Dimers formed by mixed-type G-quadruplex binder pyridostatin specifically recognize human telomere G-quadruplex dimers

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Electronic Supplementary Information

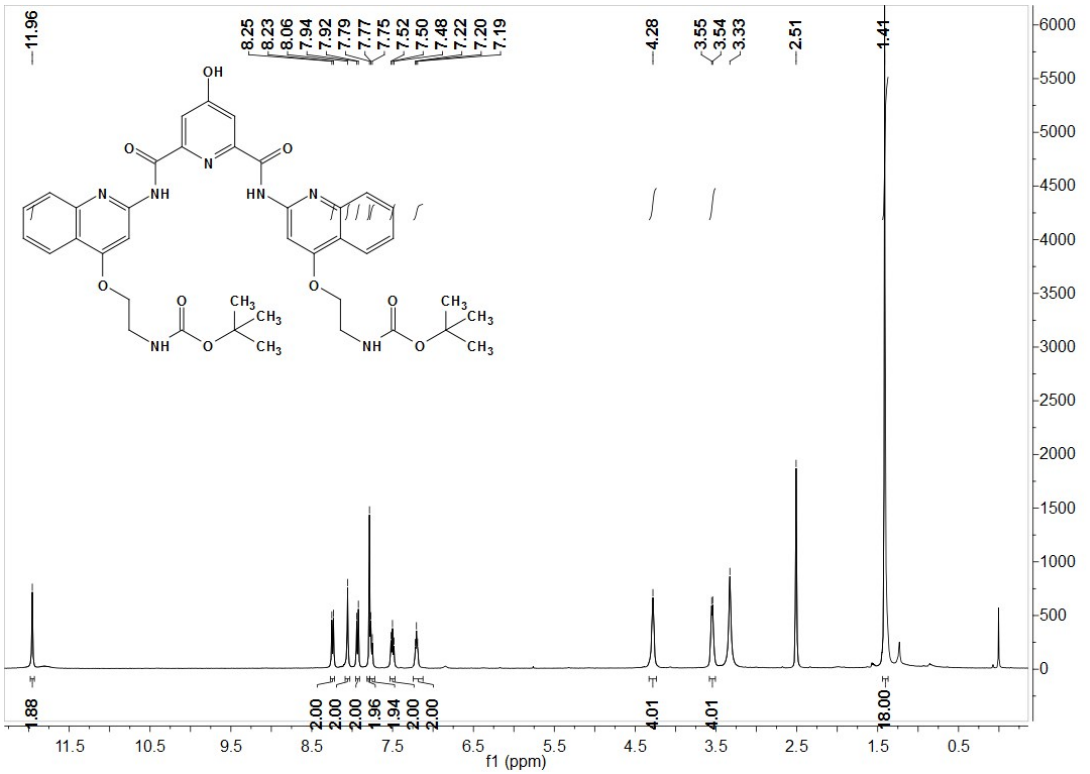


Figure S1 ^{1}H NMR (400 MHz) of compound **4** in DMSO-d_6.

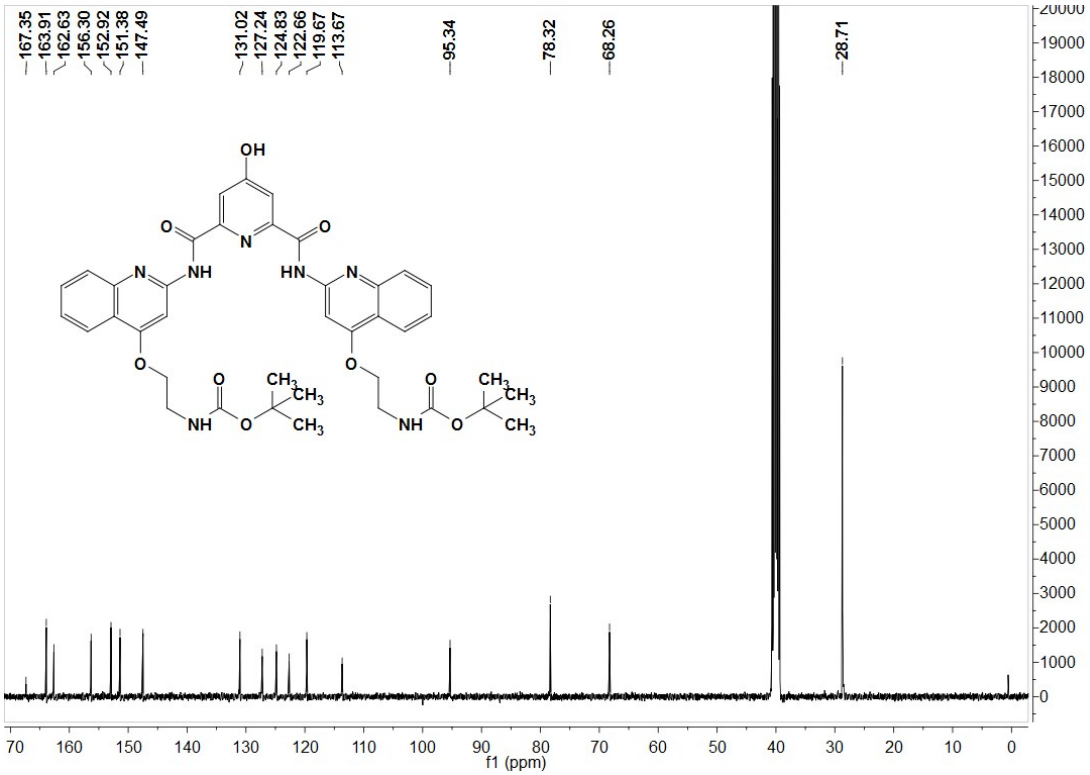


Figure S2 ^{13}C NMR (100 MHz) of compound **4** in DMSO-d_6.

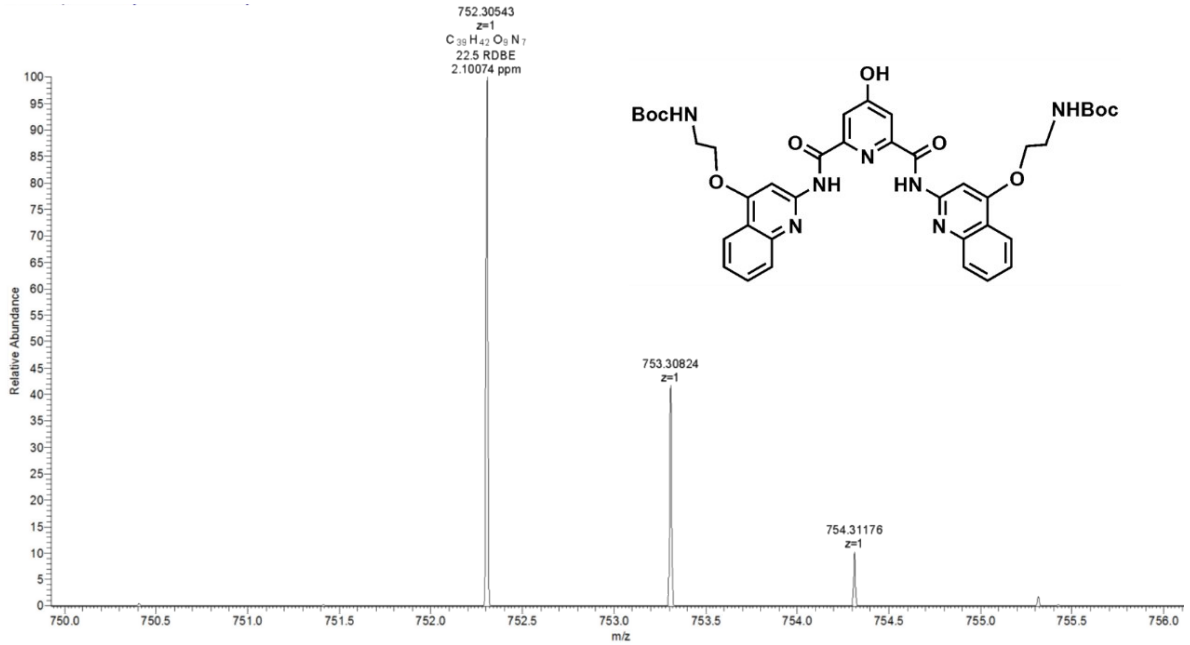


Figure S3 HR-ESI-MS of compound **4**.

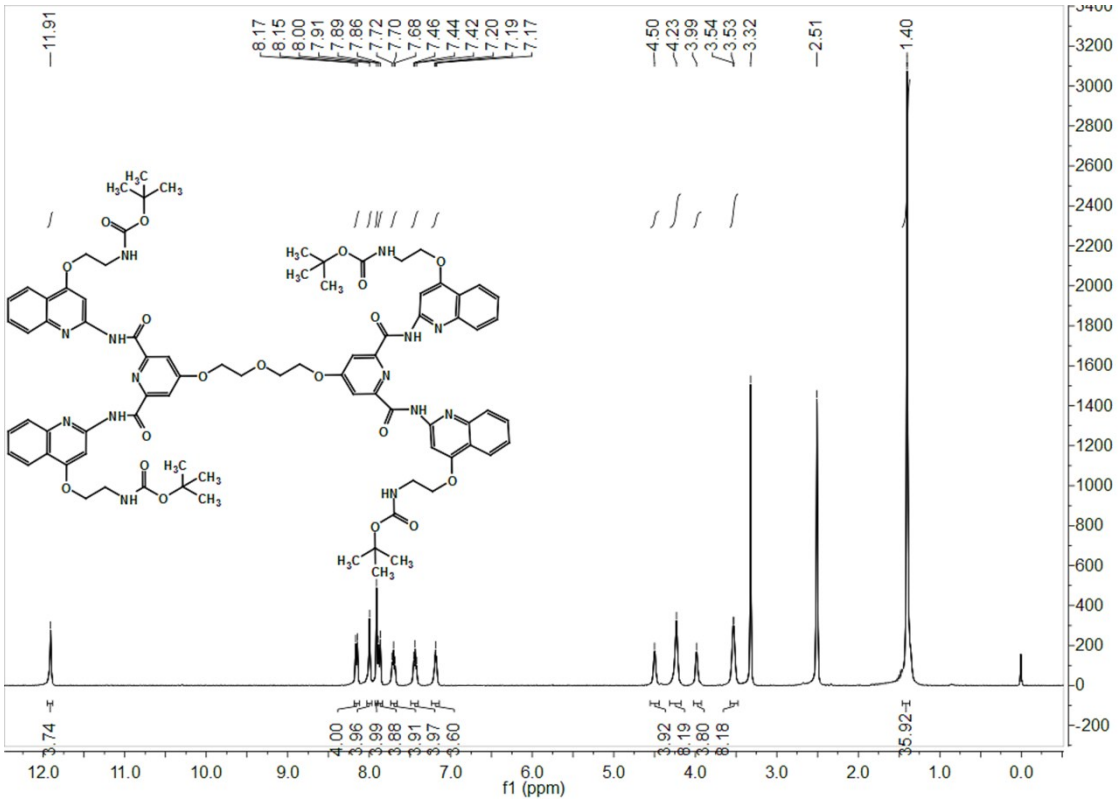


Figure S4 ^{1}H NMR (400 MHz) of compound **6a** in DMSO-d_6.

