

## Electronic Supporting Information

# A luminescent switch-on assay for the detection of specific gene deletion using G-quadruplex DNA and silver nanoclusters

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## Experimental section

### Emission measurement

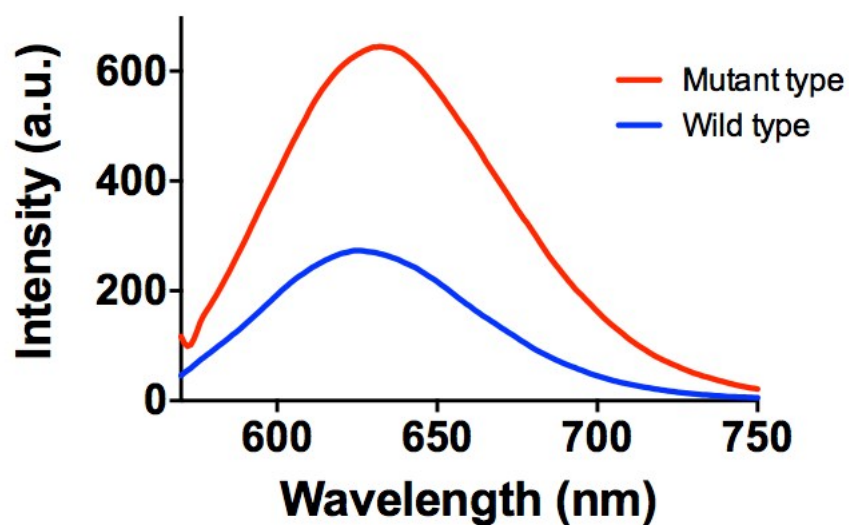
A mixture of P1, P2 and mutant DNA or wild-type DNA was mixed in hybridization buffer (50 mM Tris containing 50 mM KNO<sub>3</sub>, pH 7.0). The mixture was annealed at 95 °C for 10 min, and was slowly cooled to 25 °C. The mixture solution was then added with AgNO<sub>3</sub> and NaBH<sub>4</sub> to produce silver nanoclusters. In the emission measurement, 100 μL of the DNA mixture stock solution was diluted with 400 μL of Tris buffer (50 mM, 50 mM KNO<sub>3</sub>, pH 7.0). The mixture was allowed to equilibrate at 25 °C for 10 min. Luminescence emission spectra were recorded on a PTI QM-4 spectrofluorometer at 25 °C.

