

Electronic Supplementary Information

Detection of mismatched DNAs via the binding affinity of MutS using a gold nanoparticle-based competitive colorimetric method

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Experimental procedures: The thiol-modified DNAs used for DNA-AuNP assemblies and unmodified DNAs used as competitors were purchased from Bioneer Inc. (Korea). Single stranded DNAs (100 μ M) were annealed by mixing in 1:1 ratio, followed by heating to 95 $^{\circ}$ C, then cooling to 20 $^{\circ}$ C for 3 h. The synthesis and functionalization of AuNPs with thiol-modified DNAs were carried out using previously reported procedures with minor modifications.¹ *Taq*. MutS was over-expressed and purified following the literature procedures.² For T_m measurement, DNA-AuNP assemblies including a competitor (7 μ M) and MutS (14 μ M) was incubated for 10 min. in 14 mM Tris (pH 7.0) buffer with 85 mM NaCl and 0.6 mM MgCl₂. Melting curves were obtained on a Cary 100 UV-Vis spectrometer (Varian) and the UV/Vis data were monitored at a scan rate of 1 $^{\circ}$ C/min. from 25 $^{\circ}$ C to 95 $^{\circ}$ C.

REFERENCES.

- (1) J. J. Storhoff, R. Elghanian, R. C. Mucic, C. A. Mirkin, R. L. Letsinger, *J. Am. Chem. Soc.* 1998, **120**, 1959.
- (2) M. Cho, S. Chung, S.-D. Heo, J. Ku, C. Ban, *Biosens. Bioelectron.* 2007, **22**, 1376.

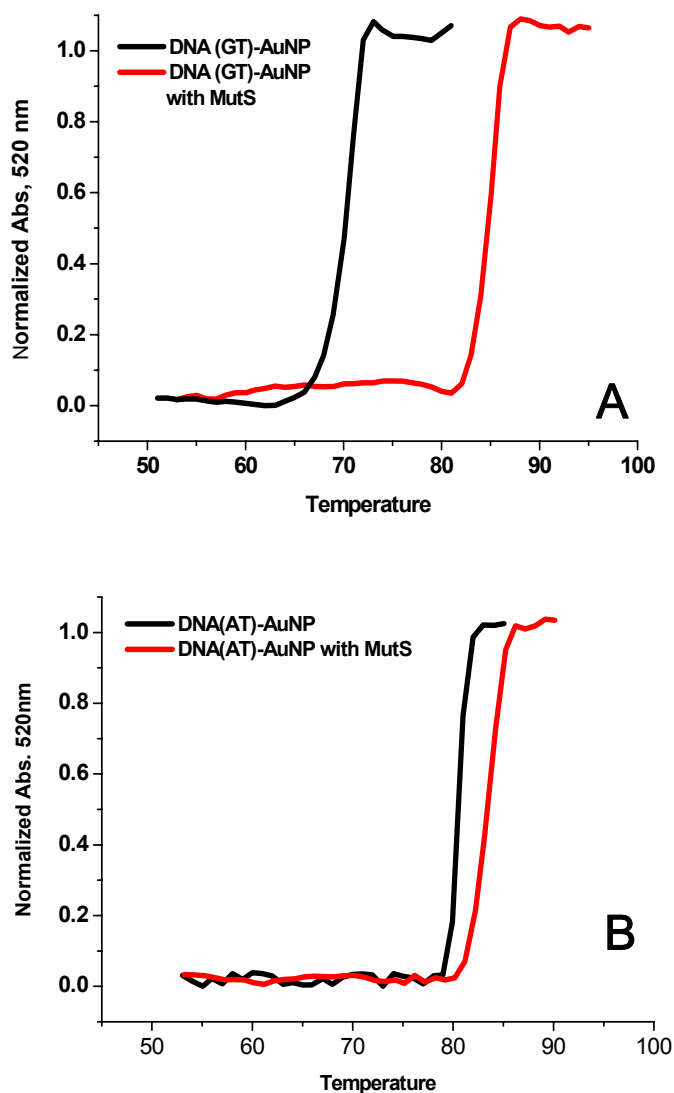
Table S1. Melting temperature (T_m) according to MutS binding for DNA-AuNP assemblies in the presence of competitors and for competitors in the absence of DNA-AuNP assemblies

Competitor type	T_m (°C)
Control (-) ^a	70.5±0.15
GT mismatch	76.1±0.23
CT mismatch	81.5±0.32
CC mismatch	83.5±0.37
AT match	85.1±0.40
Control (+) ^b	85.2±0.39

^a Control (-) represents DNA-AuNP assemblies without any competitors and MutS.

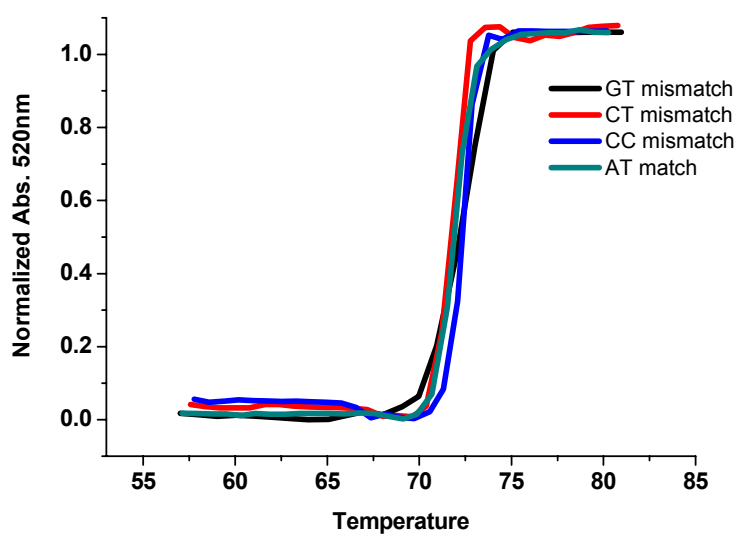
^b Control (+) represents DNA-AuNP assemblies in presence of MutS without any competitors.

Figure S1.



Melting curves (monitored at 520 nm) of DNA-AuNP assemblies containing (A) GT mismatched sites and (B) AT matched sites according to binding of MutS. The binding of MutS to a mismatched site on DNA-AuNP assemblies increased T_m from 70.5 °C to 85.2 °C. The T_m of DNA-AuNP assemblies with matched sequence was hardly different from that of assemblies in the absence of MutS (from 81.3 °C to 84.1 °C).

Figure S2.



Melting curves (monitored at 520 nm) of DNA-AuNP assemblies with a competitor (GT, CT, CC and AT) according to nonspecific binding of BSA. There was no change in T_m values for different types of competitor.