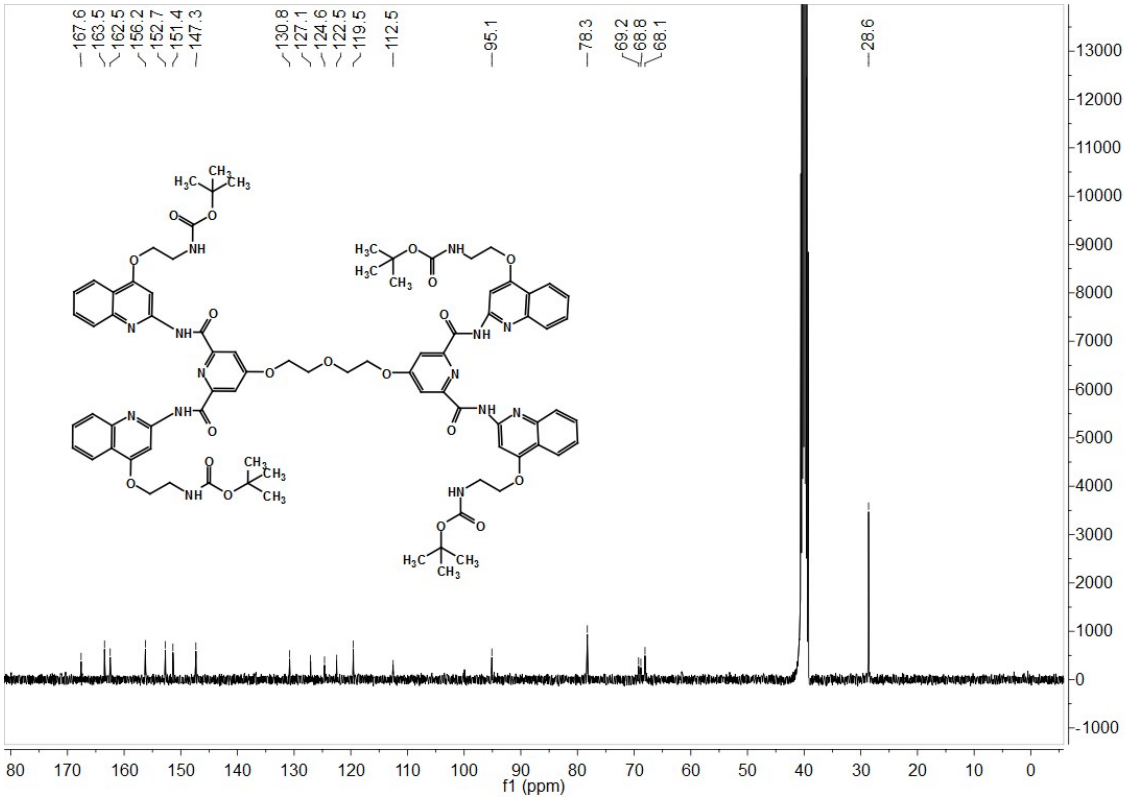


Figure S5 ^{13}C NMR (100 MHz) of compound **6a** in DMSO-d_6.

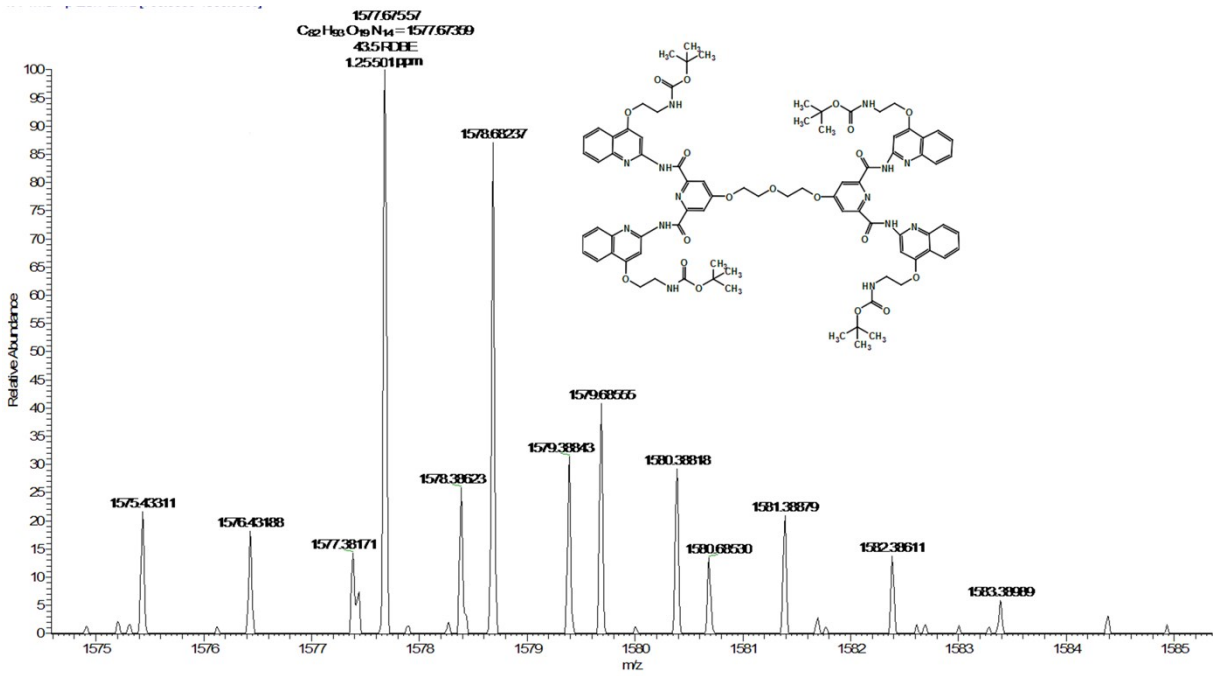


Figure S6 HR-ESI-MS of compound **6a**.

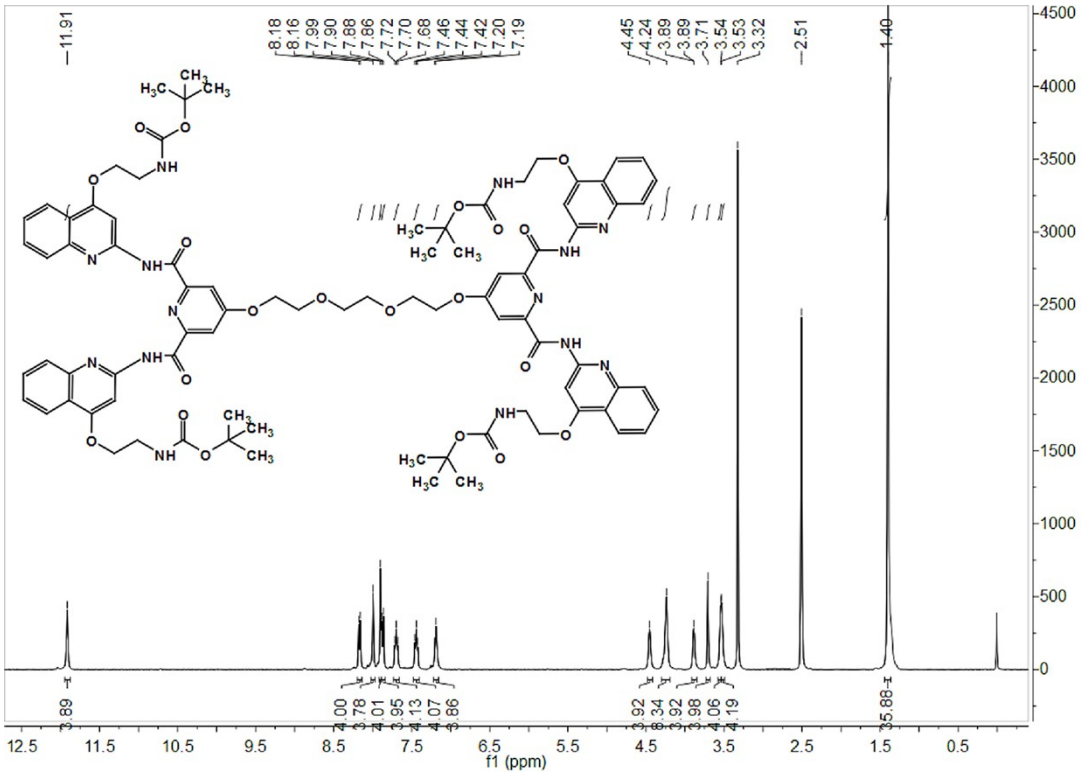


Figure S7 ^{1}H NMR (400 MHz) of compound **6b** in DMSO-d_6.

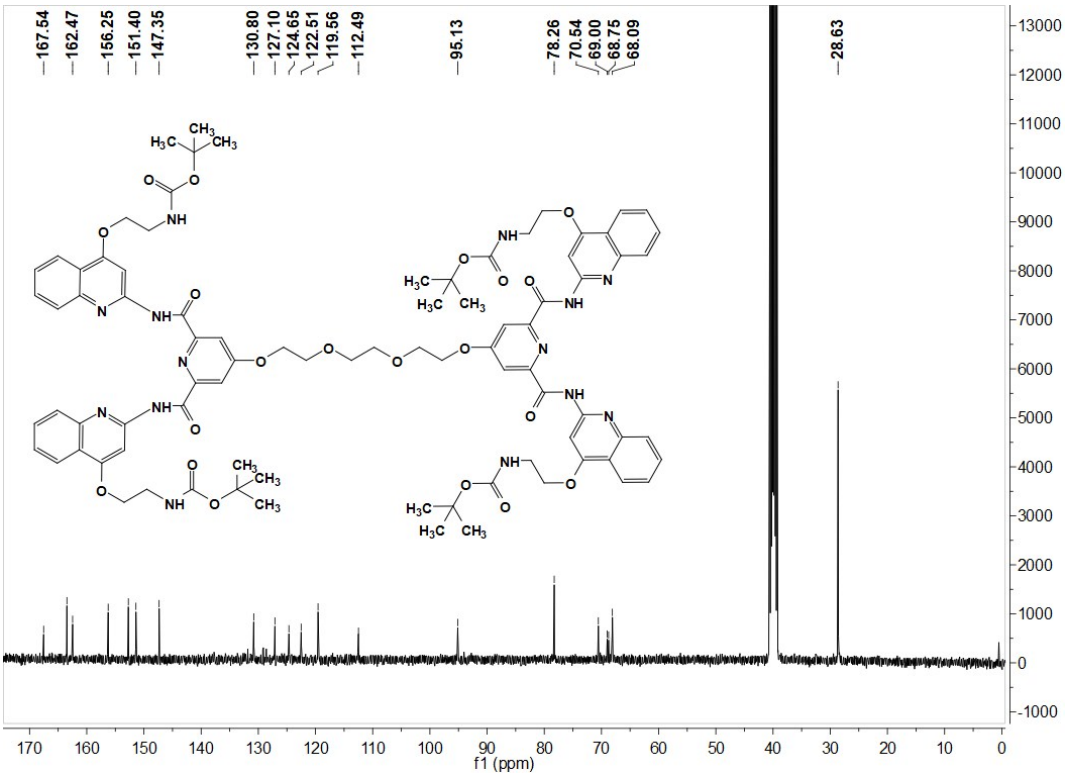


Figure S8 ^{13}C NMR (100 MHz) of compound **6b** in DMSO-d_6.

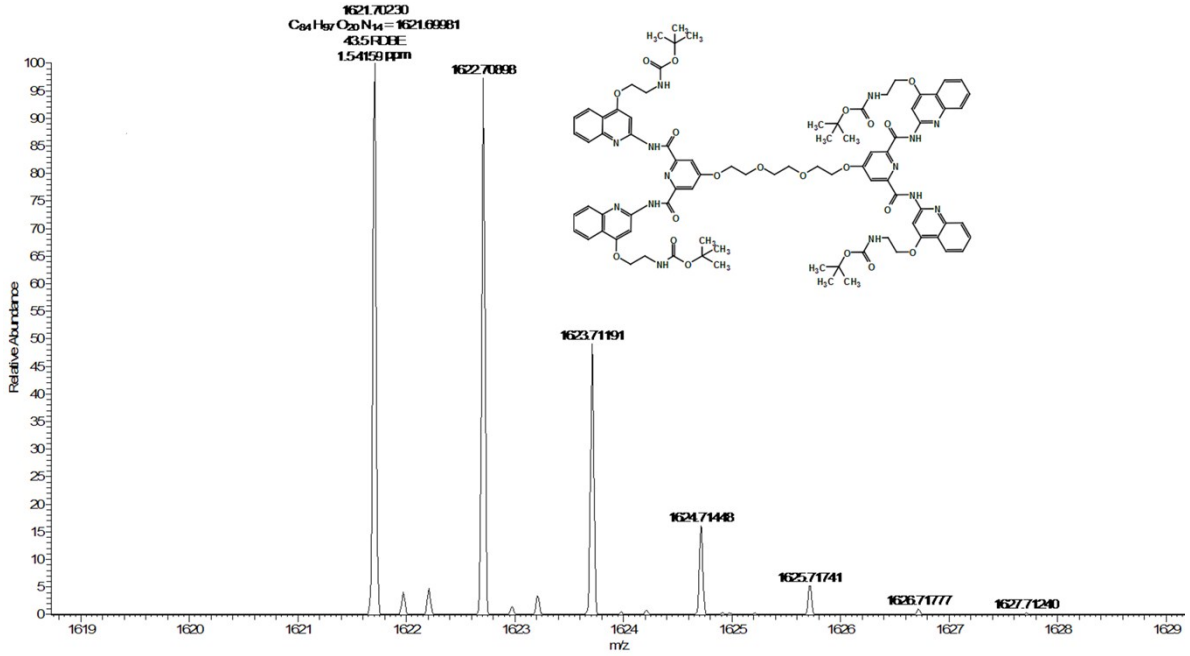


Figure S9 HR-ESI-MS of compound **6b**.