**Table S1.** DNA sequences used in this project.

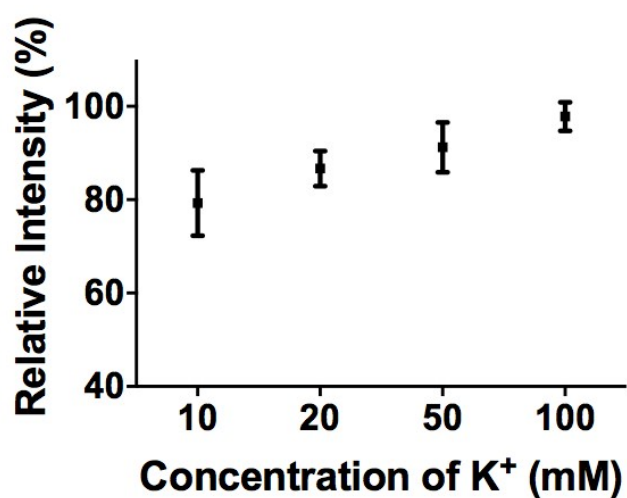
	Sequence
P1 (c-kit1)	5'-GACA <sub>2</sub> CGACACAGTG <sub>4</sub> AG <sub>3</sub> CGCTG <sub>3</sub> AG <sub>2</sub> AG <sub>3</sub> -3'
P2	5'-C <sub>3</sub> T <sub>2</sub> A <sub>2</sub> TC <sub>4</sub> AC <sub>3</sub> TCA <sub>2</sub> CA <sub>2</sub> GCTA-3'
LMP1 wild type DNA	5'- TAGCT <sub>2</sub> GT <sub>2</sub> GAG <sub>3</sub> TGCG <sub>3</sub> AG <sub>3</sub> AGTCATCGTG <sub>2</sub> TG <sub>2</sub> TGT <sub>2</sub> CAT CACTGTGTCGT <sub>2</sub> GTC-3'
LMP1 mutant type DNA	5'-TAGCT <sub>2</sub> GT <sub>2</sub> GAG <sub>3</sub> CACTGTGTCGT <sub>2</sub> GTC-3'
P1 (c-kit87up)	5'-GACA <sub>2</sub> CGACACAGTGAG <sub>3</sub> AG <sub>3</sub> CGCTG <sub>3</sub> AG <sub>2</sub> AG <sub>3</sub> -3'
P1 (TBA)	5'-GACA <sub>2</sub> CGACACAGTG <sub>3</sub> T <sub>2</sub> G <sub>2</sub> TGTG <sub>2</sub> T <sub>2</sub> G <sub>2</sub> -3'
P1 (Pu22)	5'-GACA <sub>2</sub> CGACACAGTGTGAG <sub>3</sub> TG <sub>4</sub> AG <sub>3</sub> TG <sub>4</sub> A <sub>2</sub> -3'
P1 (Pu27)	5'-GACA <sub>2</sub> CGACACAGTGTG <sub>4</sub> AG <sub>3</sub> TG <sub>4</sub> AG <sub>3</sub> TG <sub>4</sub> A <sub>2</sub> G <sub>2</sub> -3'
P1 (HTS)	5'-GACA <sub>2</sub> CGACACAGTGT <sub>2</sub> AG <sub>3</sub> T <sub>2</sub> AG <sub>3</sub> T <sub>2</sub> AG <sub>3</sub> T <sub>2</sub> AG <sub>3</sub> -3'
P1 (PS2.M)	5'-GACA <sub>2</sub> CGACACAGTG <sub>2</sub> TG <sub>3</sub> TAG <sub>3</sub> CG <sub>3</sub> T <sub>2</sub> G <sub>2</sub> -3'
LMP1 mutant DNA-5	5'- TAGCT <sub>2</sub> GT <sub>2</sub> GAG <sub>3</sub> TGCG <sub>3</sub> AG <sub>3</sub> AGTCATCGTG <sub>2</sub> TG <sub>2</sub> TGCACTG TGTCGT <sub>2</sub> GTC-3'
LMP1 mutant DNA-10	5'- TAGCT <sub>2</sub> GT <sub>2</sub> GAG <sub>3</sub> TGCG <sub>3</sub> AG <sub>3</sub> AGTCATCGTG <sub>2</sub> CACTGTGTC GT <sub>2</sub> GTC-3'
LMP1 mutant DNA-15	5'- TAGCT <sub>2</sub> GT <sub>2</sub> GAG <sub>3</sub> TGCG <sub>3</sub> AG <sub>3</sub> AGTCATCACTGTGTCGT <sub>2</sub> GT C-3'
LMP1 mutant DNA-20	5'-TAGCT <sub>2</sub> GT <sub>2</sub> GAG <sub>3</sub> TGCG <sub>3</sub> AG <sub>3</sub> ACACTGTGTCGT <sub>2</sub> GTC-3'
LMP1 mutant DNA-25	5'-TAGCT <sub>2</sub> GT <sub>2</sub> GAG <sub>3</sub> TGCG <sub>3</sub> CACTGTGTCGT <sub>2</sub> GTC-3'
CCR5 wild type DNA	5'- CTCAT <sub>4</sub> C <sub>2</sub> ATACAGTCAGTATCA <sub>2</sub> T <sub>2</sub> CTG <sub>2</sub> A <sub>2</sub> GA <sub>2</sub> T <sub>3</sub> C <sub>2</sub> AGAC AT <sub>2</sub> A <sub>3</sub> GATAGTCAT-3'
CCR5 mutant type DNA	5'-CTCAT <sub>4</sub> C <sub>2</sub> ATACAT <sub>2</sub> A <sub>3</sub> GATAGTCAT-3'
CCR5-P1 (c-kit1)	5'-ATGACTATCT <sub>3</sub> A <sub>2</sub> TAG <sub>3</sub> AG <sub>3</sub> CGCTG <sub>3</sub> AG <sub>2</sub> AG <sub>3</sub> -3'
CCR5-P2	5'-C <sub>3</sub> T <sub>2</sub> A <sub>2</sub> TC <sub>5</sub> GTATG <sub>2</sub> A <sub>4</sub> TGAG-3'



