

## Supporting Information

A label-free fluorescent molecular beacon based on aptamer-templated silver nanoclusters: use for detection of adenosine and adenosine deaminase

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### *Experimental Section*

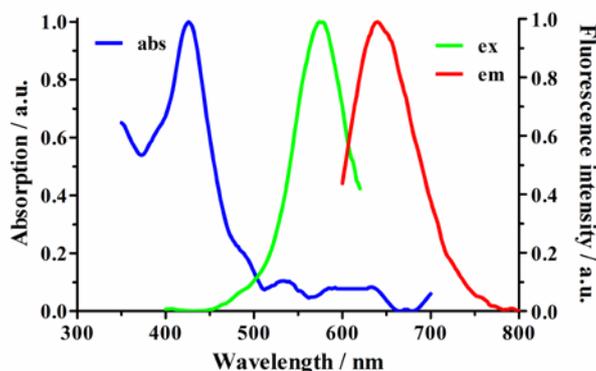
**Reagents and Materials:** All chemicals used were obtained from commercial sources and directly used without additional purification. The synthetic oligonucleotide was purchased from Sangon Inc. (Shanghai, China) with the sequences 5'-CCC TTA ATC CCC TTT ACC TGG GGG GAG TAT TTT TGC GGA GGA AGG TGG GTG GGG TGG GGT GGG G-3'. The adenosine deaminase was purchased from Diazyme Co., Ltd. (Shanghai, China). Adenosine 5'-triphosphate (ATP), guanosine 5'-triphosphate (GTP), cytidine 5'-triphosphate (CTP) and uridine 5'-triphosphate (UTP) were purchased from Sigma-Aldrich (St. Louis, MO). Unless otherwise noted, all samples were prepared using distilled water purified by a Milli-Q water purification system (Millipore Corp., Bedford, MA). Silver nitrates ( $\text{AgNO}_3$ ) were purchased from Sinopharm Chemical Reagent Company (Shanghai, China). Sodium borohydride ( $\text{NaBH}_4$ ) was obtained from Tianlian Fine Chemical Co., Ltd. (Shanghai, China).

**Instrumentation:** Fluorescence was measured in a fluorescence microplate reader (Bio-Tek Instrument, Winooski, USA) using a black 384 well microplate (Fluotrac 200, Greiner, Germany). Transmission electron microscope (TEM) measurements were performed on Jeol JEM-2100 instrument. Samples for TEM studies were prepared by placing a drop of DNA-templated silver nanoclusters (DNA-AgNCs) solution on a copper grid. The films on the TEM grids were allowed to dry for 2 min following

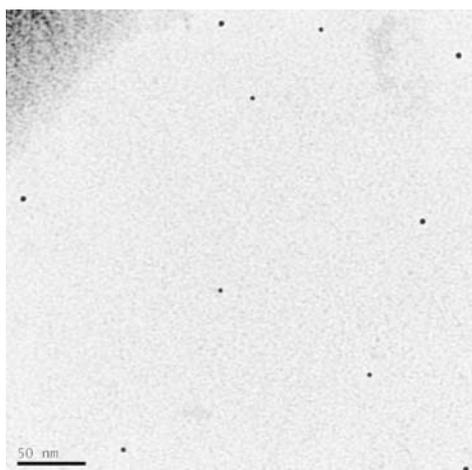
that the extra solution was removed using a blotting paper.

**Preparation of DNA-templated Silver nanoclusters (DNA-AgNCs):** The synthesis of DNA-AgNCs was according to the reported method with minor modification.<sup>1</sup> Briefly, 3  $\mu\text{M}$  DNA template or control DNA and 18  $\mu\text{M}$   $\text{AgNO}_3$  were sequentially added and mixed with sodium phosphate buffer (20 mM, pH 6.6), and the reaction mixture was incubated at room temperature, in the dark, for 20 minutes. 18  $\mu\text{M}$   $\text{NaBH}_4$  was added and the reaction mixture was incubated at room temperature, in the dark, for one hour. Following reduction of  $\text{Ag}^+$  ions, fluorescent DNA-AgNCs were produced with fluorescence emission at 640 nm (excitation at 570 nm).