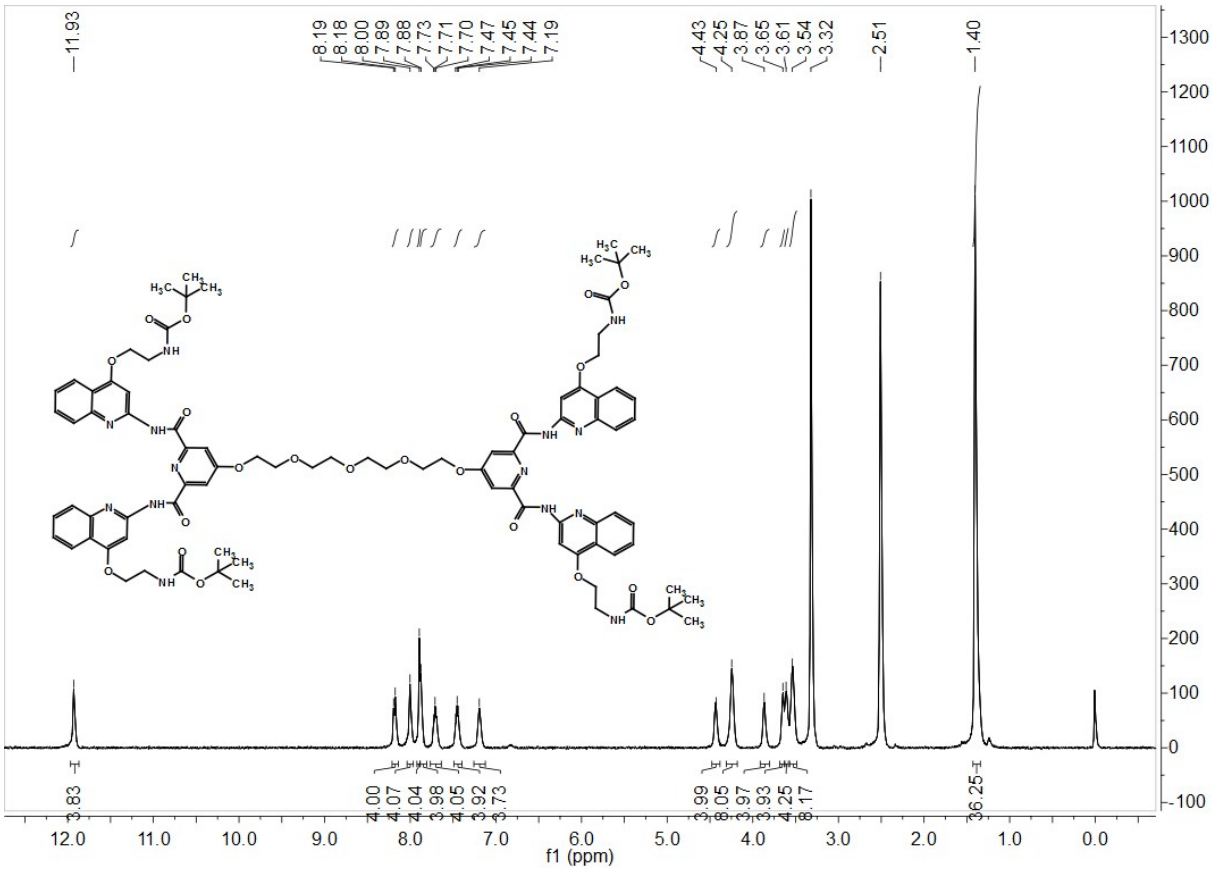


Figure S10 ^{1}H NMR (400 MHz) of compound **6c** in DMSO-d_6.

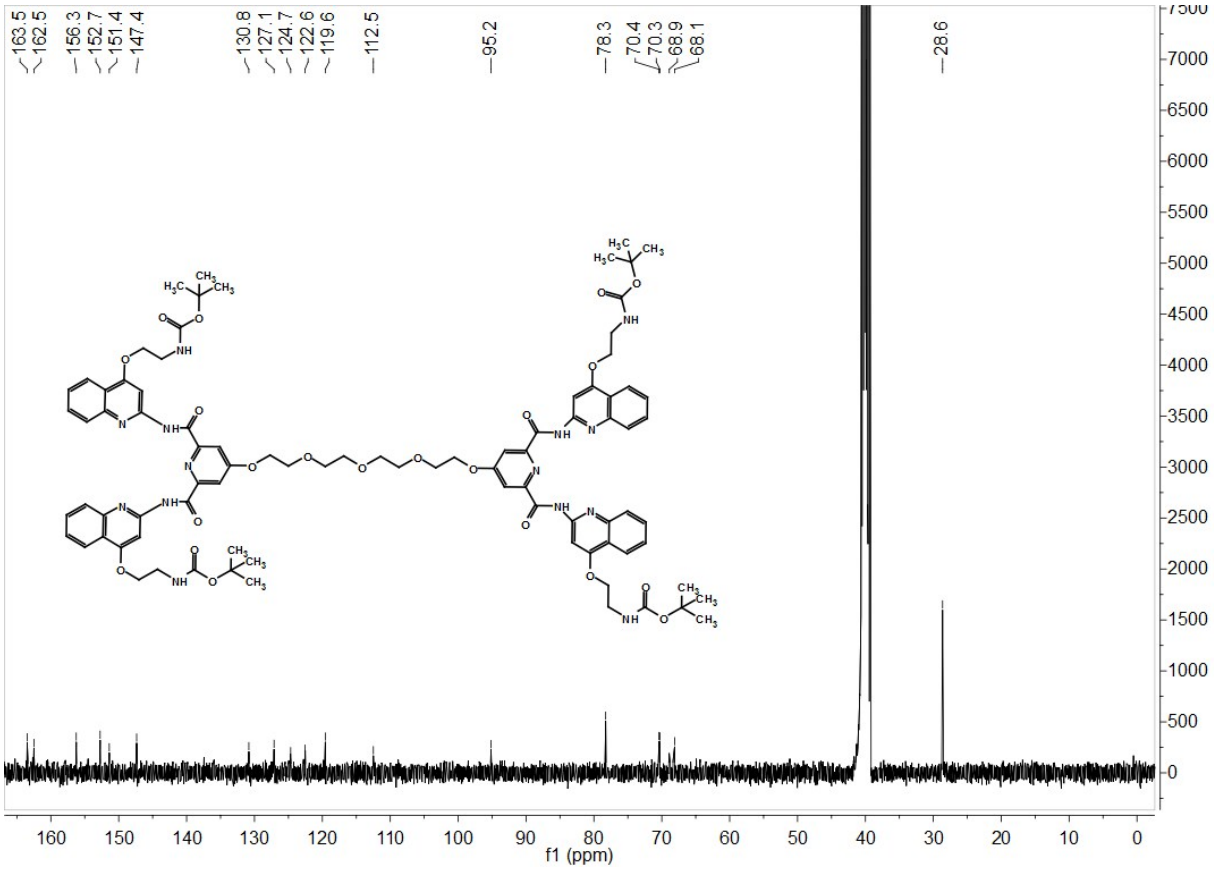


Figure S11 ^{13}C NMR (100 MHz) of compound **6c** in DMSO-d_6.

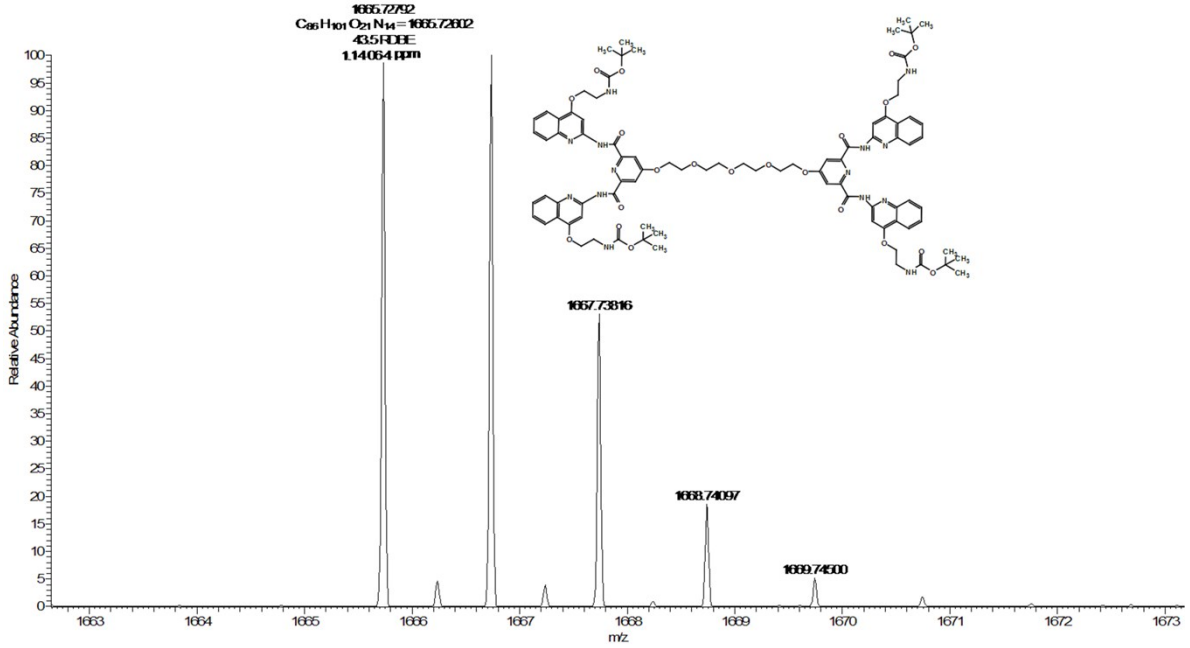


Figure S12 HR-ESI-MS of compound **6c**.

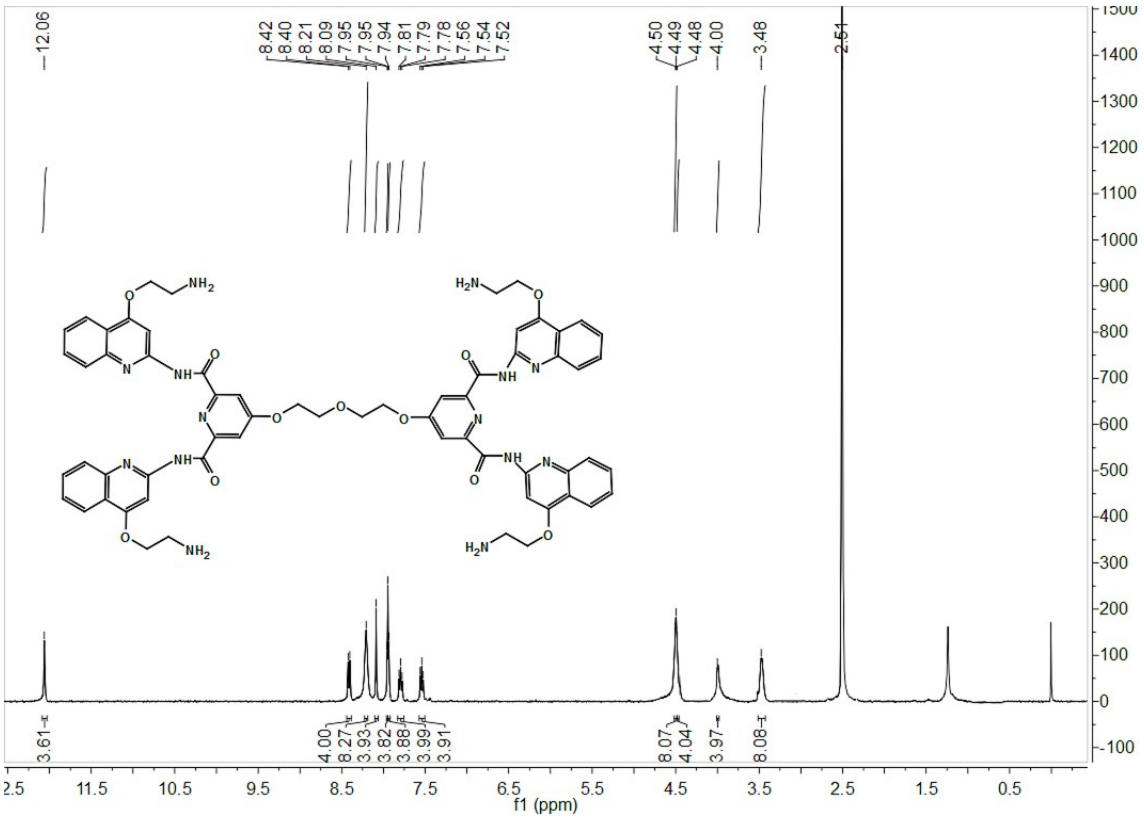


Figure S13 ^{1}H NMR (400 MHz) of dimer **1a** in DMSO-d_6.

