Electronic Supplementary Material (ESI) for Chemical Communications

Supporting Information

Sensitive analysis of DNA methyltransferase based on a hairpin-shaped DNAzyme

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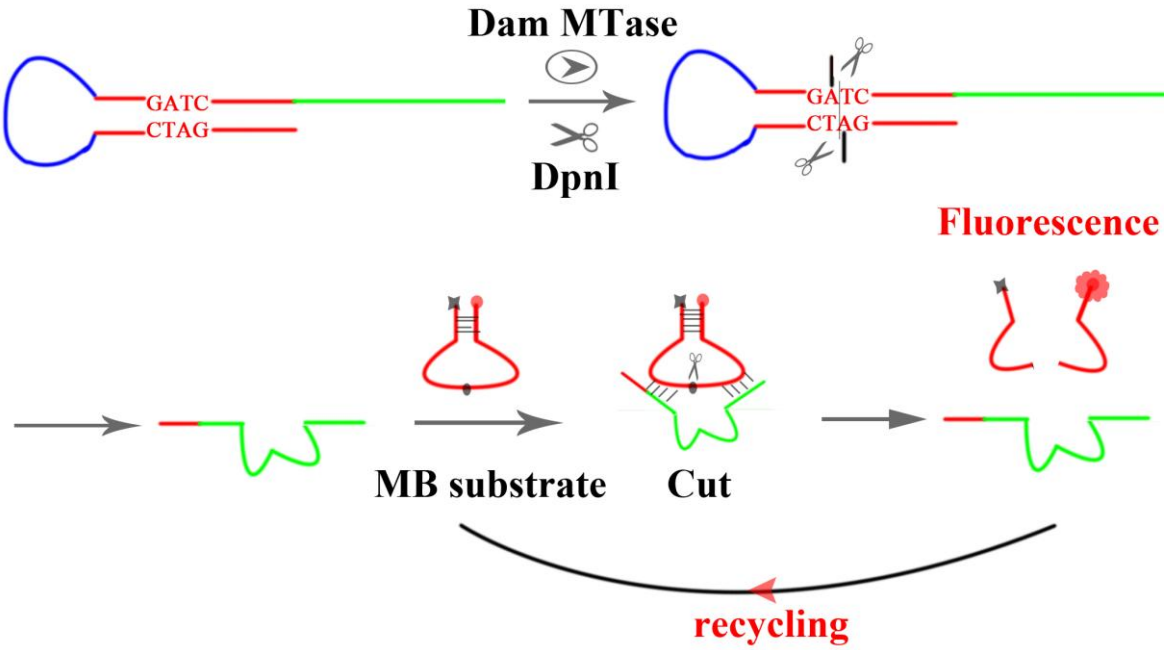

DNA methylation plays important roles in a variety of biological processes, and their aberrant profiles have been found in many diseases. Herein, the analysis of DNA methylation and MTase (methyltransferase) activity is pretty important in epigenetic study. We developed an effective strategy for sensitive analysis of MTase activity based on a hairpin shaped DNAzyme. Dam MTase has been chose as the model, and 8-17 DNAzyme amplicon has been adopted and found to be very effective in such analysis. With the newly developed platform, a sensitive and convenient detection of MTase activity could be achieved.

Contents List

1.1 General information: $MgCl_2$, Tris base and NaCl were purchased from Acros and the oligonucleotides were purchased from Invitrogen Technology(Shanghai, China). DNA adenine methylation(Dam) MTase, DpnI and S-adenosylmethionine (SAM) were purchased from New England Biolabs (NEB) Inc. Fluorescence was measured by LS55 Perkin Elmer. All measurements were performed at room temperature.

1.2 Table S1 Sequences of DNA probes used in methylation analysis.

Oligomer	Sequence(from 5'to 3')
Dam F1	**AGAAGAG** *ATGGATCAAG* TAACCAATGTGCAGA*CTTGATC* *CAT***CTCTTCT**CCGAGCCGGTCG AAATAGTGGGTG
Dam F2	**GAAGAG** ATGGATCAAG TAACCAATGTGCAGACTTGATC CAT**CTCTTC**TCCGAGCCGGTCG AAATAGTGGGTG
Dam F3	**AAGAG** ATGGATCAAG TAACCAATGTGCAGACTTGATC CAT**CTCTT**CTCCGAGCCGGTCG AAATAGTGGGTG
Dam F4	**AGAG** ATGGATCAAG TAACCAATGTGCAGACTTGATC CAT**CTCT**TCTCCGAGCCGGTCG AAATAGTGGGTG
Dam F5	**GAG** ATGGATCAAG TAACCAATGTGCAGACTTGATC CAT**CTC**TTCTCCGAGCCGGTCG AAATAGTGGGTG
MB substrate	/FAM/- CCACCACATTCAAATTCACCAACTATrAGGAAG- AGATGTTACGAGGCGGTGGTGG-/BHQ/

