Electronic Supplementary Material (ESI)

A Nanobiosensor for the Simple Detection of Small Molecules Using Non-crosslinking Aggregation of Gold Nanoparticles with G-quadruplexes

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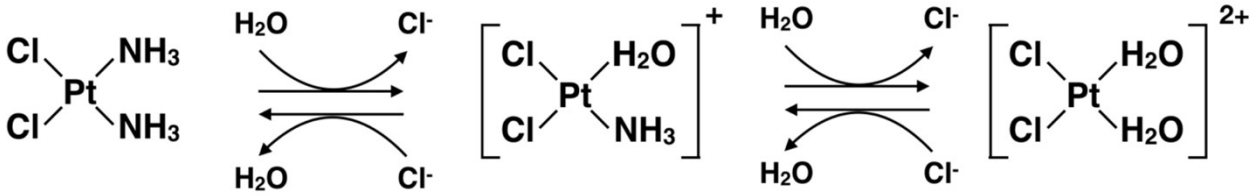
Table S1 DNA sequences of G4 used in this study.

Name	Sequence (from 5' to 3')
21CTA (Chair-type)	HS-$(CH_2)_6$-GGGCTAGGGCTAGGGCTAGGG
22AG (Basket-type)	HS-$(CH_2)_6$-AGGGTTAGGGTTAGGGTTAGGG
35B1 (Kras) (Propeller-type)	HS-$(CH_2)_6$-AGGGCGGTGTGGGAAGAGGGAAGAGGGGGAGGCAG



Scheme S1 Hydrolysis of cisplatin dichloro-form (inactive species) to diaqua-form (active species)[1]

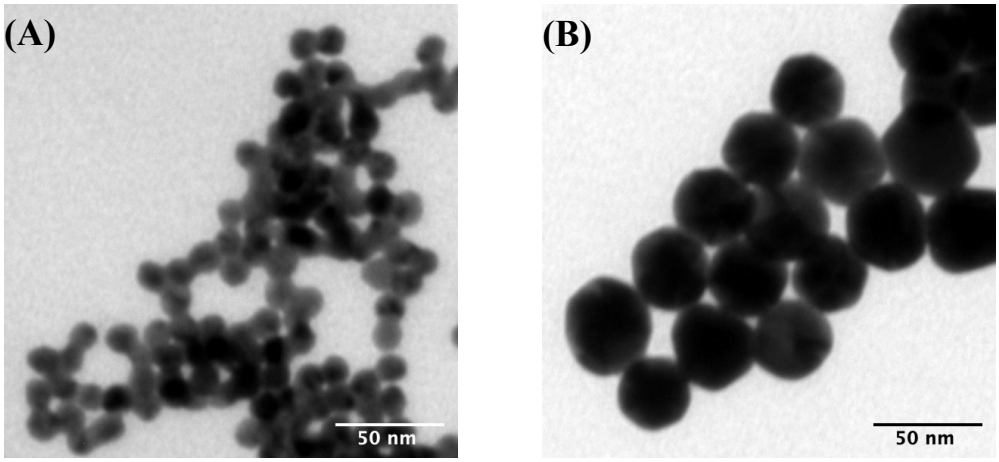


Fig. S1 TEM images of 15 nm (A) and 40 nm AuNPs (B). The mean radii and standard deviations for the smaller and larger AuNPs were estimated at 7.47 ± 0.37 nm and 19.0 ± 1.6 nm, respectively, from the TEM observations.