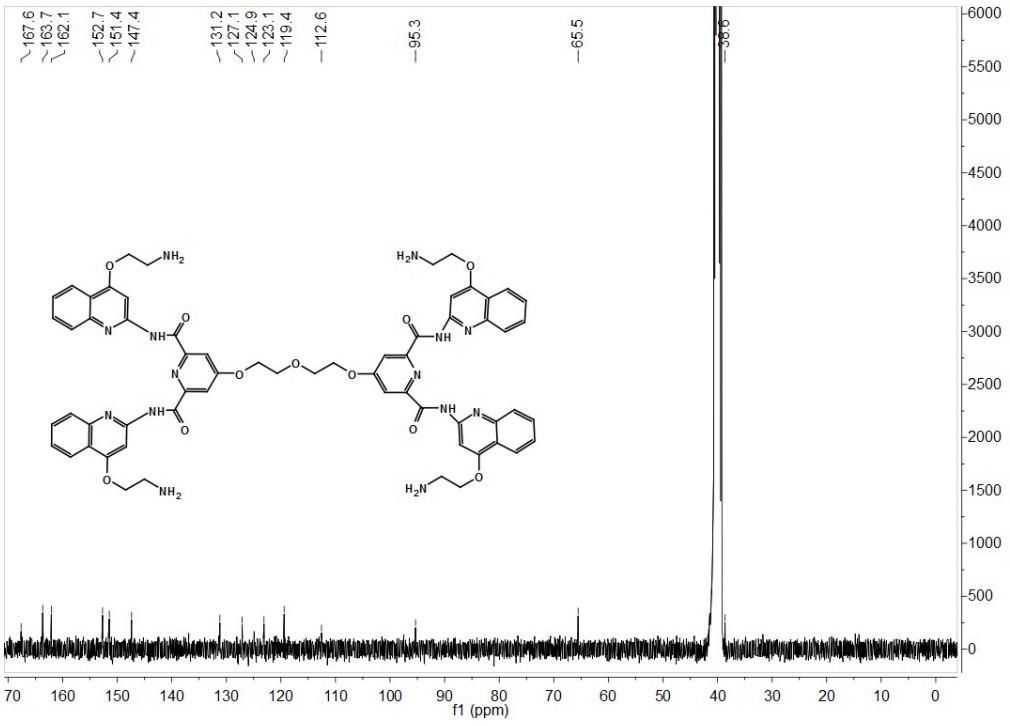


Figure S14 ^{13}C NMR (100 MHz) of dimer **1a** in DMSO-d_6.

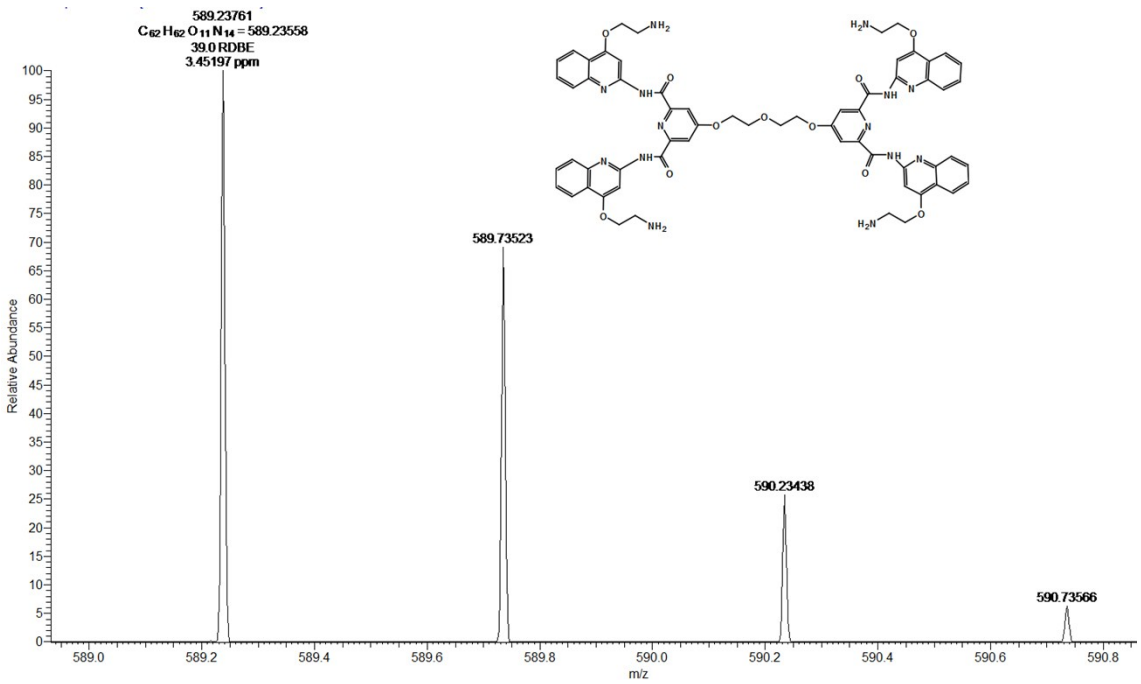


Figure S15 HR-ESI-MS of dimer **1a**.

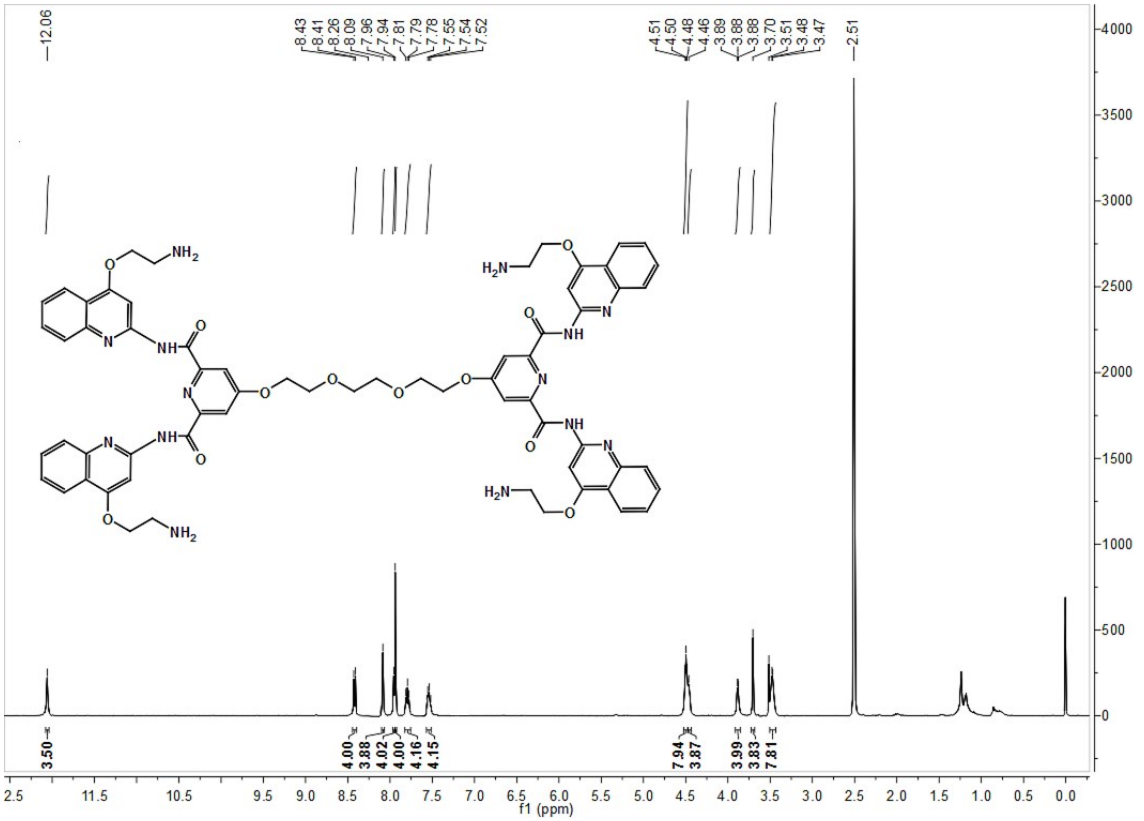


Figure S16 ^{1}H NMR (400 MHz) of dimer **1b** in DMSO-d_6.

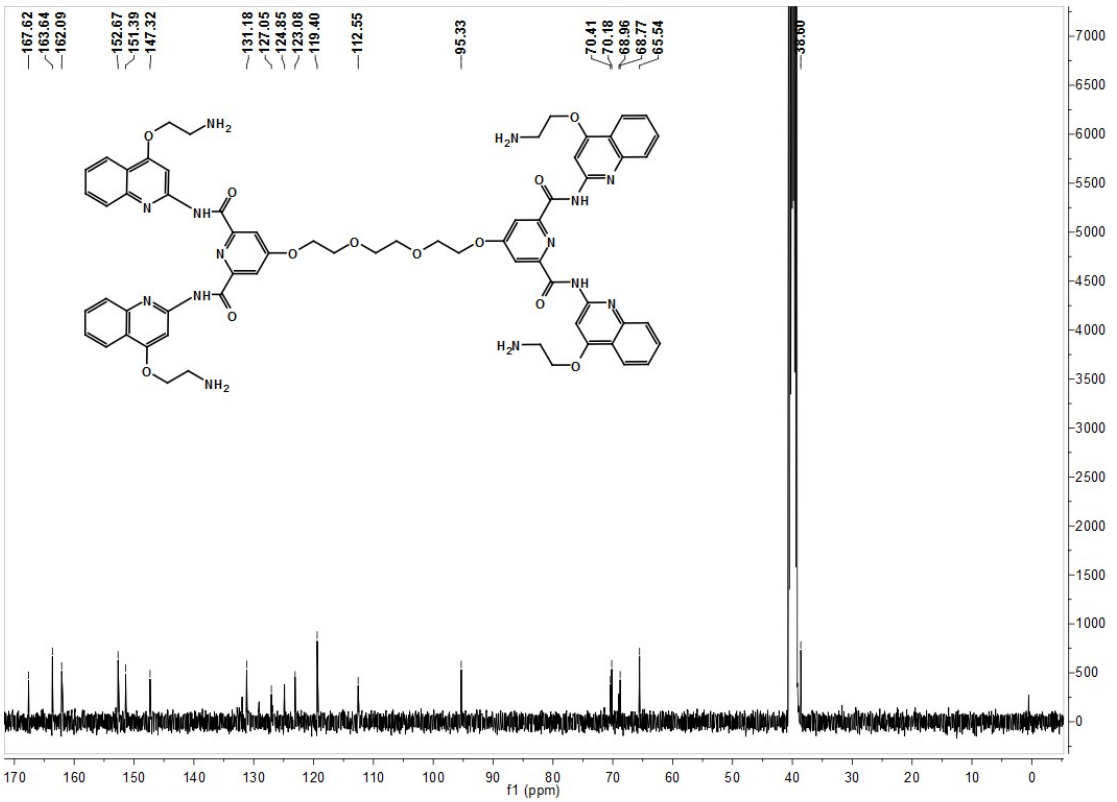


Figure S17 ^{13}C NMR (100 MHz) of dimer **1b** in DMSO-d_6.