1.3 Figure S1

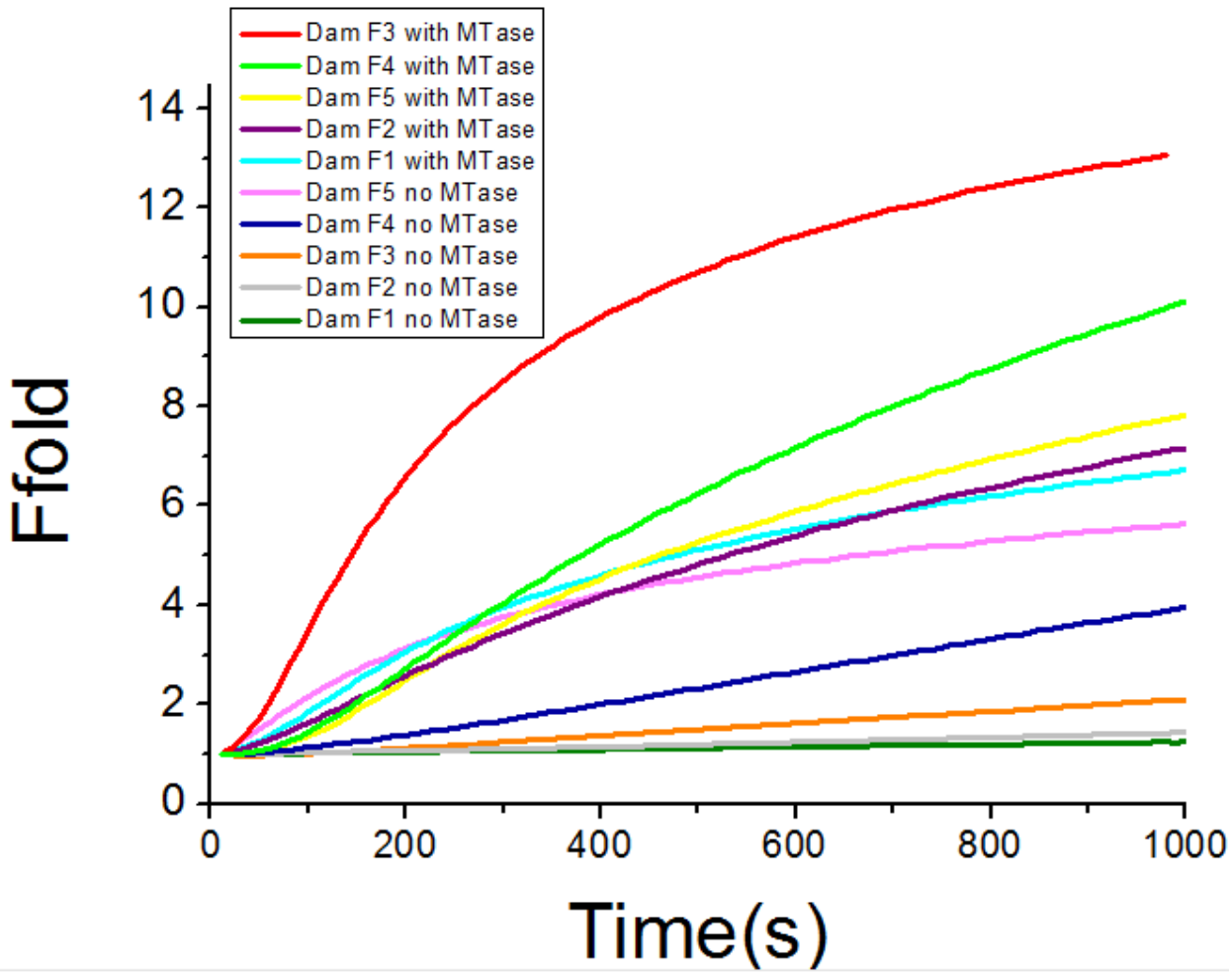

Figure S1 Preliminary dynamic assay of fluorescence response of different hairpin-shaped DNA probes. The concentration for DNA probe is 1.0 μM and concentration of Dam MTase are 200 U/mL. The methylation buffer contained 50 mM of NaCl, 10 mM of tris-HCl (pH7.5), 10 mM of $MgCl_2$. The following cleavage reaction was conducted in a buffer containing 5 mM of NaCl, 1 mM of tris-HCl (pH7.5), 1.5 mM of $MgCl_2$ and 0.1 μM of MB substrate. The curves were obtained with a kinetic mode on a fluorescence spectrameter.

