Design of DNA nanostructure-based interfacial probes for electrochemical detection of nucleic acid directly in whole blood

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Table S1. The used sequences in this study.

Name	Sequence (5'→3')
ssDNA	MB-TGTGCGGAGGAAGGTCCTGATACGC-SH
TDN10-1	MB-TTTTTTTTTTCTCCAAGTCTACCTTGCTACACGACGCCATAGTA
TDN10-2	SH-CACAGCAGTGCAGTGTAGCAAGAGGCGAGGGTCC
TDN10-3	SH-CACTGCTGTGAAACACTACGTGTCTACTGTGGCG
TDN10-4	SH-AGACTTGGAGGCCACGTAGTGTTTGGACCCTCGC
TDN10-1-one mismatch	MB-TTTTTTTTTTCTCAAAGTCTACCTTGCTACACGACGCCATAGTA
TDN10-1-two mismatch	MB-TTTTTTTTTTCTCAAAGTCTACCTTCCTACACGACGCCATAGTA
TDN10-1-three mismatch	MB-TTTTTTTTTTCTCAAAGTCTACCTTCCTACACGACGCCTTAGTA
TDN20-1	MB-TTTTTTTTTTGCAACATTCCTAAGTCTGAAACGCGATTACAGCTTGCTACACGAGAAGAGCCGCCATAGTAATG
TDN20-2	SH-TATCACCAGGCAGTTGAATCCAGTGTAGCAAGCTGTAATCGCAGGGAATGCGAGGGTCCAATAC
TDN20-3	SH-GATTCAACTGCCTGGTGATAAAACGACACTACGTGGGAACGGTCCATTACTATGGCGGCTCTTCA
TDN20-4	SH-TTCAGACTTAGGAATGTTGCGCCCGTTCCCACGTGGTGTCGTTTGTATTGGACCCTCGCATTCC
TDN20-1-one mismatch	MB-TTTTTTTTTTGCAACATTCCTAAGTCTGAAACGCGATTACAGCTTGCTACACGAGAAGAGCCGCCATAGTAATG
TDN20-1-two mismatch	MB-TTTTTTTTTTGCAACATACCTAAGTCTGAAACGCGATTACGTTGCTACACGAGAAGAGCCGCCTTAGTAATG
TDN20-1-three mismatch	MB-TTTTTTTTTTGCAACATACCTAAGTCTGAAACGCGATTACGGCTTGCTACACGAGAAGAGCCGTTAGTAATG
TDN30-1	MB-TTTTTTTTTTTGATACGATCGCAACATTCCTAAGTCTGAAACGCGATTACAGCTTGCTACACCCTAAGCTATGAGAAGAGCCGCCATAGTAATGCTGACCTTAG
TDN30-2	SH-TATCACCAGGCAGTTGAATCGACTTACGCACAATAGCTTAGGGTGTAGCAAGCTGTATCGCAGGGAATGCGAGGGTCCAATACTAGATACCAATTGGTATCTA
TDN30-3	SH-

	TGCGTAAGTCGATTCAACTGCCTGGTGATAAAACGACACTACGTGGGAAC GGTTACGGAAGCTCCTA AGGTCAGCATTACTATGGCGGCTCTTCA
TDN30-4	SH- TTCAGACTTAGGAATGTTGCGATCGTATCAGCGCTTCCGTAACCGTTCCCA CGTGGTGTCGTTTTTGGTATCTAGTATTGGACCCTCGCATTCC
TDN30-1-one mismatch	MB- TTTTTTTTTTGATACGATCGCAGCATTCCTAAGTCTGAAACGCGATTACA GCTTGCTACACCCTAAGCTATGAGAAGAGCCGCCATAGTAATGCTGACCT TAG
TDN30-1-two mismatch	MB- TTTTTTTTTTGATACGATCGCAGCATTCCTAAGTCTGAAACGCGATTACA GCTTGCTTCACCCTAAGCTATGAGAAGAGCCGCCATAGTAATGCTGACCT TAG
TDN30-1-three mismatch	MB- TTTTTTTTTTGATACGATCGCAGCATTCCTAAGTCTGAAACGCGATTACA GCTTGCTTCACCCTAAGCTATGAGAAGAGCCGCCATAATAATGCTGACCTT AG
TDN20-DNA-1	CGGAACTC-(MB)- GTTTTTTTTGCAACATTCCTAAGTCTGAAACGCGATTACAGCTTGCTACAC GAGAAGAGCCGCCATAGTAATG
TDN20-DNA-2	SH- TATCACCAGGCAGTTGAATCCAGTGTAGCAAGCTGTAATCGCAGGGAATG CGAGGGTCCAATACTTTTGTACCT
TDN20-DNA-3	SH- GATTCAACTGCCTGGTGATAAAACGACACTACGTGGGAACGGTCCATTAC TATGGCGGCTCTTCA
TDN20-DNA-4	SH- TTCAGACTTAGGAATGTTGCGCCCGTTCCCACGTGGTGTCGTTTGTATTGG ACCCTCGCATTCC
Target	AGGTACCGAGTTCCG
TDN20-ATP-1	ACCTGGGGGAGTATTGC-(MB)- GTTTTTTTGCAACATTCCTAAGTCTGAAACGCGATTACAGCTTGCTACACG AGAAGAGCCGCCATAGTAATG
TDN20-ATP-2	SH- TATCACCAGGCAGTTGAATCCAGTGTAGCAAGCTGTAATCGCAGGGAATG CGAGGGTCCAATACTTTTGAGGAAGGT
TDN20-ATP-3	SH- GATTCAACTGCCTGGTGATAAAACGACACTACGTGGGAACGGTCCATTAC TATGGCGGCTCTTCA
TDN20-ATP-4	SH- TTCAGACTTAGGAATGTTGCGCCCGTTCCCACGTGGTGTCGTTTGTATTGG ACCCTCGCATTCC