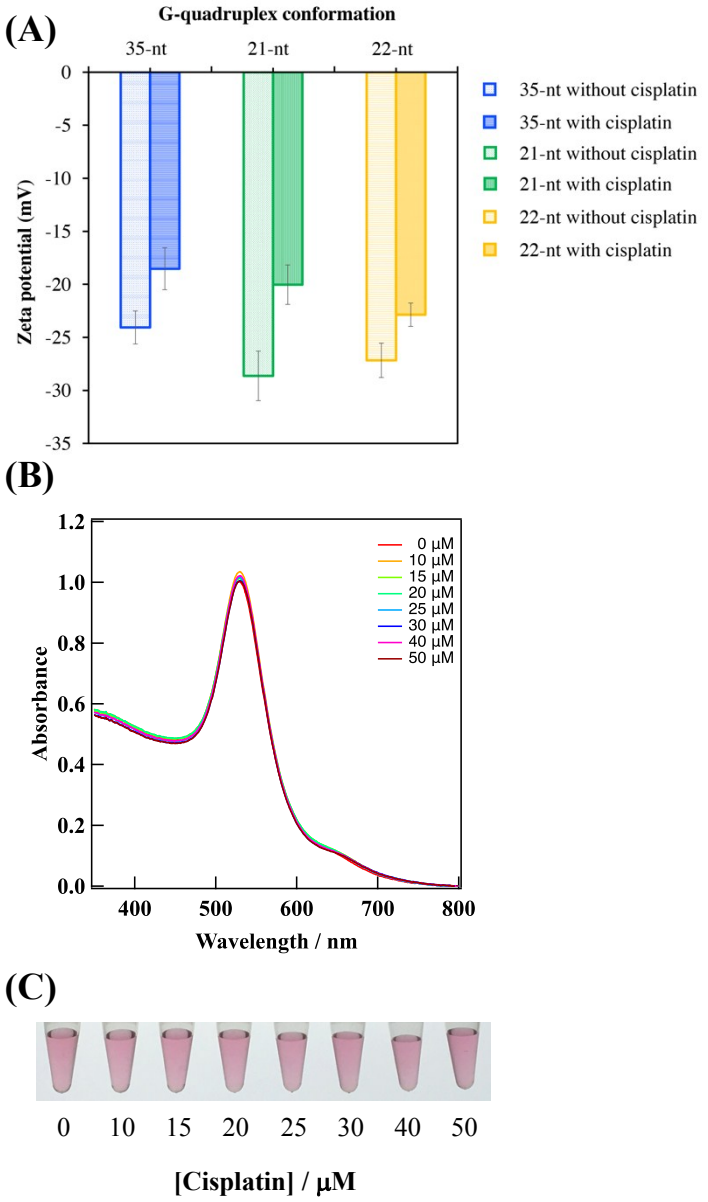


Fig. S2 (A) Zeta potential data of 1.0 OD G4-AuNPs in 10 mM PB (pH 5.0) containing 1.5 mM EDTA and 0.1 M $NaNO_3$ after overnight incubation with (line-filled bar) and without (dash-filled bar) 150 µM of cisplatin. (B) UV-vis spectra of 35-nt G4-AuNPs in 10 mM PB (pH 5.0) containing 1.5 mM EDTA at 1.0 M $NaNO_3$, under different cisplatin concentrations from 0 to 50 µM. Data were gathered 10 min after adding cisplatin. No peak shift was observed at any cisplatin concentration. (C) The corresponding 35-nt G4-AuNPs solutions at the various cisplatin concentrations. The particles remained dispersed.

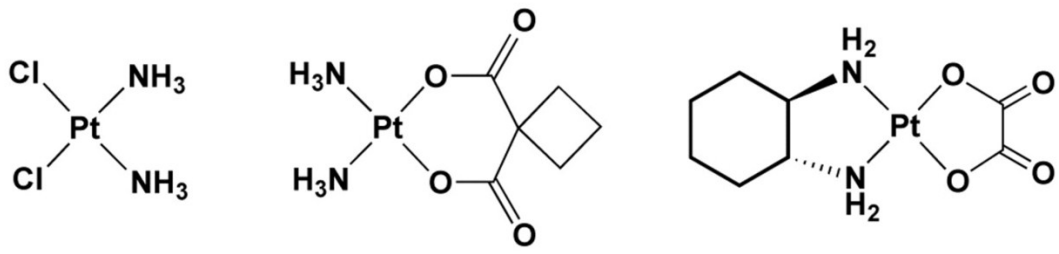


Fig. S3 Representation of the platinum-based alkylating agents: (left) cisplatin (11 atoms with two leaving chloride (Cl^-) atoms), (middle) carboplatin (17 atoms with a leaving cyclobutane-1,1-dicarboxylate ($C_6H_6O_4^{2-}$) group) and (right) oxaliplatin (29 atoms with a leaving oxalate ($C_2O_4^{2-}$) group).

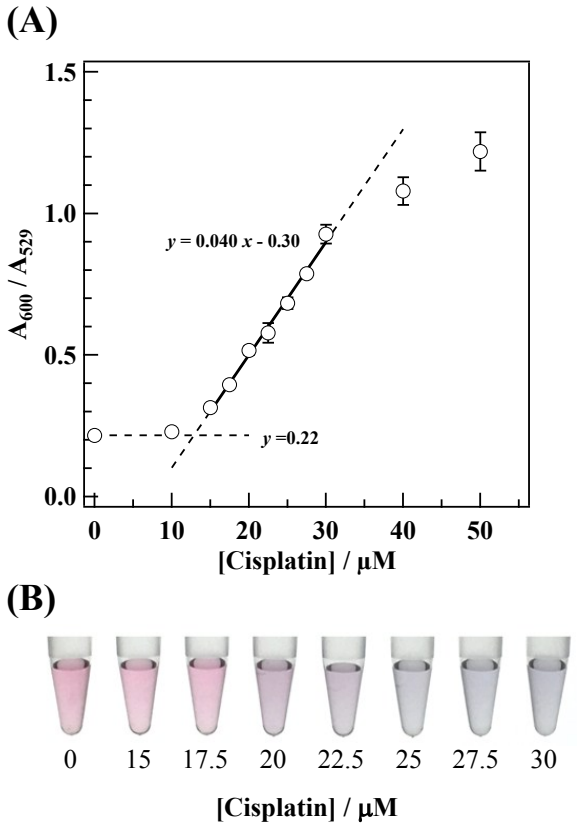


Fig. S4 (A) Cisplatin detection using 1.0 OD 35-nt G4-AuNPs in 10 mM PB containing 1.5 mM EDTA (pH 5.0) at 1.5 M $NaNO_3$. Data were gathered 10 min after the addition of cisplatin. The regression line (y = 0.040x – 0.30) in the dynamic range and LOD (y = 0.22) are shown.[2] The intersection point of the lines yielded x = 12.9. (B) The corresponding images of 35-nt G4-AuNPs solutions.

References

(1) Legendre, F.; Bas, V.; Kozelka, J.; Chottard, J. C. A Complete kinetic study of GG versus AG platination suggests that the doubly aquated derivatives of cisplatin are the actual DNA binding. *Chem. Eur. J.*, 2000, **6**, 2002–2010.

(2) Thomsen, V.; Schatzlein, D.; Mercuro, D. Limits of detection in spectroscopy. *Spectroscopy*, 2003, **18**, 112–114.