Supporting Information

Application of Ammonium Persulfate for Selective Oxidation of Guanine for Nucleic Acid Sequencing

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1. Table S1. DNA oligonucleotides used in this study.

Name	Sequences (5'-3')
Hairpin-loop	AGTCTATTGTTTAGACT-HEX
Bulge	ACGATCGTCATGTCTAGCAGCTA-HEX
Bulge-complementary	TAGCTGCTAGAATGACGATCGT
Loop and bulge	HEX-TCATCGATGCGTCATTGGTATGACGCGGTATCGATGA
Mismatch	ACGATCGTCATGTCTAGCAGCTA-HEX
Mismatch-complementary	TAGCTGCTAGAGATGACGATCGT
Terminal	HEX-CATGCGTTCCCGTG
Terminal -complementary	CACGGGAACGCATG
G-quadruplex	HEX-TTAGGGTTAGGGTTAGGGTTAGGG
ds	TGTGTCGCTCTTACAAGGCA-HEX
ds-complementary	TGCCTTGTAAGAGCGACACA
ZG4	TGGTGGTGGTGGTTGTGGTGGTGGTGTT-HEX
G3	HEX-TGGGTAGGGCGGG
8-oxo-G	TTTTCGATCTTACAA(8-oxo-G)CCA
Single 1	FAM-TGCGTCTGCGTC
Single 2	FAM-TCACTGTGCAGCATGTGGCAG

Single 3	HEX-CTTTGGTCCTGAAGGAGGATAGG
33mer-RNA	HEX-CUCGCAUCGAUGAAGAACGCAGCGAAAUCCCAU
22mer-RNA	HEX- CAAGCCUGUUUGACAUACAUUU
76-template-1mC	CCTCACCATCTCAACCAATATTATATTACGCGTATAA(5mC)GCGTA TTGGCGCTATAATATTGAGGGAGAAGTGGTGA
76-template-2mC	CCTCACCATCTCAACCAATATTATATTACGCGTATAA(5mC)G(5mC) GTATTGGCGCTATAATATTGAGGGAGAAGTGGTGA
76mer template-forward primer	GGGTTTTATTATTTTAATTAATATTATATT
76mer template-reverse primer	HEX-TCACCACTTCTCCCTCAAT

2. Polyacrylamide gel electrophoresis analyzed other oligodeoxyribonucleotides.

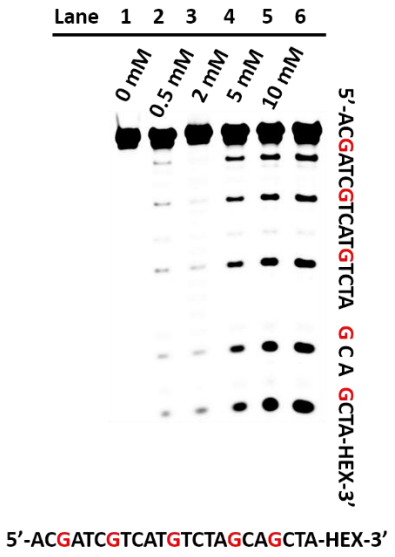

Figure S1. Polyacrylamide gel electrophoresis analysis of ODN-mismatch with AP for incubating with different concentration. Treat the DNA (20 pmol) with AP then treated with piperidine at 90℃ for 40 min. Lane 1-5 was 0, 0.5 mM, 2 mM, 5 mM and 10 mM respectively. Lane 6: G-ladder (DMS treated).

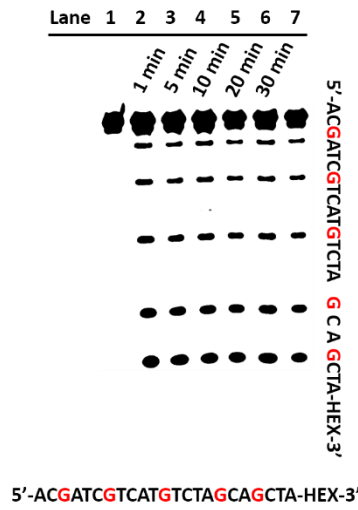

Figure S2. Polyacrylamide gel electrophoresis analysis of ODN-mismatch with AP for incubating with different time. Treat the DNA (20 pmol) with AP then treated with piperidine at 90 ℃ for 40 min. Lanes 1-6 was 0, 1 min, 5 min, 10 min, 20 min and 30 min respectively. Lane 7: G-ladder (DMS treated).

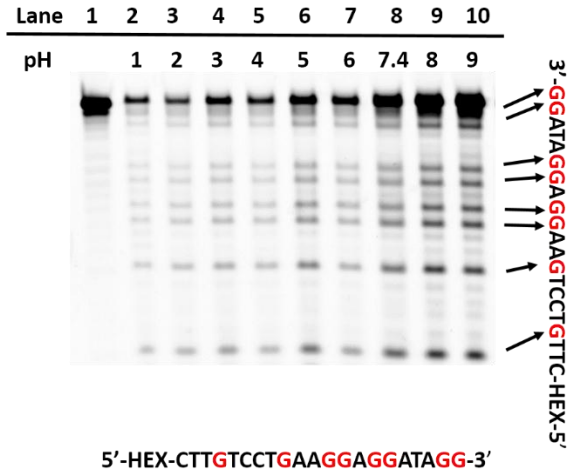

Figure S3. Polyacrylamide gel electrophoresis analysis of 21mer-ODN, which was oxidized in Tris-HCl buffer at different pH values.

