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Electronic Supplementary Material

Repaired-Driven DNA Tetrahedral Nanomachine Combined with DNAzyme for 8-oxo guanine DNA Glycosylase Activity Assay, Drug Screening and Intracellular Imaging.

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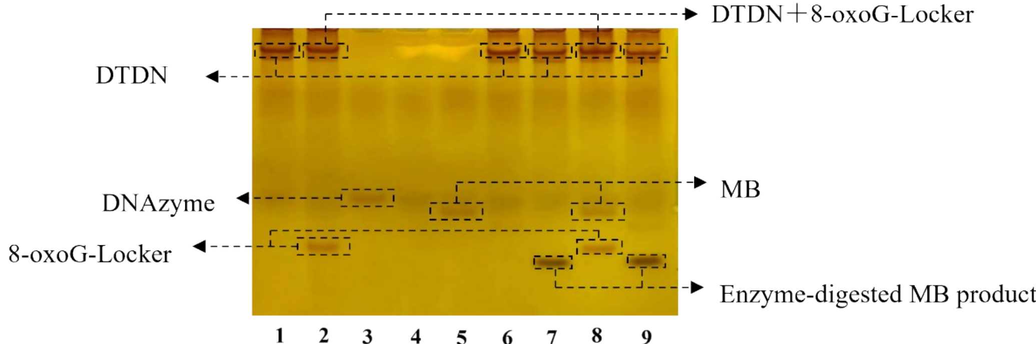

Fig.S1. Native PAGE gel (8%) for the 8oxoG-DNA glycosylase assay. Lane 1: DTDN; Lane 2: DTDN+ 8-oxoG-Locker; Lane 3: DNAzyme; Lane 4: DNAzyme+MB; Lane 5: MB; Lane 6: DTDN+MB; Lane 7: DTDN+8-oxoG-Locker+ 8-oxoG DNA glycosylase; Lane 8: DTDN+ 8-oxoG-Locker +MB; Lane 9: DTDN+ 8-oxoG-Locker +MB + 8-oxoG-DNA glycosylase; [L1] = [DZ-L2] = [L3] = [L4] = 100 nM, [8-oxoG-Locker] = 150 nM, [MB] = 100 nM, [8-oxoG-DNA glycosylase] = 80 U/mL.

Table S1. The sequences of oligonucleotide strands

Name	Sequences (5'-3')
L1	ATTTATCACCCGCCATAGTAGACGTATCACCAGGCAGTTGAGACGAACATTCCTAAGTCTGAA
DZ-L2	CATCTCTTCTCCGAGCCGGTCGAAATAGTTGGTTTTTTTACATGCGAGGGTCCAATACCGACGA TTACAGCTTGCTACACGATTCAGACTTAGGAATGTTCG
L3	ACTACTATGGCGGGTGATAAAACGTGTAGCAAGCTGTAATCGACGGGAAGAGCATGCCCATC C
L4	ACGGTATTGGACCCTCGCATGACTCAACTGCCTGGTGATACGAGGATGGGCATGCTCTTCCCG
8-oxoG-Locker	CGACCG8oxoGCTCGG8oxoGAAGAGA
MB	FAM-CCACCACTCACCAACTAT(A)rGGAAGAGATGTTGTGGTGG-BHQ1
DNAzyme	CATCTCTTCTCCGAGCCGGTCGAAATAGTTGGT

Table S2. The composition and pH of buffers for the enzymes

Enzyme	Buffer (1×)	pH (25℃)
Fpg	10 mM Bis Tris progane-HCl, 10 mM MgCl2, 1mM DTT, 100μg/mL BSA	7.0
T4 DNA Ligase	50 mM Tris-HCl, 10 mM $MgCl_2$, 1 mM ATP, 10 mM DTT	pH 7.5
UDG	20 mM Tris-HCl, 1 mM EDTA, 1 mM DTT	8.0
hAAG	10 mM Tris-HCl, 100 mM KCl, 1 mM DTT, 0.1 mM EDTA, 50% Glycerol 0.5% Tween® 20, 0.5% IGEPAL® CA-630	pH 7.4
APE1	50 mM KAc, 20 mM Tric-Ac, 10 mM Mg (Ac)2, 1 mM DTT	7.9

Table S3. The detailed information of 14 natural compounds.

Code	Compound Name	Molecular formula	Stucture
a	Chikusetsusaponin IV	$C_{47}H_{74}0_{18}$	
b	Chikusetsusaponin IVa	$C_{42}H_{66}0_{14}$	
c	Chikusetsusaponin IV methyl ester	$C_{48}H_{76}0_{18}$	
d	Ginsenoside Rg1	$C_{42}H_{72}0_{14}$	
e	Chikusetsusaponin IVa methyl ester	$C_{43}H_{68}O_{14}$	

f	Chikusetsusaponin V methyl ester	$C_{49}H_{78}O_{19}$	
g	Ginsenoside Rg2	$C_{42}H_{72}0_{13}$	
h	Ginsenoside F1	$C_{36}H_{62}0_{9}$	
i	Ginsenoside Rd	$C_{48}H_{82}O_{18}$	
j	Ginsenoside Rh1	$C_{36}H_{62}O_{9}$	
k	Ginsenoside Rh4	$C_{36}H_{60}O_{8}$	

l	Notoginsenoside R1	$C_{47}H_{80}O_{18}$	
m	Pseudoginsenoside RT1 methyl ester	$C_{48}H_{76}O_{18}$	
n	Ginsenoside Rg3	$C_{42}H_{72}O_{13}$	

Table S4. The comparison of the presented work with other reported works for detecting 8-oxoG DNA glycosylase activity.

Analytical method	Signal	Detection limit	Material synthesis time	Reaction step	Reaction time	Application	Reference
DNAzyme and rGO based biosensor	Fluorescence	0.66 U/mL	5h	3	170min	Activity assay, drug screening, and bacterial imaging	1
Closing-upon-repair DNA tetrahedron nanoswitch	Fluorescence	0.3653 U/mL	160min	1	90min	Intracellular	2
Pyrrolo-dC modified duplex DNA probe	Fluorescence	1.25 U/mL	25min	1	60min	Activity assay	3
DNAzyme-mediated cascade amplification platform	Fluorescence	0.14 U/mL	/	2	155min	Activity assay, drug screening, and serum sample analysis	4
Target-induced self-primed rolling circle amplification and magnetic nanoprobes	Fluorescence	1.033 U/mL	/	5	5.75h	Activity assay and diluted human serum assay	5
Enzyme-catalytic cleavage reaction of DNA substrate	Nanopore analysis	0.01 U/mL	20min	2	135min	Cellular hOGG1 Activity	6
Repaired-driven three-dimensional DNA nanomachine combining with DNAzyme	Fluorescence	0. 52 U/mL	45min	2	155min	Activity Assay, Drug Screening, and Intracellular Imaging.	This work

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