1.4 Figure S2

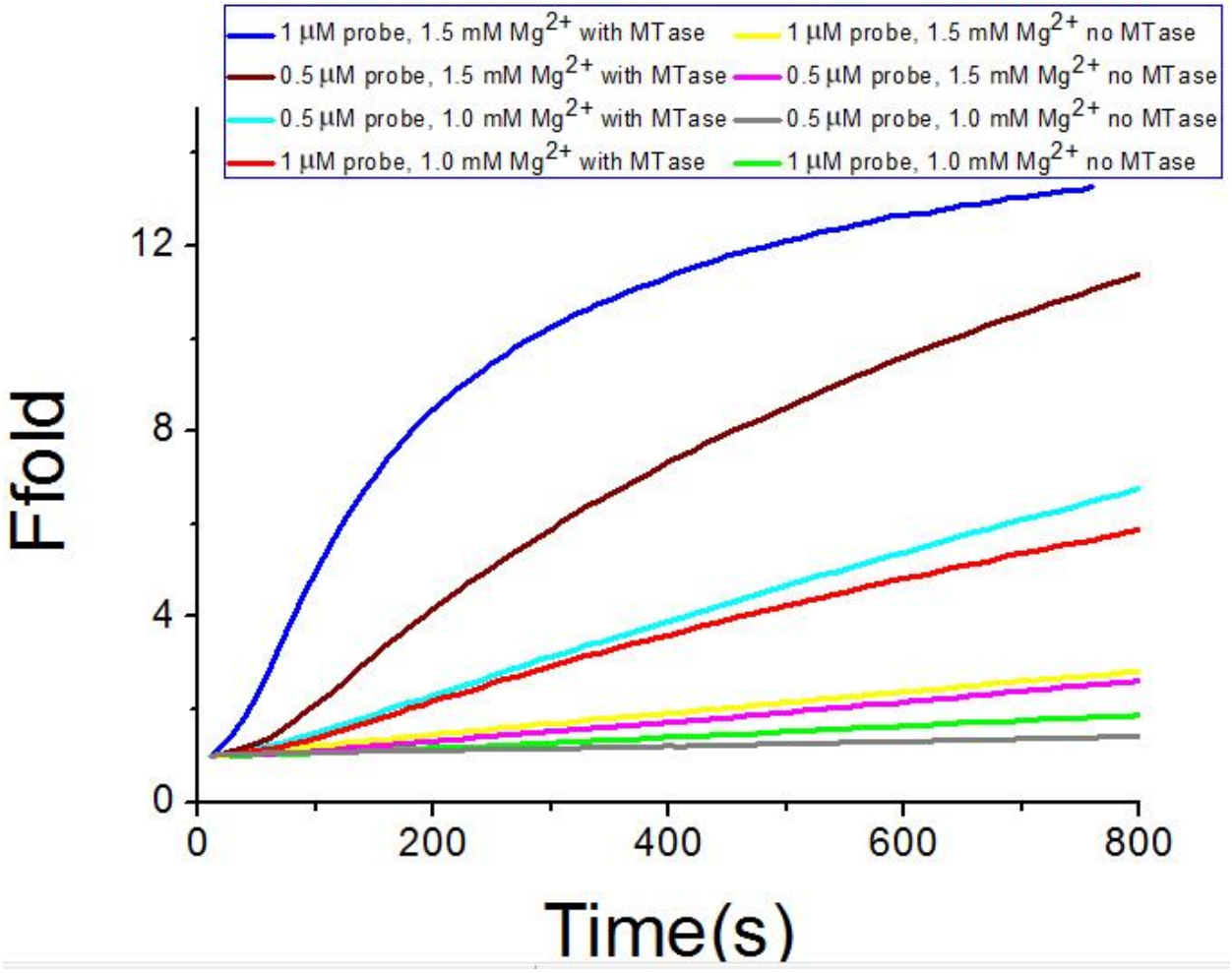

Figure S2 Time-dependent fluorescence response of different concentrations of hairpin-shaped DNA probe and Mg^{2+}. The methylation buffer contained 50 mM of NaCl, 10 mM of tris-HCl (pH7.5), 10 mM of $MgCl_2$, 200 U/mL of Dam Mtase, 400U/mL of DpnI and a varing concentrations of Dam F3 probe(the concentrations were specified in the curves). The following cleavage reaction was conducted in a buffer containing 5 mM of NaCl, 1 mM of tris-HCl (pH7.5), 0.1 μM of MB substrate and a varing concentrations of $MgCl_2$(the concentrations were specified in the curves). The curves were obtained with a kinetic mode on a fluorescence spectrameter.