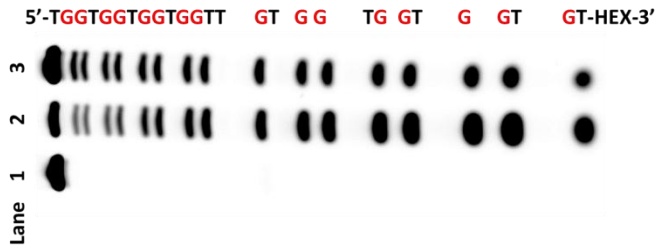

Figure S4. Polyacrylamide gel electrophoresis analysis of G-quadruplex ODN-ZG4. Lane 1: DNA without treatment; Lane 2: DNA was treated with AP; Lane 3: DNA was treated with DMS.

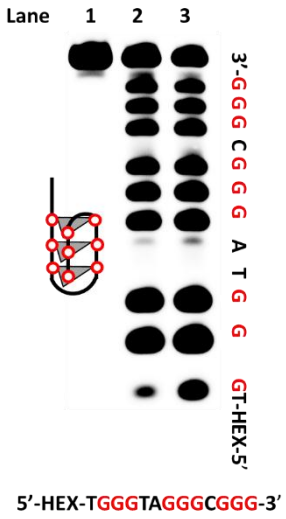

Figure S5. Polyacrylamide gel electrophoresis analysis of G-triplex structure of ODN-G3. Lane 1: DNA without treatment; lane 2: DNA was treated with AP; lane 3: DNA was treated with DMS.

Figure S6. Polyacrylamide gel electrophoresis analysis of ODN-single 1. Lane 1: DNA without treatment; lane 2: DNA was treated with AP; lane 3: DNA was treated with DMS.

Figure S7. Polyacrylamide gel electrophoresis analysis of ODN-single 2. Lane 1: DNA without treatment; lane 2: DNA was treated with AP; lane 3: DNA was treated with DMS.

Figure S8. Polyacrylamide gel electrophoresis analysis of ODN-single 3. Lane 1: DNA without treatment; lane 2: DNA was treated with AP; lane 3: DNA was treated with DMS.

3. Circular dichroism spectra of G-quadruplexes and G-triplex.

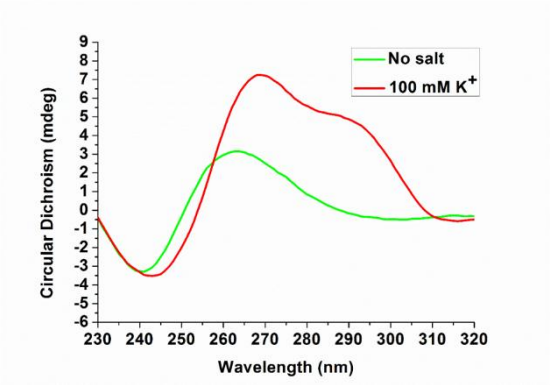

Figure S9. Spectra of 7.5 μM DNA G-quadruplex. Green line: no salt; red line: in presence of 100 mM K^+. The hybrid-type G-quadruplex showed a positive peak at 290 nm and a characteristic shoulder peak at 270 nm.

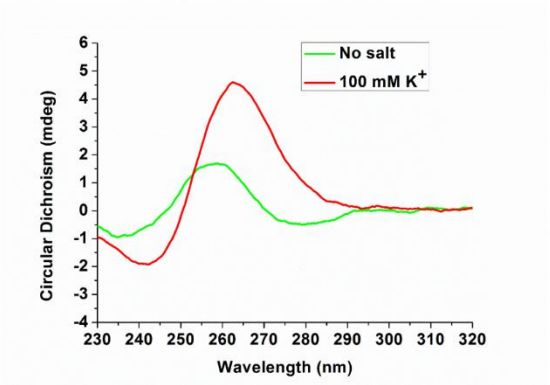

Figure S10. Spectra of 7.5 μM DNA G-triplex. Green line: no salt; red line: in presence of 100 mM K^+. The G-triplex showed a positive peak at 265 nm and a negative peak at 240 nm.

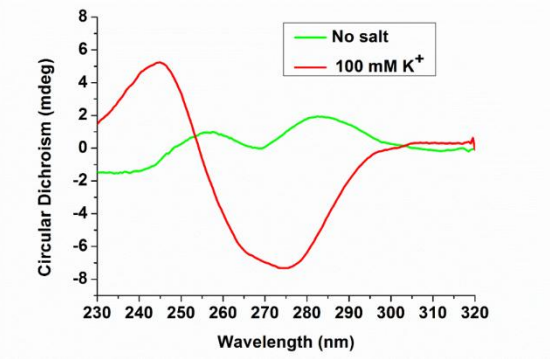

Figure S11. Spectra of 7.5 μM DNA G-quadruplex. Green line: no salt; red line: in presence of 100 mM K^+. The ZG4-quadruplex showed a positive peak at approximately 245 nm and a negative peak at 275 nm.

