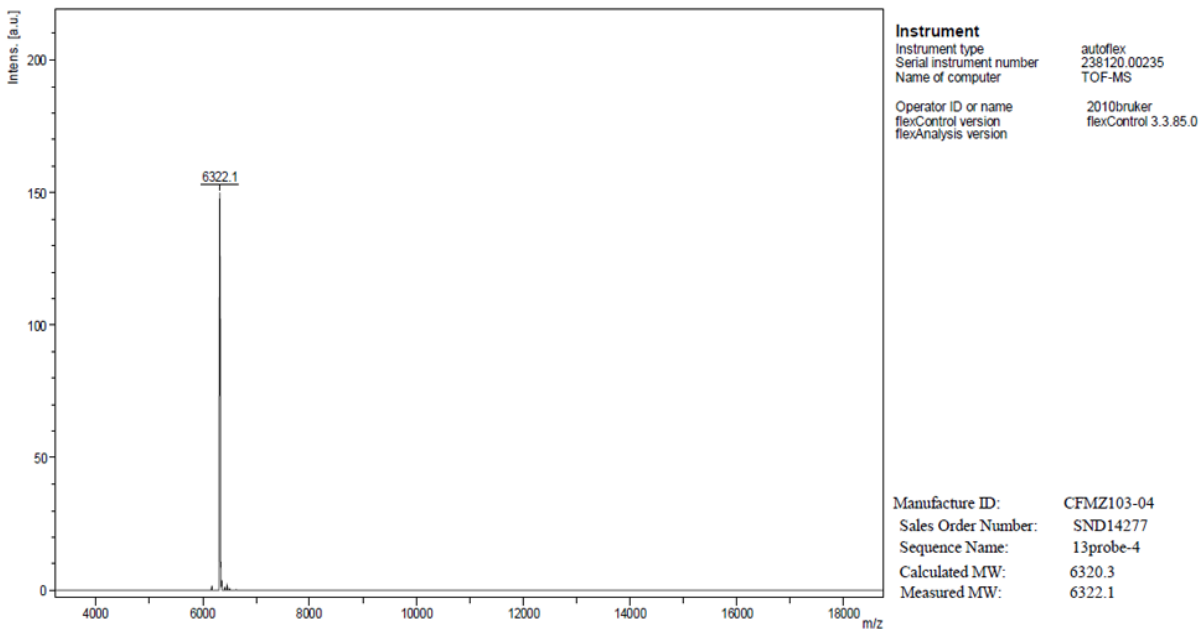


Fig. S5 Mass spectrum of oligo 5. Calculated MW: 6320.3, measured MW: 6322.1.