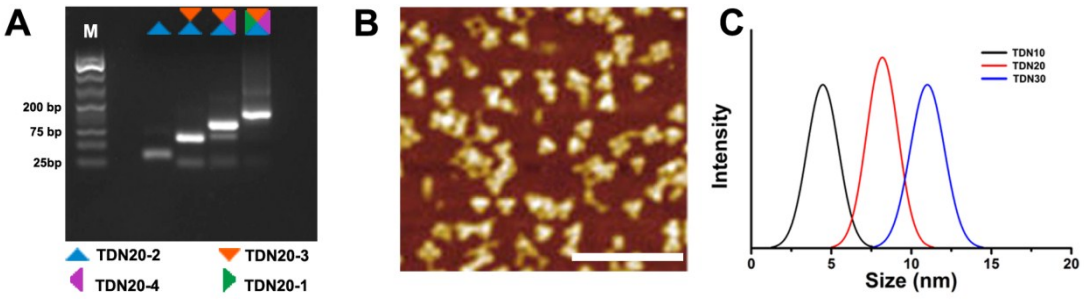

Figure S1. Gel electrophoresis, atomic force microscopy, and dynamic scatting light results demonstrate the formation of the DNA tetrahedron probes.

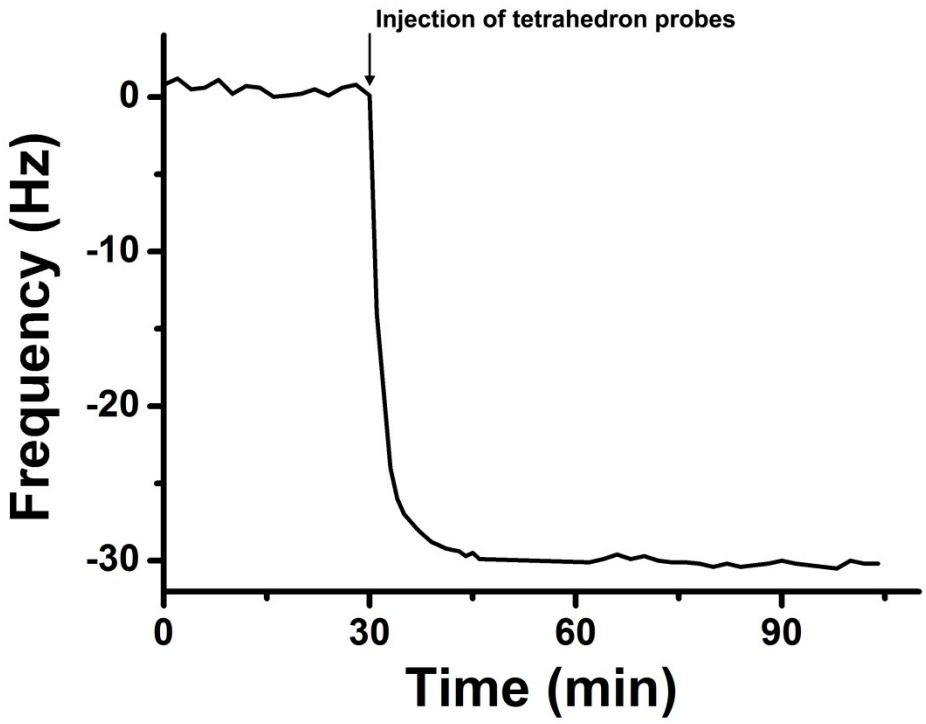

Figure S2. Quartz Crystal Microbalance (QCM) results show the rapid modification of tetrahedron probes on the planar gold surface via gold-thiol bond formation.