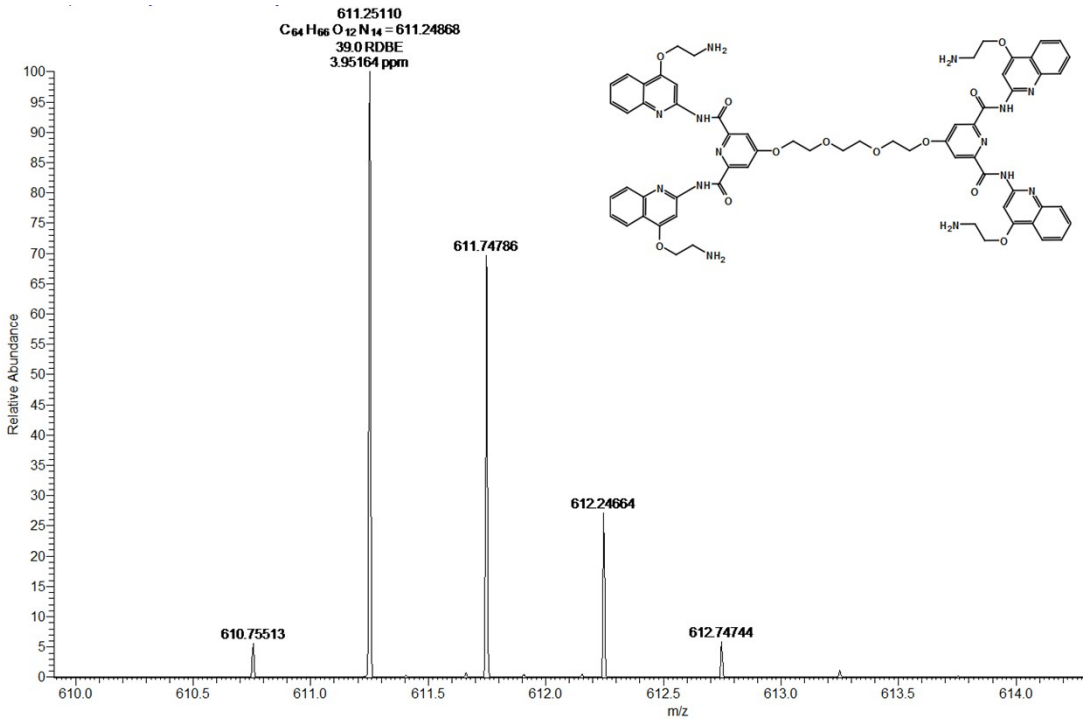


Figure S18 HR-ESI-MS of dimer **1b**.

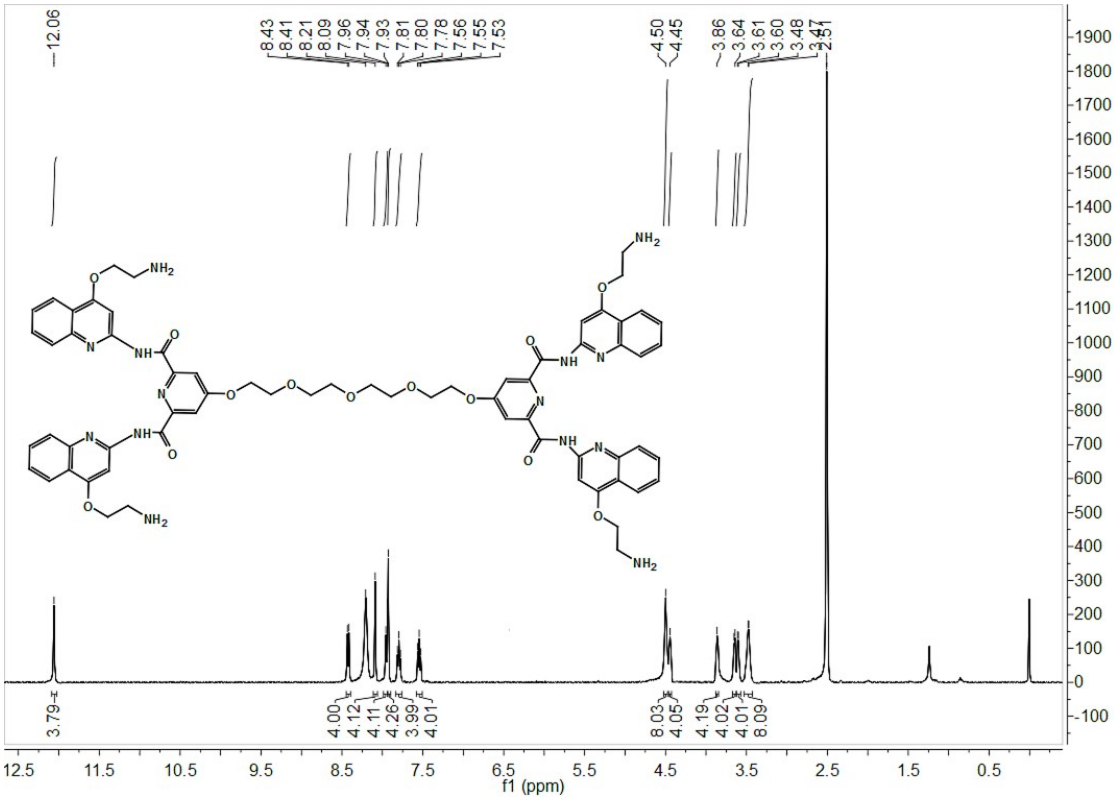


Figure S19 ^{1}H NMR (400 MHz) of dimer **1c** in DMSO-d_6.

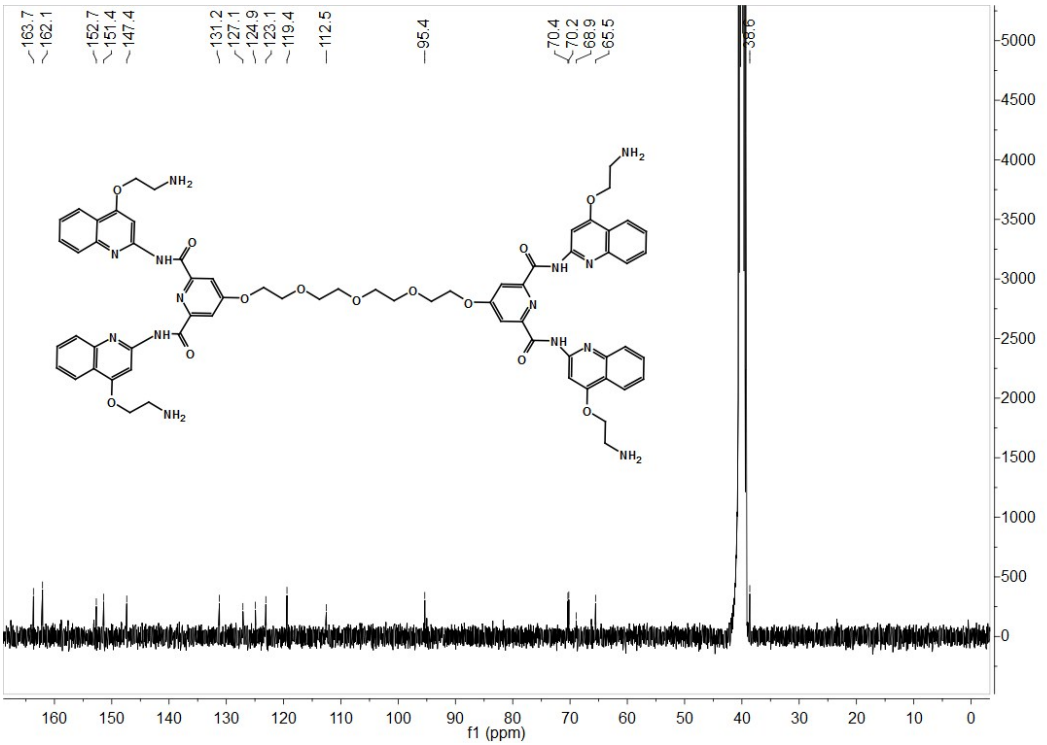


Figure S20 ^{13}C NMR (100 MHz) of dimer **1c** in DMSO-d_6.

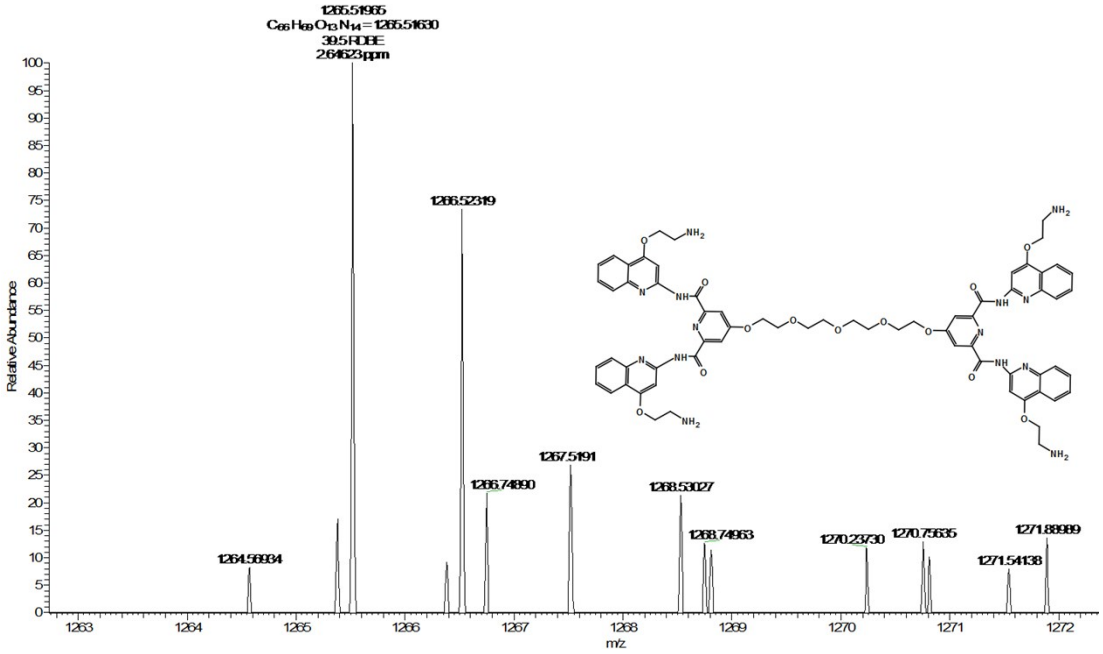


Figure S21 HR-ESI-MS of dimer **1c**.