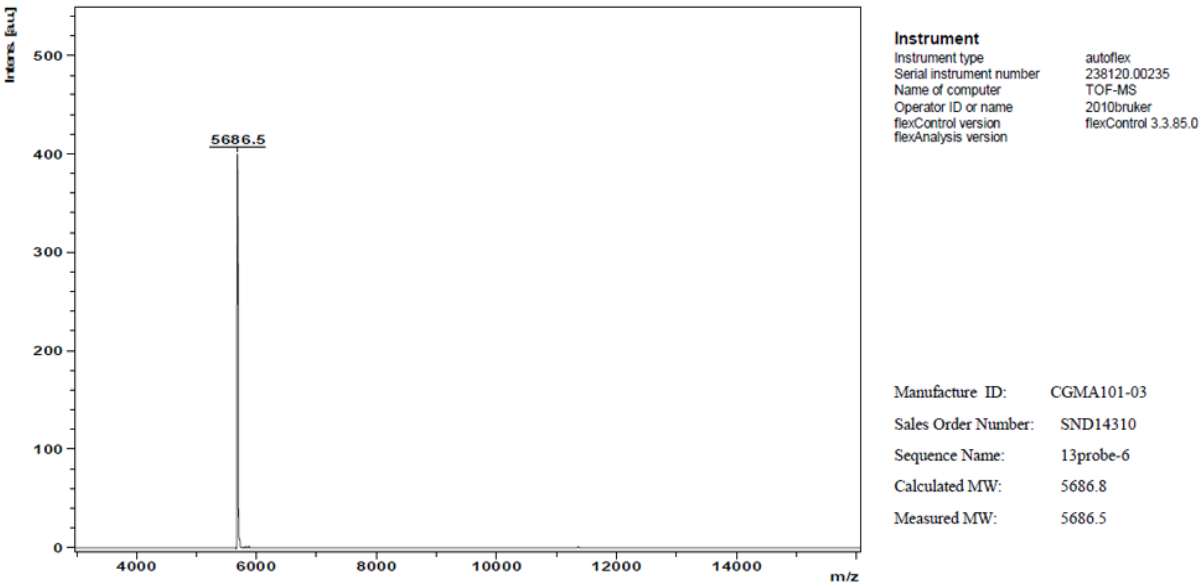


Fig. S6 Mass spectrum of oligo 6. Calculated MW: 5686.8, measured MW: 5686.5.

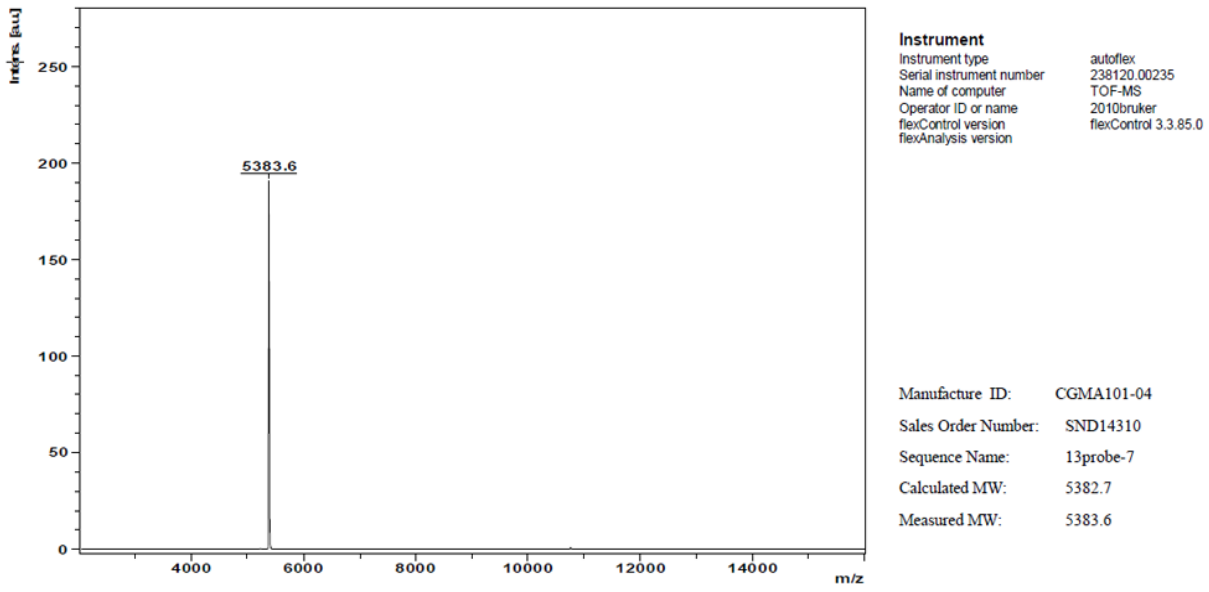


Fig. S7 Mass spectrum of oligo 7. Calculated MW: 5382.7, measured MW: 5383.6.

