Supplementary Material (ESI) for Analyst
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A DNA nanoswitch incorporating the fluorescent base analogue 2-amino purine detects single nucleotide mismatches in unlabelled targets

Colin J. Campbell[1,3,], Christopher P. Mountford[2], Helene C. Stoquert[1], Amy H. Buck[1], Paul Dickinson[1], Elena Ferapontova[3], Jonathan G. Terry[4], John S. Beattie[1], Anthony J. Walton[4], Jason Crain[2], Peter Ghazal[1] and Andrew R. Mount[3].*

[1]Division of Pathway Medicine, University of Edinburgh, EH16 4SB, UK [2] School of Physics University of Edinburgh, Edinburgh, EH9 3JZ, UK. [3]School of Chemistry University of Edinburgh, Edinburgh, EH9 3JJ, UK. [4]Institute for Integrated Micro and Nano Systems, University of Edinburgh, Edinburgh, EH9 3JF, UK

AUTHOR EMAIL ADDRESS colin.campbell@ed.ac.uk

Supplementary Material

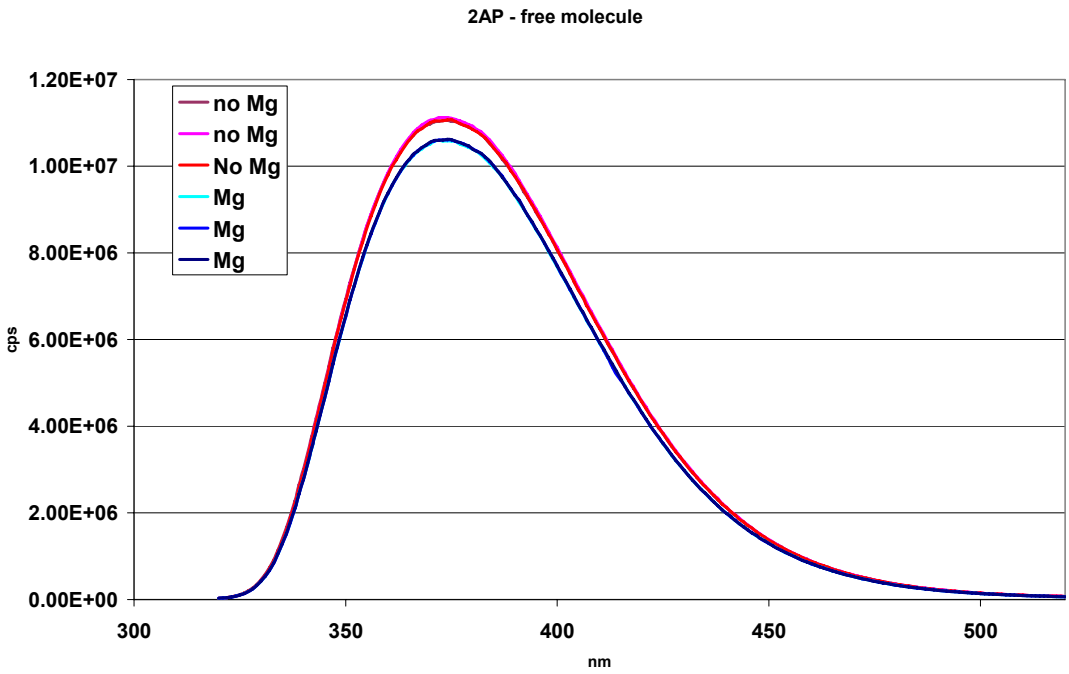

Figure S1
Emission spectra of AP (1μM) with and without $MgCl_2$ (5mM)