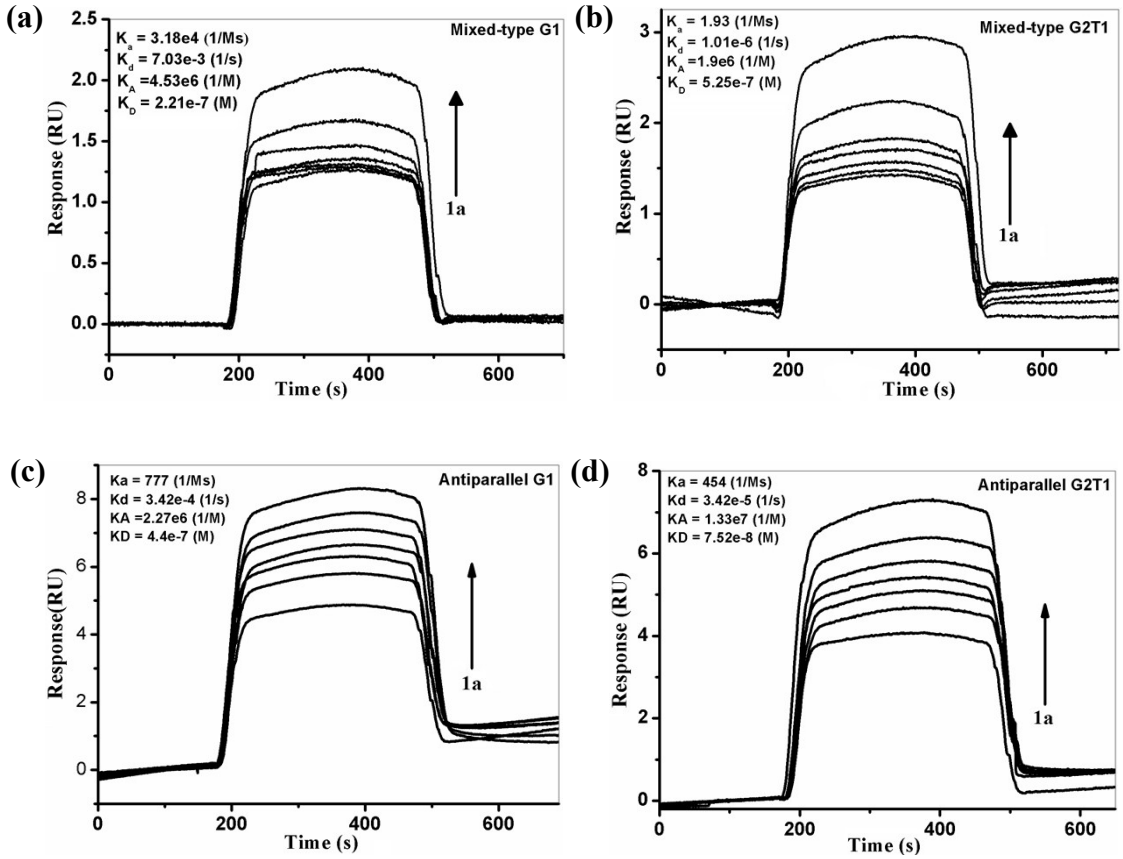


Figure S22 SPR of dimer **1a** towards mixed-type G1 (a), mixed-type G2T1 (b), antiparallel

G1 (c) and antiparallel G2T1 (d).

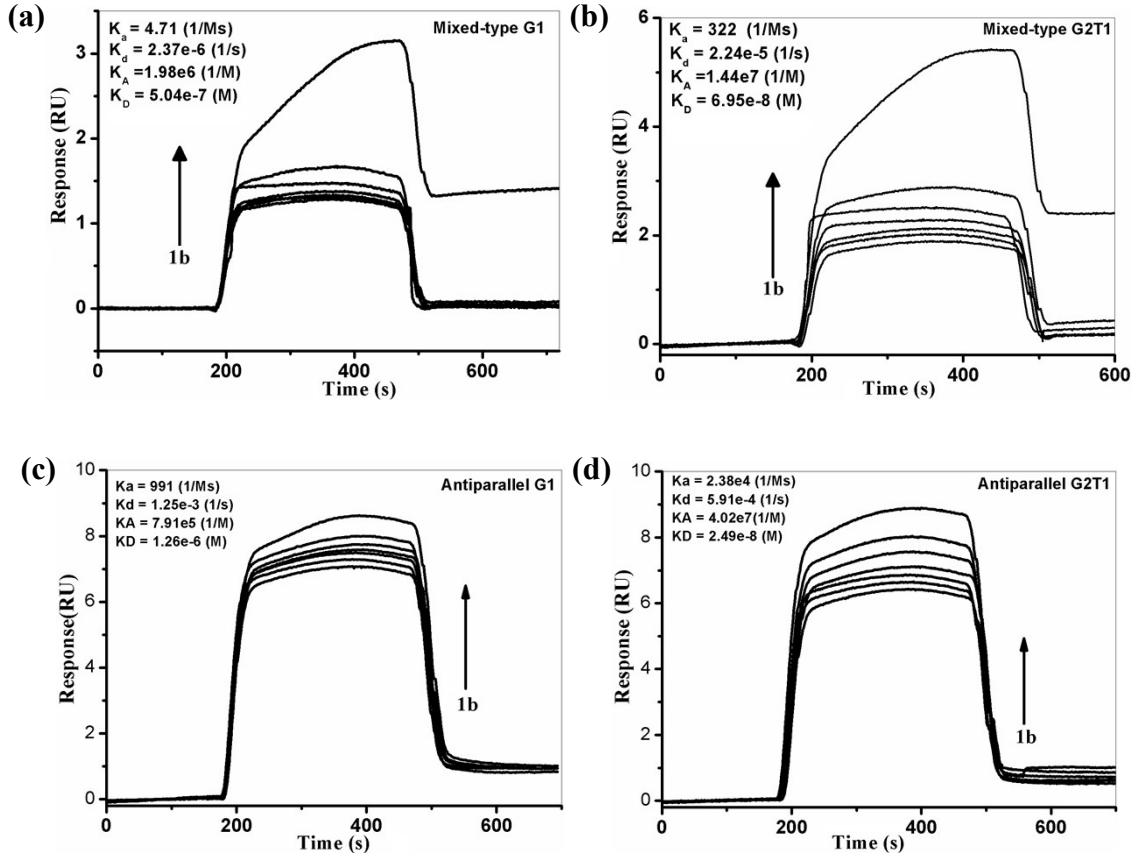
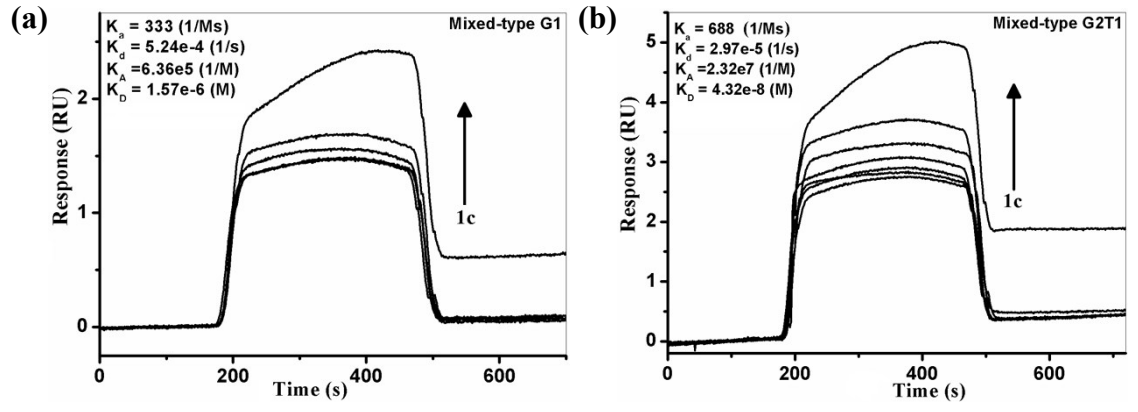


Figure S23 SPR of dimer **1b** towards mixed-type G1 (a), mixed-type G2T1 (b), antiparallel G1 (c) and antiparallel G2T1 (d).



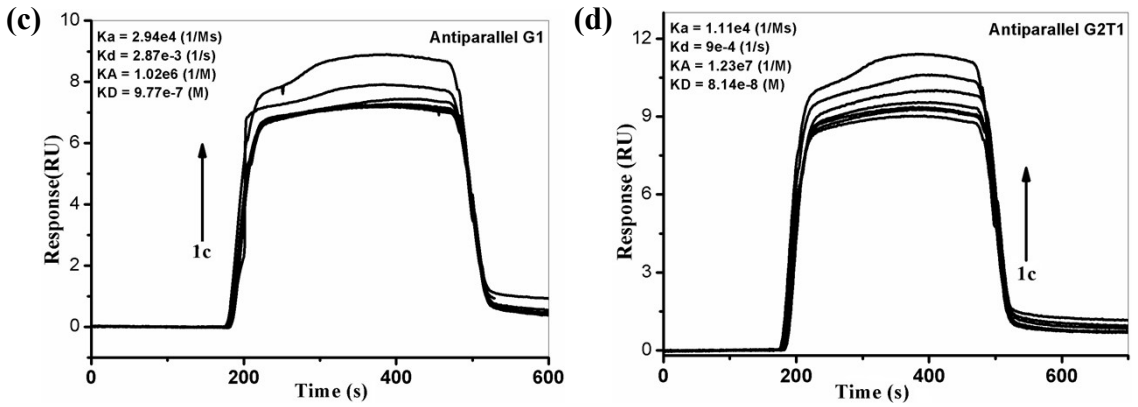


Figure S24 SPR of dimer **1c** towards mixed-type G1 (a), mixed-type G2T1 (b), antiparallel G1 (c) and antiparallel G2T1 (d).

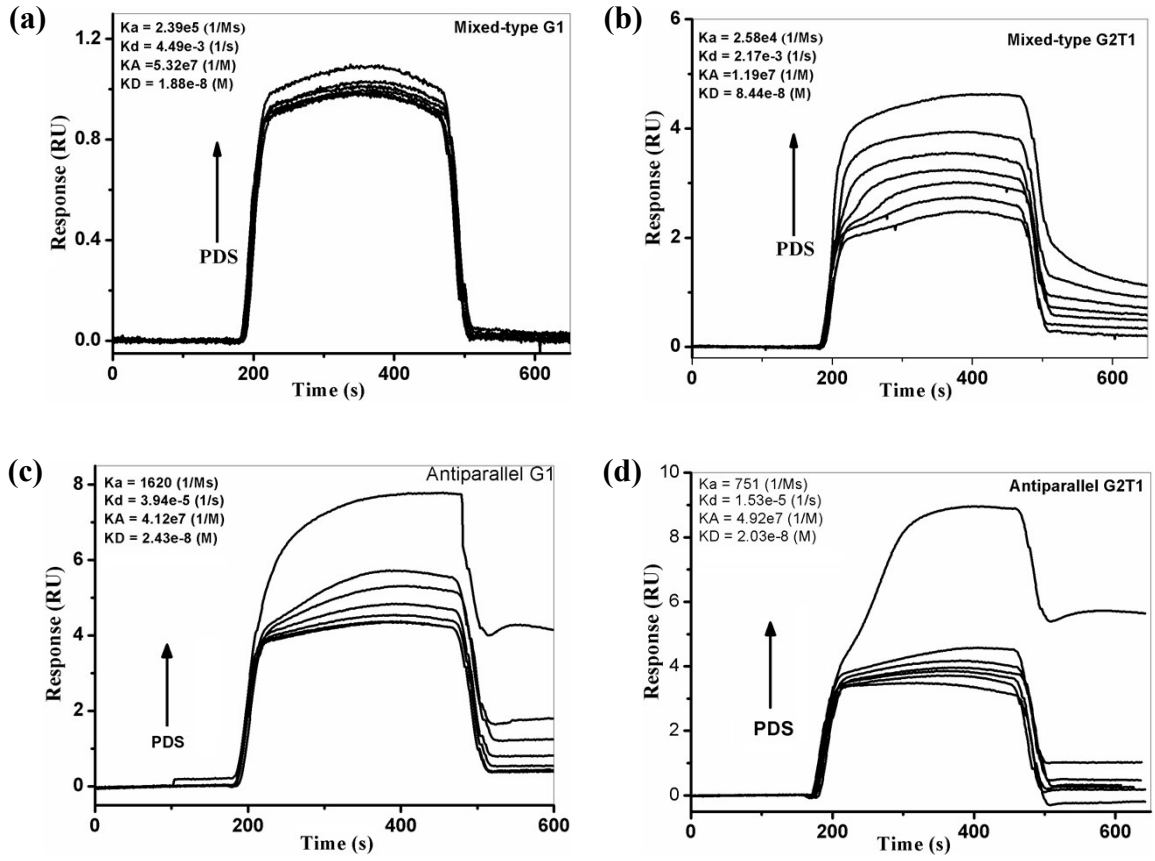


Figure S25 SPR of monomer **PDS** towards mixed-type G1 (a), mixed-type G2T1 (b), antiparallel G1 (c) and antiparallel G2T1 (d).