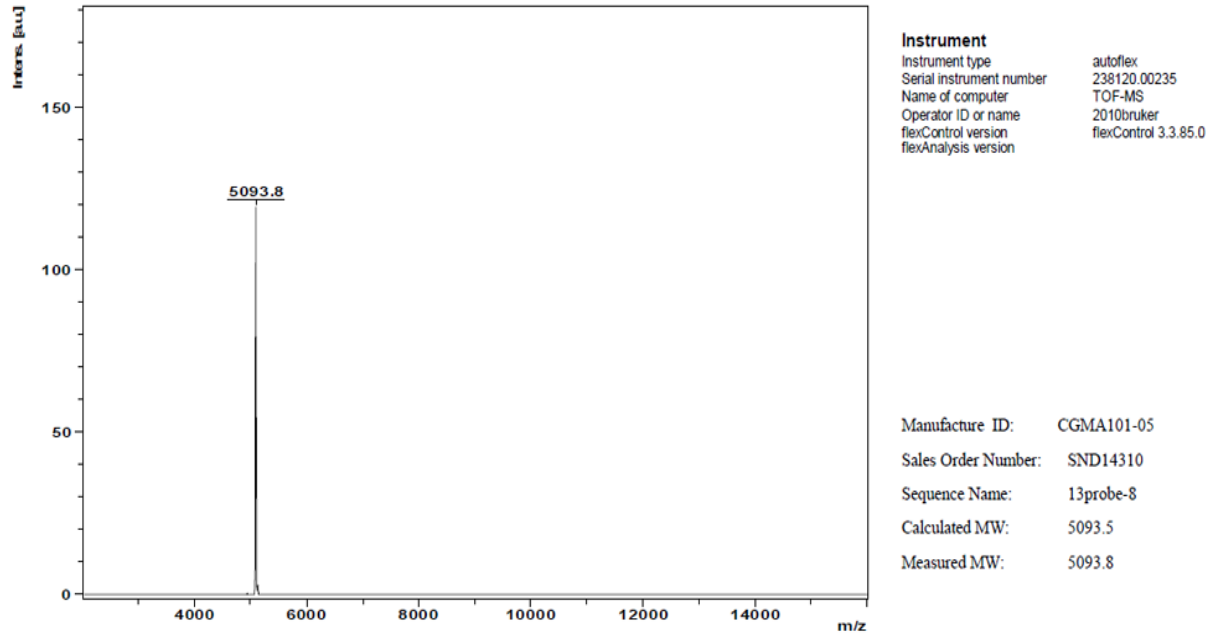


Fig. S8 Mass spectrum of oligo 8. Calculated MW: 5093.5, measured MW: 5093.8.

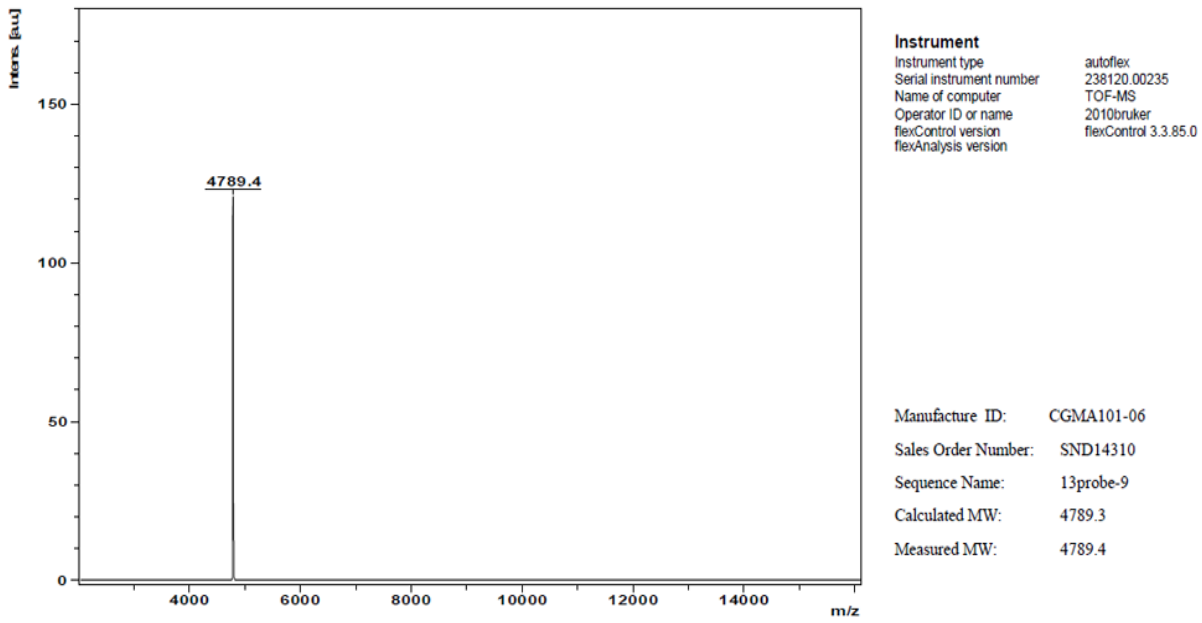


Fig. S9 Mass spectrum of oligo 9. Calculated MW: 4789.3, measured MW: 4789.4.