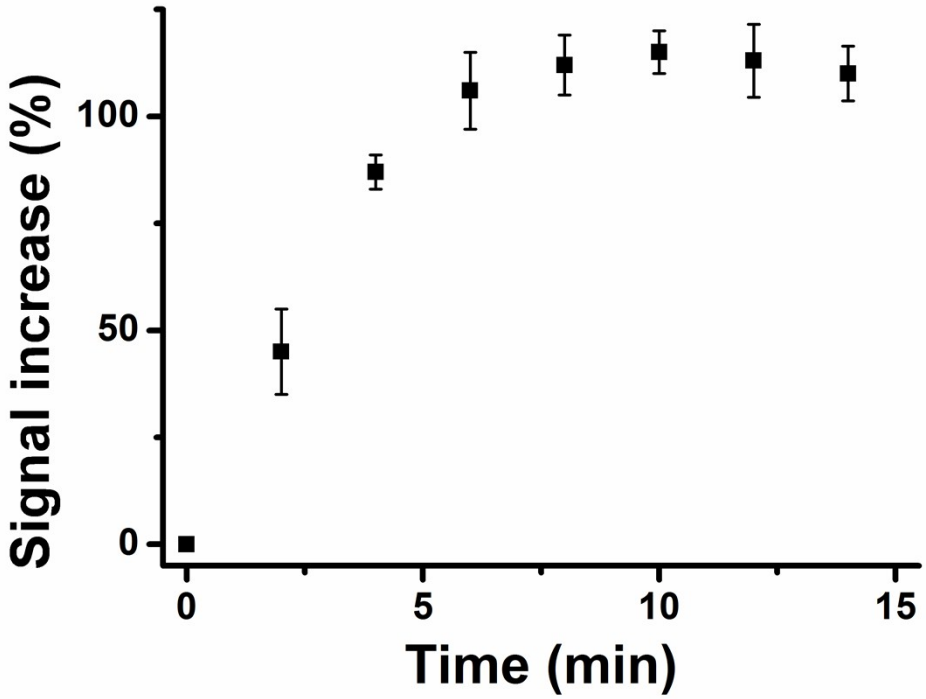

Figure S3. Hybridization time of the proposed E-nanoDNA senor for detection of DNA (1 nM).

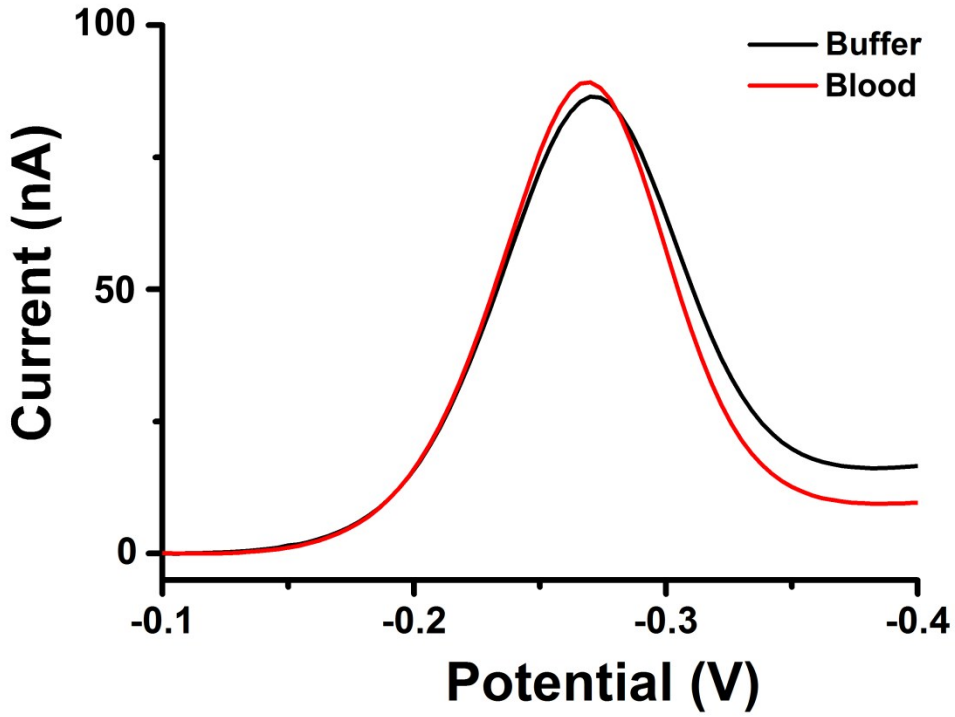

Figure S4. The target response of DNA-detecting sensors in pure buffer or in whole blood.

Table S2. Comparative study of the proposed E-nanoDNA senor and other E-DNA sensors or DNA nanostructure-based sensor

Type	Reagentless	Step	LOD	Ref.
E-DNA	Yes	One	10 pM	1
E-DNA	Yes	One	2 nM	2
E-DNA	Yes	One	200 pM.	3
E-DNA	Yes	One	50 pM	4
DNA nanostructure	No	Multiple	1 pM	5
DNA nanostructure	No	Multiple	1 fM	6
DNA nanostructure	No	Multiple	0.75 pM	7
DNA nanostructure	Yes	One	300 fM	This work

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