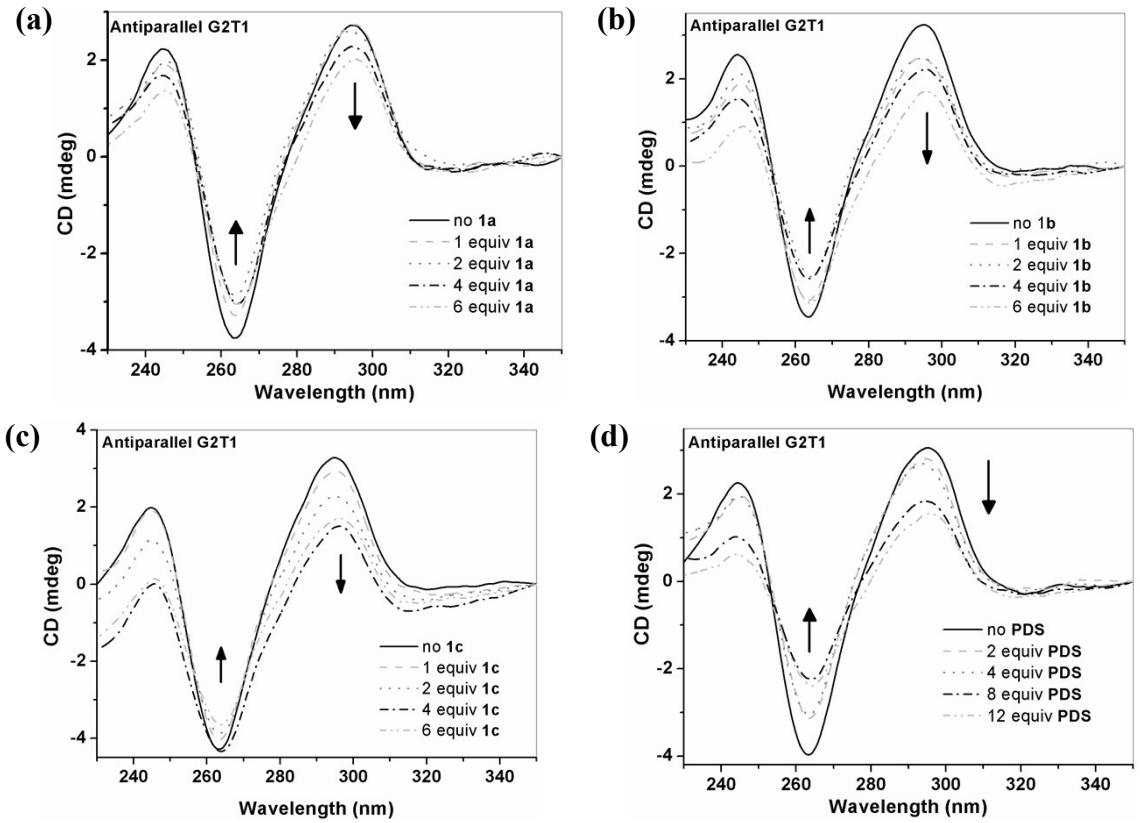


Figure S26 CD spectra of antiparallel G2T1 (5 μM) in 10 mM Tris-HCl and 100 mM NaCl with varying equivalents of dimers **1a** (a), **1b** (b), **1c** (c) and monomer **PDS** (d), respectively.

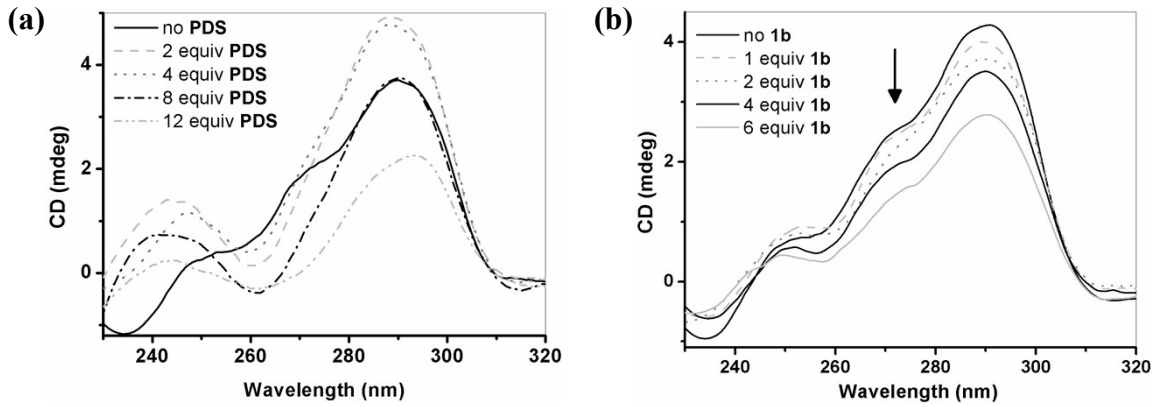


Figure S27 CD spectra of mixed-type G2T1 (5 μM) in 10 mM Tris-HCl and 60 mM KCl (pH 7.0) with varying equivalents of monomer **PDS** (a) and dimer **1b** (b), respectively.

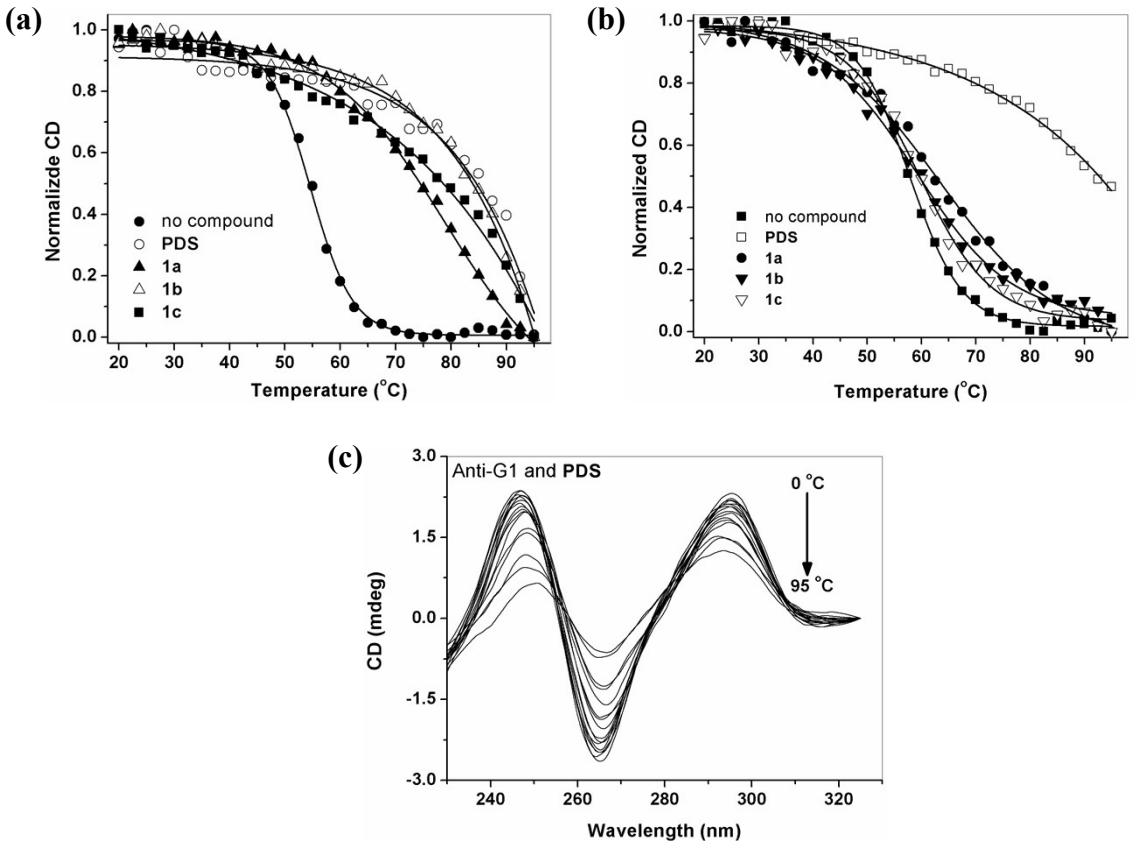


Figure S28 (a) and (b) CD melting profiles at 295 nm for antiparallel G2T1 (10 μM, a) and antiparallel G1 (20 μM, b) in the presence of compounds **PDS** and **1a~c**. (c) CD spectra of antiparallel G1 (20 μM) from 20 °C to 95 °C with monomer **PDS** (120 μM). Buffer: 10 mM Tris-HCl and 100 mM NaCl (pH 7.0).

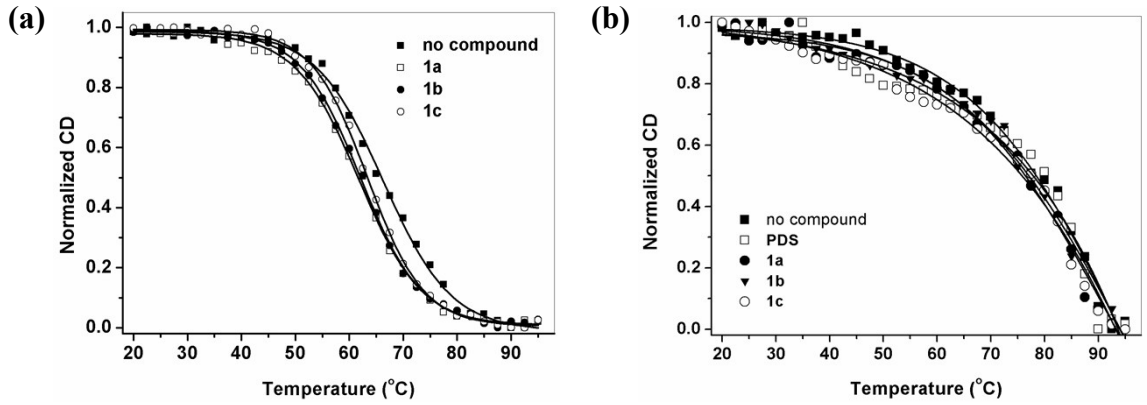


Figure S29 CD melting profiles at 295 nm for mixed-type G1 (20 μM, a) and at 275 nm for ds DNA (20 μM, b) in the presence of monomer **PDS** and dimers **1a~c**. [dimer]:[G1] = 3:1,

[**PDS**]:[G1] = 6:1, [dimer]:[ds DNA] = 3:1, [**PDS**]:[ds DNA] = 6:1.