Effect of toehold length on the dissociation of hemin dimer

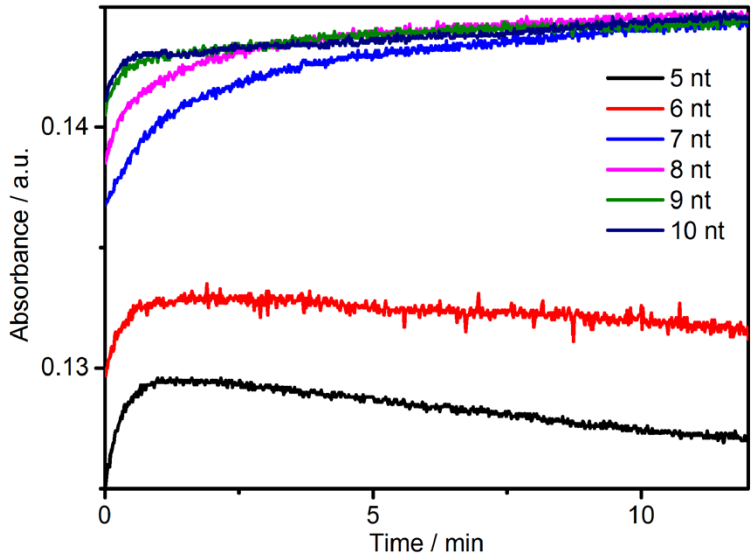


Fig. S10 Absorbance kinetic curves at 402 nm in the reaction mixture of 1 μM target DNA and 1 μM double-stranded probe with toehold length from 5 to10 nt.

Detection of target DNA in cell medium

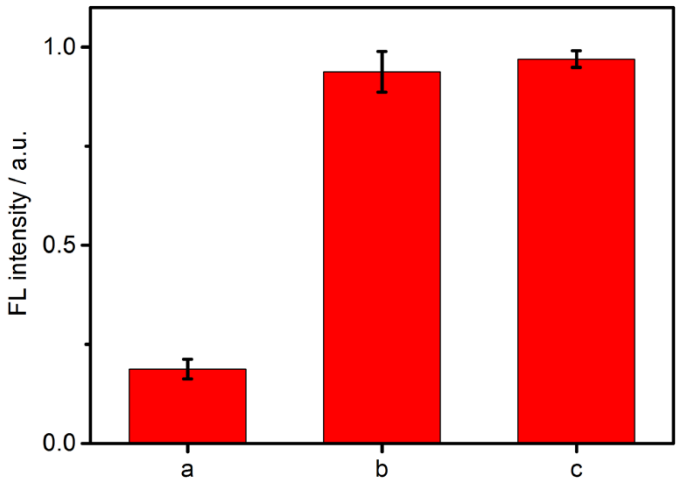


Fig. S11 Fluorescent signals of the mixture of 0.7 mM tyramine, 2.0 mM H_2O_2 with 10 nM double-stranded probe in the absence (a) and presence of 10 nM target DNA in buffer (b) or in cell medium (c).

Table S1. Analytical performances for DNA detection based on catalysis of hemin

Sensing method	Linear range	Detection limit	Assay time	Reference
fluorescence	1.0-10 nM	1.0 nM	> 1.5 h	S1
chemiluminescence	1.0-100 nM	1.0 nM	> 17 h	S2
colorimetry	-	0.2 μM	-	S3
fluorescence	0.25-10 nM	0.18 nM	20 min	this Work

Supporting references

[S1] E. Golub, R. Freeman, A. Niazov and I. Willner, *Analyst*, 2011, **136**, 4397-4401.

[S2] V. Pavlov, Y. Xiao, R. Gill, A. Dishon, M. Kotler and I. Willner, *Anal. Chem.*, 2004, **76**, 2152-2156.

[S3] Y. Xiao, V. Pavlov, T. Niazov, A. Dishon, M. Kotler and I. Willner, *J. Am. Chem. Soc.*, 2004, **126**, 7430-7431.