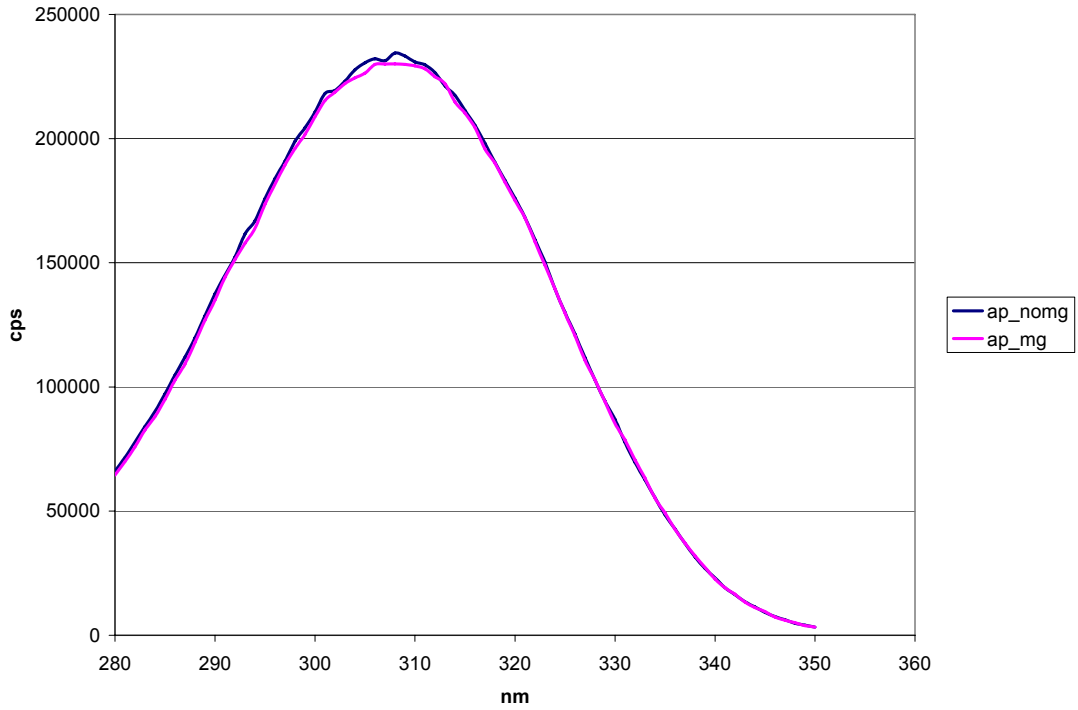

Figure S2
Excitation spectra of free AP, with and without $MgCl_2$ (5mM)

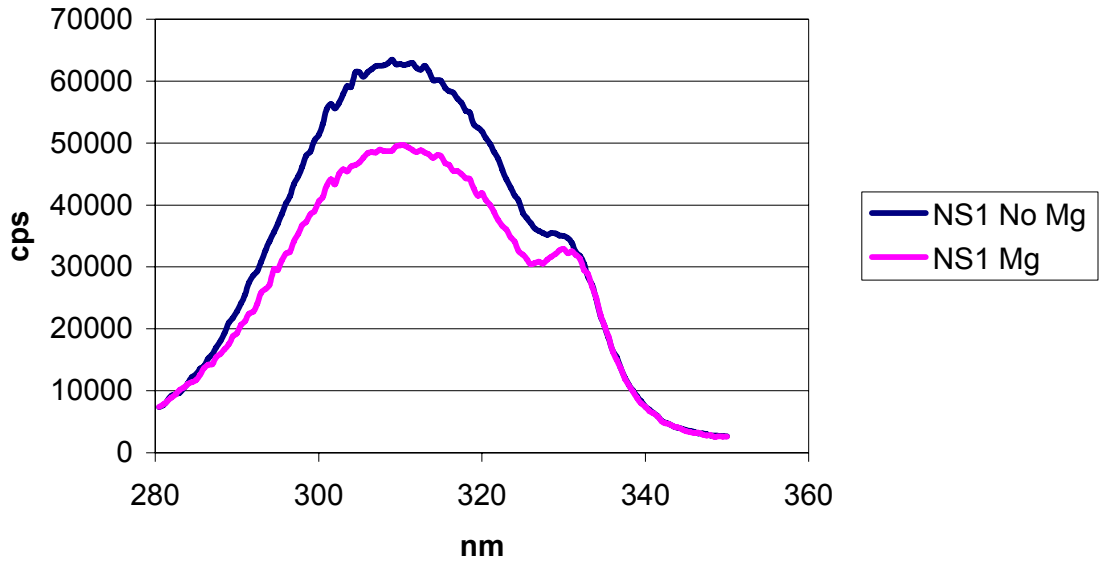

Figure S3
Excitation spectra of NS1 with and without $MgCl_2$ (5mM)