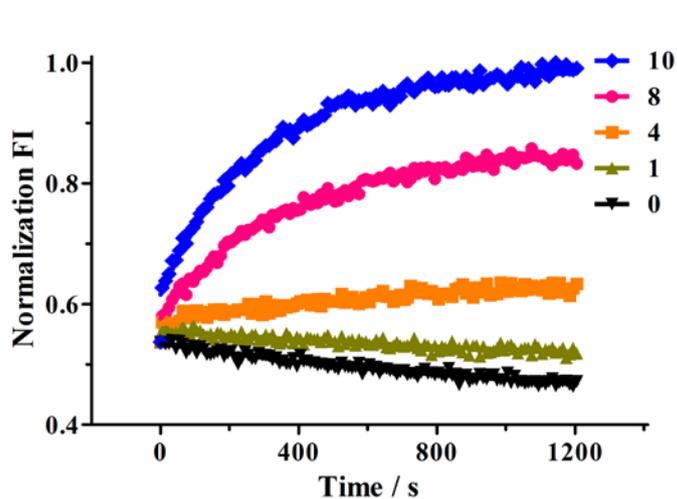
**Data Analysis.** The GraphPad Prism 5.0 software (GraphPad Software, San Diego, CA) was employed to perform the data processing.



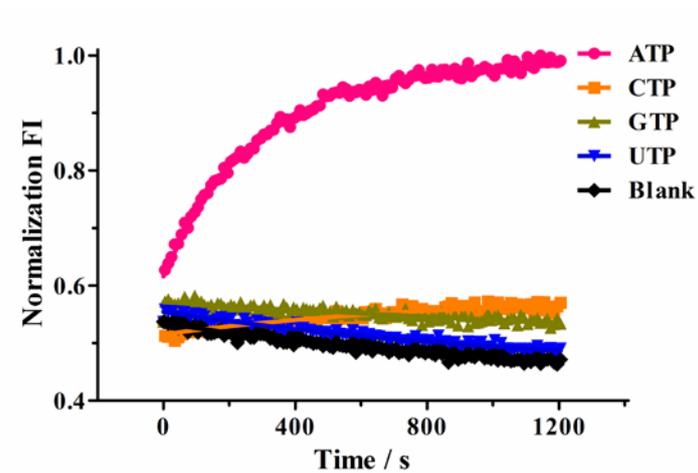
**Fig. S1** Typical absorption spectra, maximum excitation and emission spectra of the fluorescent DNA-AgNCs.



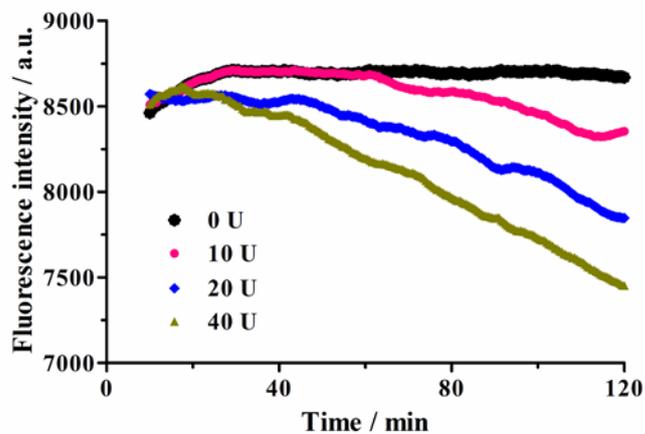
**Fig. S2** A typical TEM image of the DNA-AgNCs.



**Fig. S3** The kinetics of fluorescence enhancement of DNA-AgNCs solution upon added various ATP concentrations of 0, 1.0, 4.0, 8.0 and 10.0 mM.



**Fig. S4** The kinetics of fluorescence enhancement of DNA-AgNCs solution upon added ATP, CTP, GTP and UTP with concentrations of 10 mM, respectively.



**Fig. S5** The kinetics of fluorescence quenching of DNA-AgNCs solution upon added adenosine deaminase with concentrations of 0 U, 10 U, 20 U and 40 U, respectively.

#### References:

1. J. Sharma, H. C. Yeh, H. Yoo, J. H. Werner, J. S. Martinez, *Chem. Commun.* 2011, **47**, 2294.