Inhibitory effect of mercury(II) ion on exonuclease III via gel electrophoresis and microfluidic electrophoresis

Min Yuan[a,b], Yonggang Zhu[b,*], Xinhui Lou[c,*], Chen Chen[b,d,e], Gang Wei[e], Minbo Lan [d], Jianlong Zhao[a,*]

[a] State Key Lab of Transducer Technology, Shanghai Institute of Microsystem and Information Technology, Chinese Academy of Sciences, 865 Changning Rd, Shanghai 200050, China.

[b] CSIRO Materials Science and Engineering, PO Box 56, Highett, VIC 3190, Australia.

[c] Department of Chemistry, Capital Normal University, 105 Xisanhuan North Rd, Beijing 100084, China.

[d] Shanghai Key Laboratory for Functional Material Chemistry, East China University of Science and Technology, Meilong Road 130, Shanghai 200237, China.

[e] CSIRO Materials Science and Engineering, PO Box 218, Lindfield, NSW 2070, Australia

* Corresponding authors: yonggang.zhu@csiro.au (Y. Zhu), Tel: (+ 61 3) 95452791;
xlou9999@yahoo.com (X. Lou);
jlzhao@mail.sim.ac.cn (J. Zhao).

Supplementary Information

1. Preparation of 15% polyacrylamide gel

2 mL of 10× TBE buffer (890 mM Tris, 890 mM boric acid, 20 mM EDTA), 7.5 mL of 40% Acrylamide/Bis-acrylamide (19:1) solution and 200 μL of 10% ammonium persulfate solution were mixed homogeneously in 10.3 mL of deionized water, where the ammonium persulfate was utilized for the cross linking of acrylamide monomer. As a catalyst, 20 μL of N,N,N',N'-tetramethylethylenediamin (TEMED), was added and blended uniformly in order to catalyse the cross-linking reaction. The uniform mix was instantly poured into the gel-making kit and followed a 10 holes or 15 holes comb. The polyacrylamide gel would be generated after 1 hour under dark condition at room temperature.

2. Formation of 21 bp dsDNA

25 μL of 15 μM probe 21-N and 25 μL of 15 μM probe 21-C were added into 125 μL of hybridized buffer solution which contained 20 mM Mops, 100 mM $NaNO_3$, pH 7.2, and mixed immediately until well-distributed. After 30 minutes hybridization at room temperature, 21 bp dsDNA N-C with a concentration of 2.14 μM was generated in the mixture. Another 21 bp dsDNA AB-PM which was bond by probe AB and probe PM was also made following the above protocol. The final concentration of AB-PM generated was 1.43 μM.

3. Degradations of AB-PM and AB by Exo III without Hg^{2+}

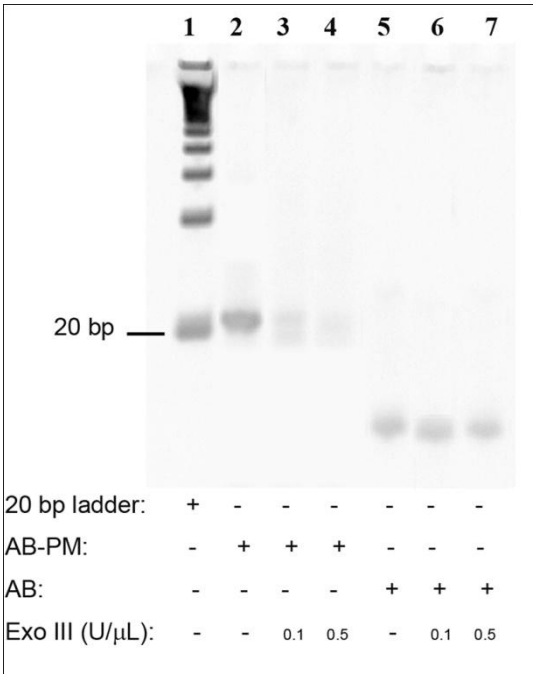

Fig S1. The degradation characteristics of Exo III on 21 bp dsDNA AB-PM and 21 mer ssDNA AB. The symbol "-" means absence whereas the symbol "+" means presence. The concentrations of AB-PM and AB were both 1 μM.