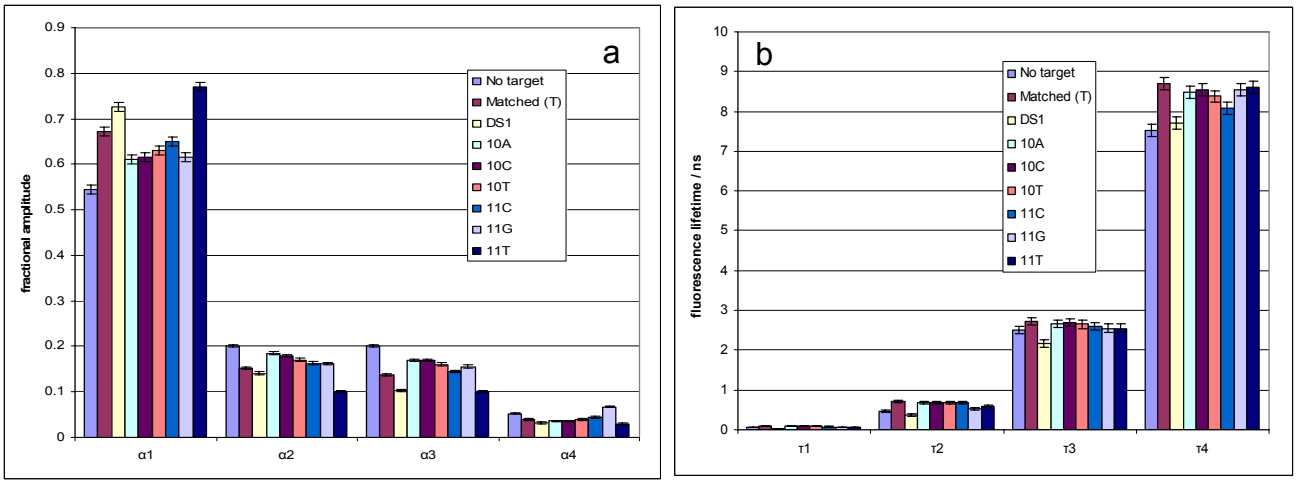

Figure S4: a – population, α_i and b – fluorescence lifetime, τ_i, data for nanoswitches in the absence of Mg^{2+} (the open configuration). Error bars represent standard deviations calculated from individual fits.

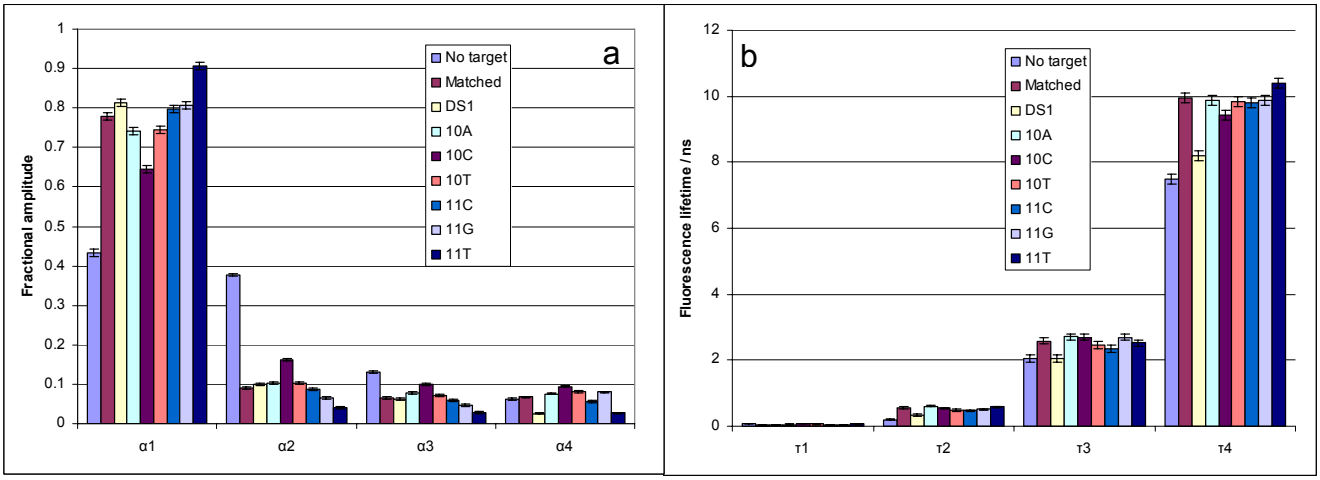

Figure S5: a – population, α_i and b – fluorescence lifetime, τ_i, data for nanoswitches in the presence of 5 mM Mg^{2+} (the closed configuration). Error bars represent standard deviations calculated from individual fits.