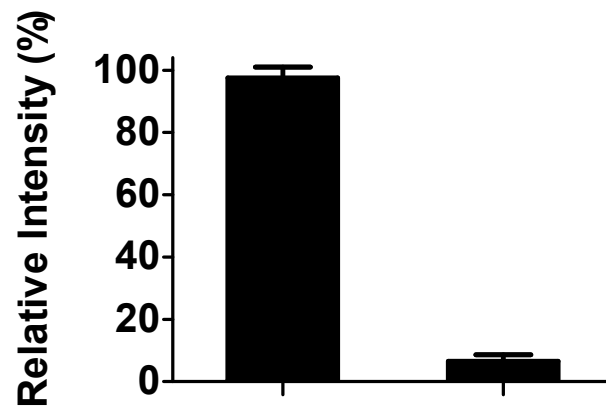
**Figure S1** Emission spectra of the system (5  $\mu$ M P1 and P2) in the presence of the mutant DNA (5  $\mu$ M) or wild-type (5  $\mu$ M) DNA.



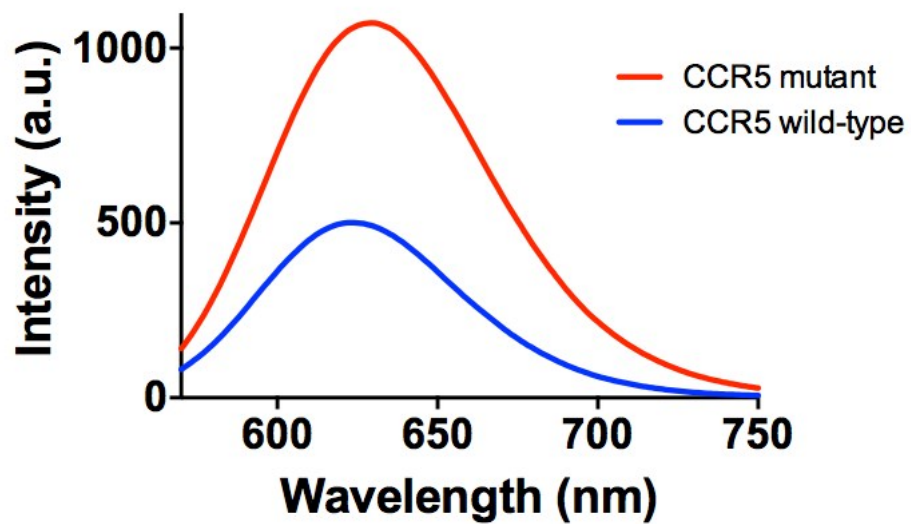
**Figure S2** Relative luminescence intensity of the system with different concentrations of  $\text{KNO}_3$  (10, 20, 50 and 100 mM).



**Figure S3** Relative luminescence intensity at  $\lambda = 630$  nm of the system utilizing  $5 \mu\text{M}$  P2 (with poly-C) and P2' (without C).



**Figure S4** Emission spectra of the system ( $5 \mu\text{M}$  P1 and P2) in the presence of CCR5 mutant DNA ( $5 \mu\text{M}$ ) or CCR5 wild-type DNA ( $5 \mu\text{M}$ ).



**Figure S5** Time course of luminescence response of AgNC in the presence/absence of G-rich sequence in buffer (black) and serum sample (red).