4. LC-MS spectrum of ODN treated with AP.

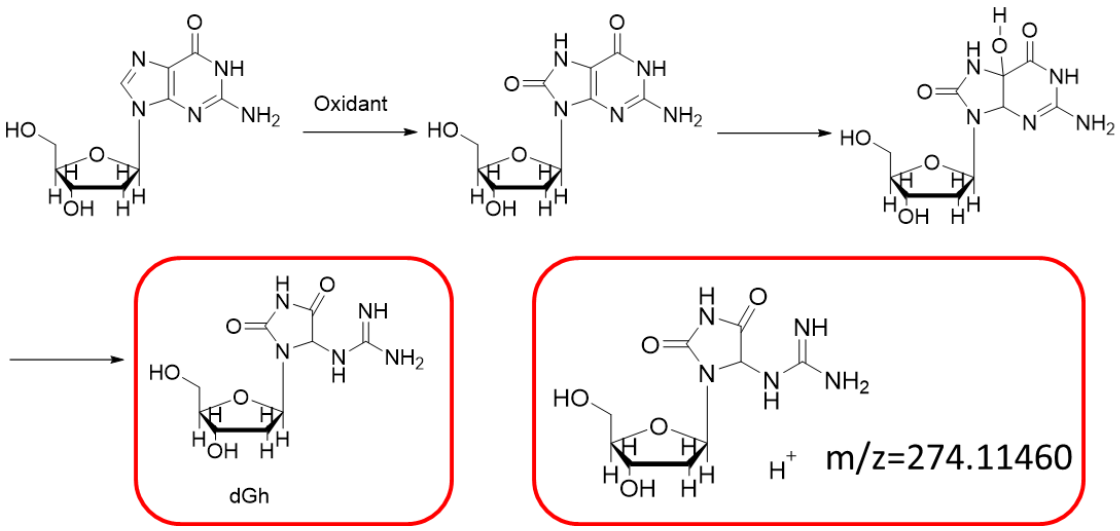

Figure S12. The guanosine could be oxidized to the labile product.

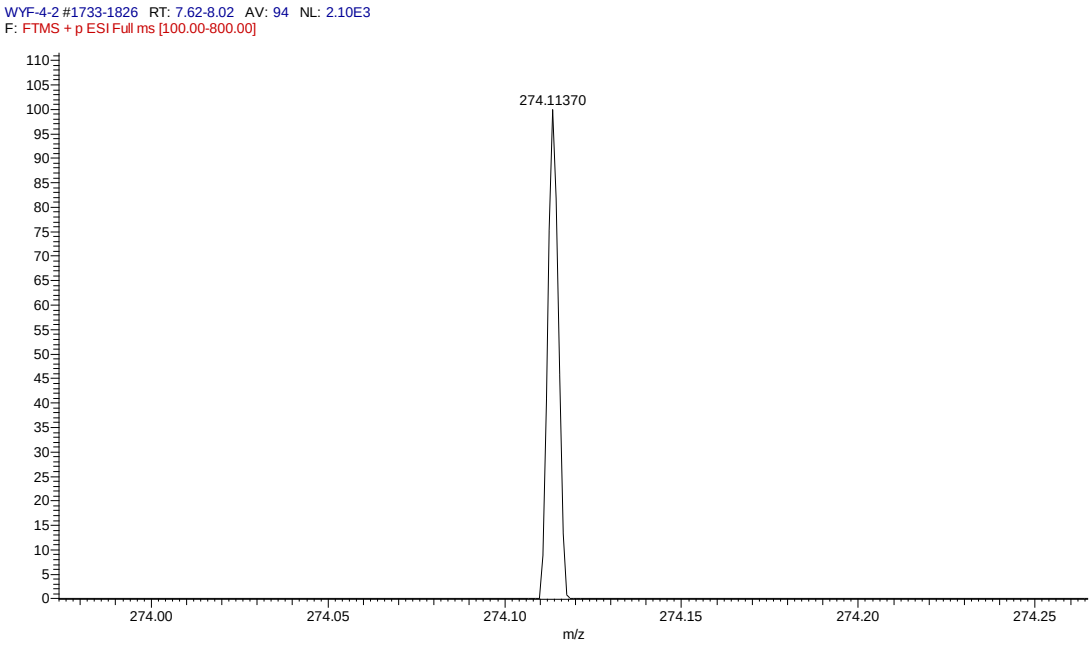

Figure S13. HPLC-MS extracted $[M+H]^+$ ion count for dGh after digestion of ODN after treatment with AP. The mass theoretical value of dGh is 274.11460, and we obtained a value of 274.11370. The sequence of the digested DNA is TAGCTGCTAGAGATGACGATCGT.