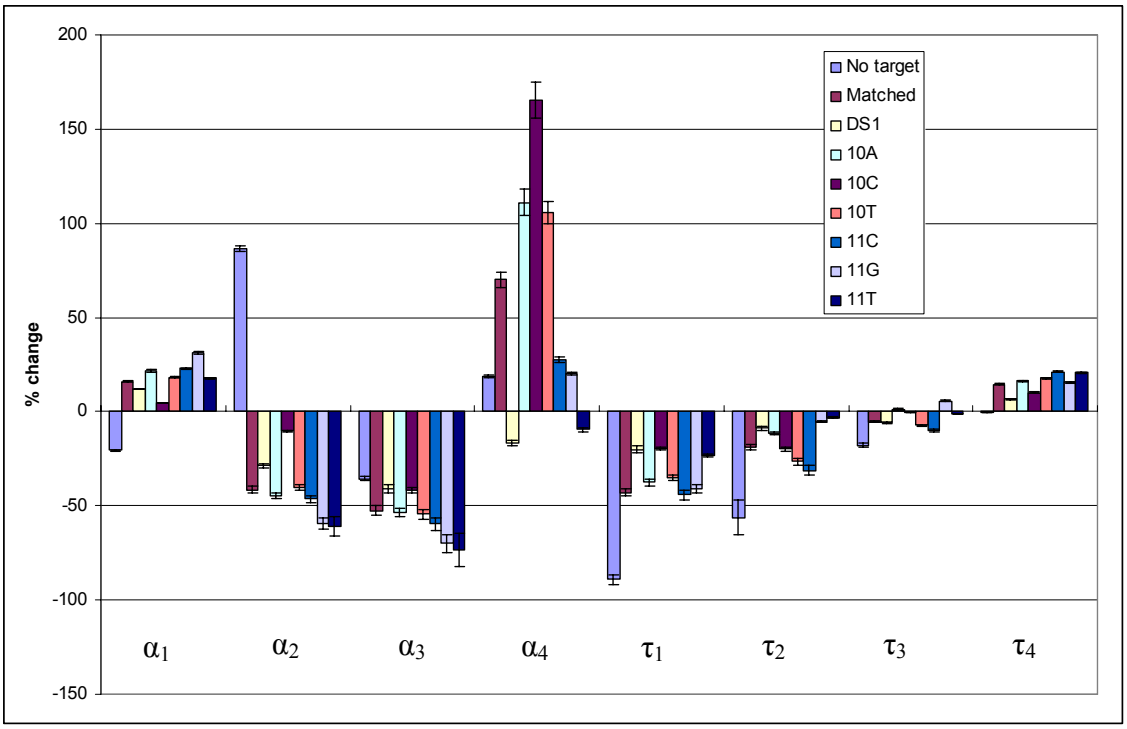

Figure S6. Change in proportion, α_i, and lifetime, τ_i, of each component, i on the addition of Mg^{2+}. Error bars represent standard deviations calculated from individual fits.

	$[Mg^{2+}]$	α_1	α_2	α_3	α_4		τ_1 (ns)	τ_2 (ns)	τ_3 (ns)	τ_4 (ns)	χ^2
No target	0 mM	0.54	0.20	0.20	0.05		0.07	0.46	2.50	7.52	1.09
No target	10 mM	0.43	0.38	0.13	0.06		0.08	0.20	2.05	7.50	1.05
Matched (T1)	0 mM	0.67	0.15	0.14	0.04		0.08	0.70	2.73	8.70	1.18
Matched (T1)	10 mM	0.78	0.09	0.07	0.07		0.05	0.57	2.59	9.96	1.03
DS1	0 mM	0.73	0.14	0.10	0.03		0.04	0.36	2.17	7.70	1.05
DS1	10mM	0.81	0.10	0.06	0.03		0.03	0.33	2.04	8.21	1.05
T10A	0 mM	0.61	0.18	0.17	0.04		0.09	0.69	2.66	8.47	1.078
T10A	10 mM	0.74	0.10	0.08	0.08		0.05	0.61	2.70	9.87	1.028
T10C	0 mM	0.62	0.18	0.17	0.04		0.08	0.68	2.70	8.55	1.063
T10C	10 mM	0.64	0.16	0.10	0.10		0.07	0.54	2.69	9.41	1.051
T10T	0 mM	0.63	0.17	0.16	0.04		0.09	0.67	2.65	8.38	1.127
T10T	10 mM	0.74	0.11	0.07	0.08		0.06	0.49	2.46	9.86	1.024
T11C	0 mM	0.65	0.16	0.14	0.04		0.07	0.68	2.61	8.09	1.103
T11C	10 mM	0.80	0.09	0.06	0.05		0.04	0.47	2.34	9.81	1.073
T11T	0 mM	0.77	0.10	0.10	0.03		0.07	0.60	2.55	8.60	1.175
T11T	10 mM	0.90	0.04	0.03	0.03		0.06	0.58	2.52	10.40	1.067
T11G	0 mM	0.62	0.15	0.16	0.07		0.07	0.54	2.55	8.54	1.024
T11G	10 mM	0.80	0.07	0.05	0.08		0.04	0.51	2.69	9.86	1.12

Table S1. Fluorescence lifetimes and amplitudes for all nanoswitches and model molecules studied. Although global fitting software reports χ^2 as a measure of fit quality and not individual error measurements, we can estimate, using individual decays, the following standard deviations in the measured parameters: $\alpha_1 \pm 0.01$, $\alpha_2 \pm 0.003$, $\alpha_3 \pm 0.003$, $\alpha_4 \pm 0.002$, $\tau_1 \pm 0.002$, $\tau_2 \pm 0.03$, $\tau_3 \pm 0.1$, $\tau_4 \pm 0.15$.