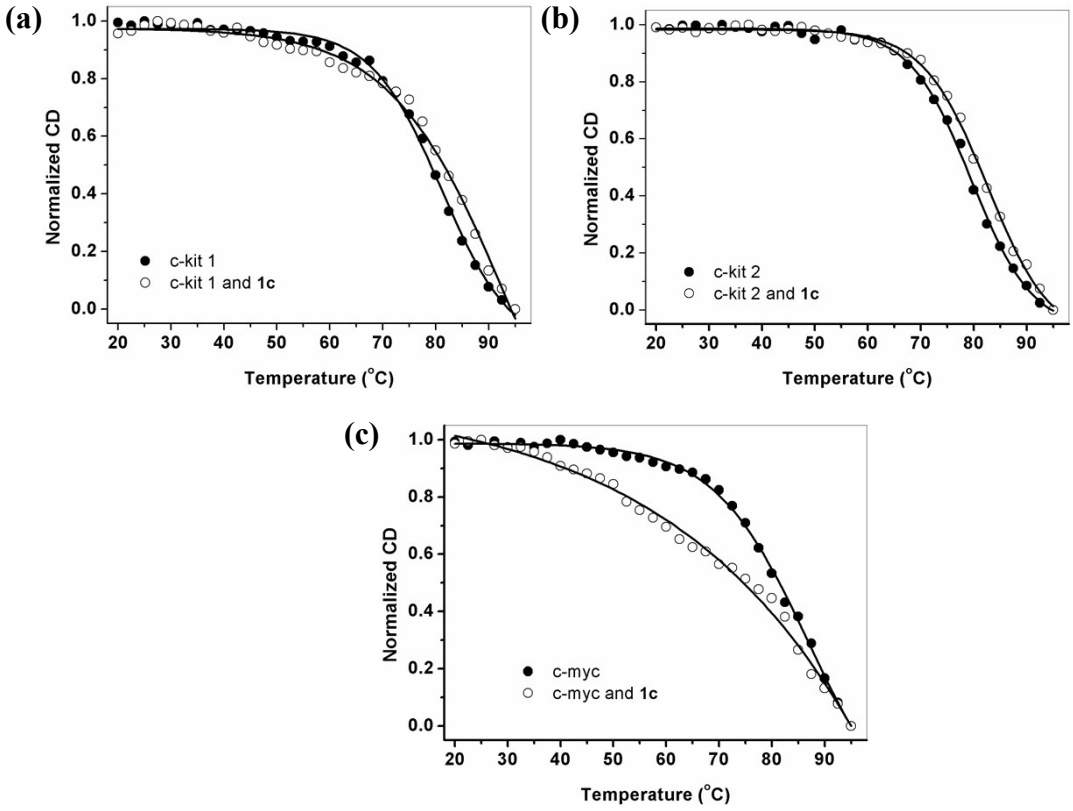
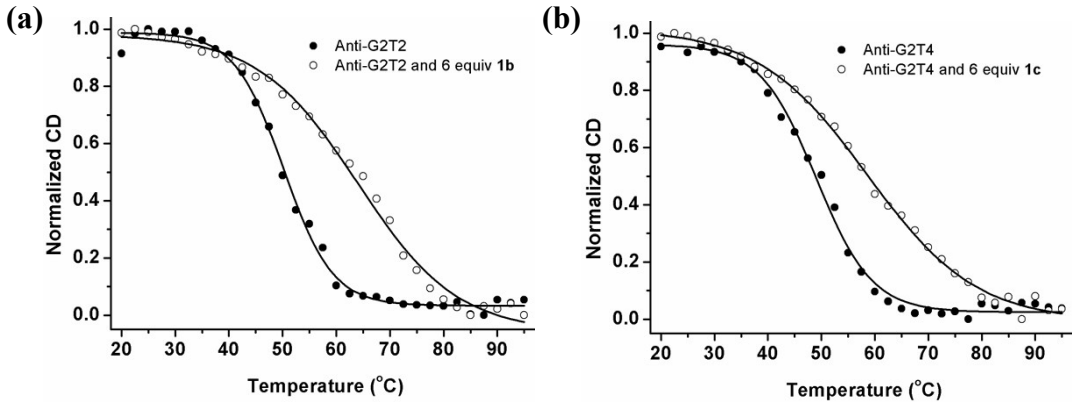


Figure S30 CD melting profiles at 262 nm for c-kit 1 (20 μM, a), c-kit 2 (20 μM, b) and c-myc (20 μM, c) in the presence of dimer **1c** (60 μM).



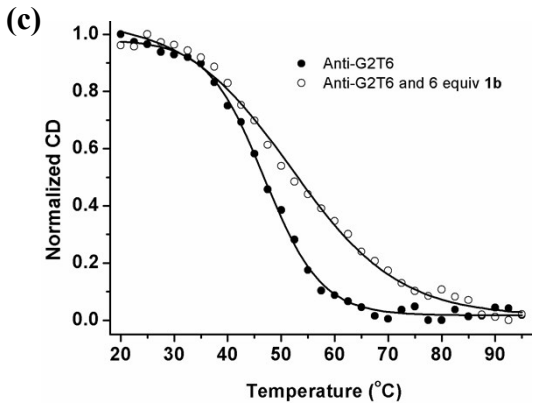


Figure S31 CD melting profiles at 295 nm for antiparallel G2T2 (a), G2T4 (b) and G2T6 (c) in the presence of dimer **1b** in 10 mM Tris-HCl and 100 mM NaCl (pH 7.0).

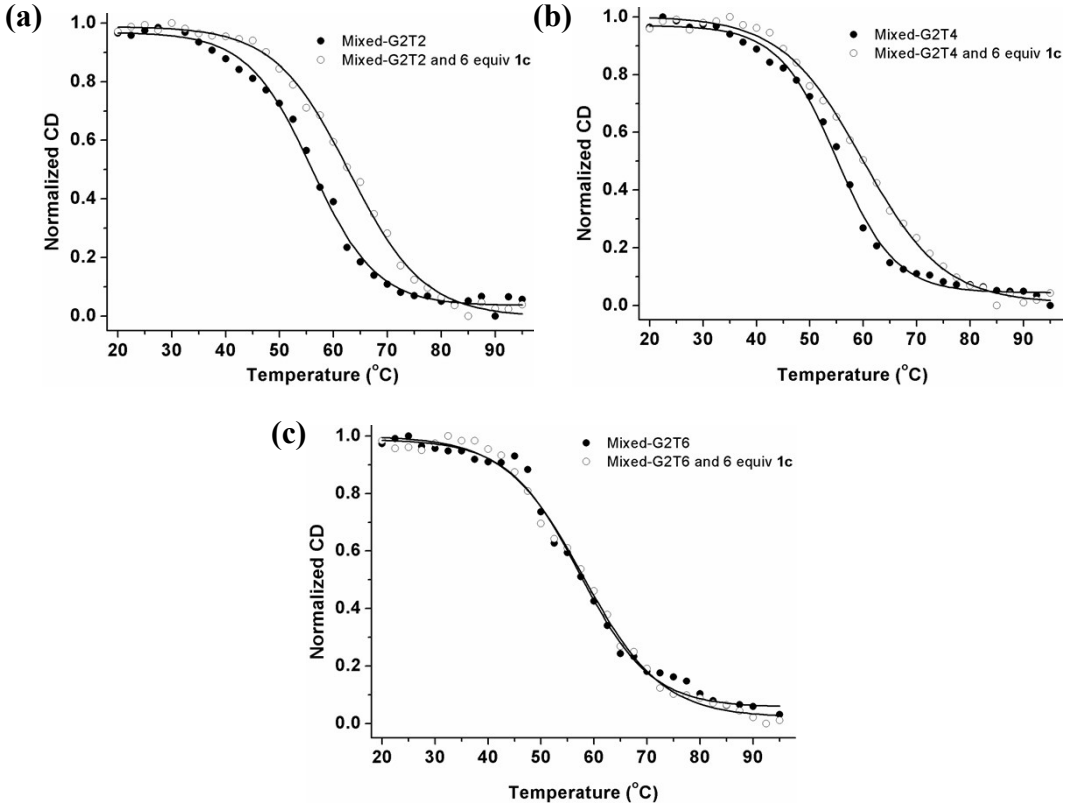


Figure S32 CD melting profiles at 295 nm for mixed-type G2T2 (a), G2T4 (b) and G2T6 (c) in the presence of dimer **1c** in 10 mM Tris-HCl and 60 mM KCl (pH 7.0).

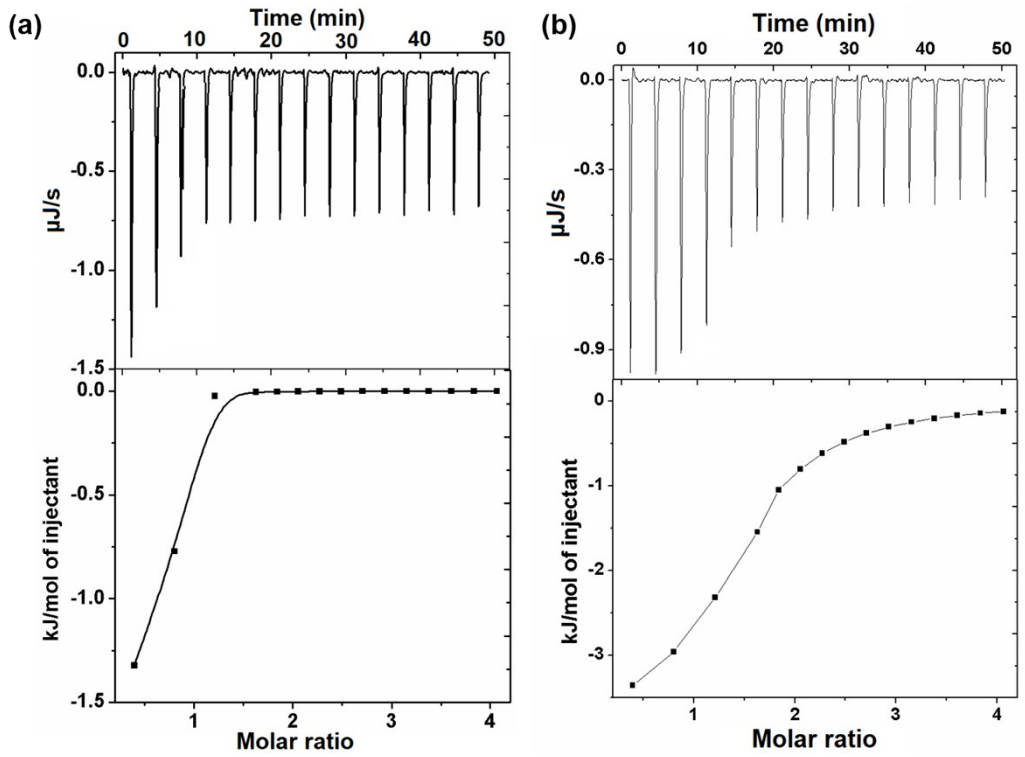


Figure S33 Upper panel shows the isothermal titration plot of dimer **1b** (in cell) with antiparallel G2T1 (a) or G1 (b) (in syrige), whereas the lower panel shows the integrated heat profile of the calorimetric titration plot shown in upper panel. Buffer: 10 mM Tris-HCl, 100 mM NaCl and pH 7.0.

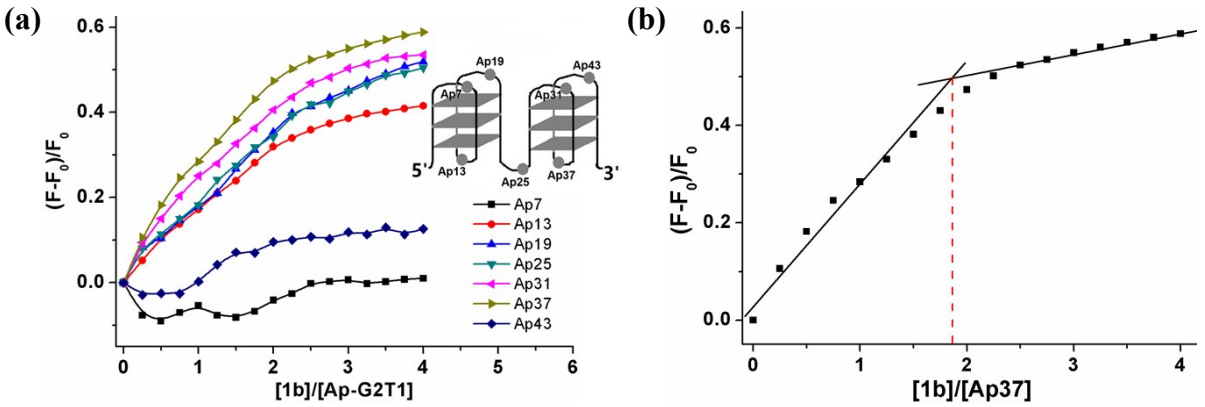


Figure S34 (a) Plot of normalized fluorescence intensity at 370 nm of 2-Ap individually labelled antiparallel G2T1 (Ap7, Ap13, Ap19, Ap25, Ap31, Ap37 and Ap43, respectively) *versus* binding ratio of [**1b**]/[Ap-G2T1]. (b) Plot of normalized fluorescence intensity at 370 nm of Ap37 versus binding ratio of [**1b**]/[Ap37]. Buffer: 10 mM Tris-HCl, 100 mM NaCl

and pH 7.0.

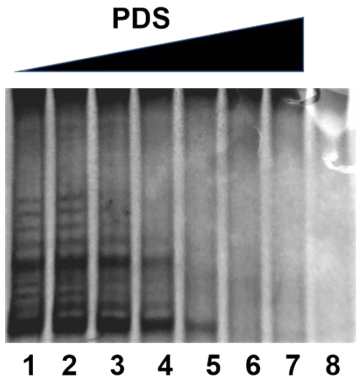


Figure S35 Telomerase inhibition in the presence of monomer **PDS** by TRAP-LIG assay. Lane 1: (+) ve control (no dimer); lanes 2-7: 0.063, 0.125, 0.25, 0.5, 1.0 and 2.0 μM, respectively; lane 8: (-) ve control (no enzyme and dimer).