Supporting Information

Title: Stable G-Quadruplex Structure in a Hydrated Ion pair: Cholinium Cation and Dihydrogen Phosphate Anion

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Materials and Methods.

We purchased $dG_3(T_2AG_3)_3$ from Operon Biotechnologies (Eurofins Scientific S.E., Japan) and used it without further purification. Cholinium dihydrogen phosphate ([ch][dhp]), cholinium dibutyl phosphate ([ch][dBp]) and 1-butyl-3-methylimidazolium dihydrogen phosphate ([C4mim][dhp]) were synthesised by a modified method of the previous one.[1] Phosphocholine calcium chloride solution was treated on an anion exchange resin (Amberlite IRN78), and then on an cation exchange resin (Tulsion-93). After treatment, the solvent was evaporated and the product was dried under reduced pressure. *n*-Tetrabutylphosphonium glycine salt ($[P_{4,4,4,4}]$[Gly]) was synthesised by the

method as described in a literature.[2] Synthesised products were identified with ^{1}H NMR, DSC, and electrospray mass spectrometry. 1-Butyl-3-methylimidazolium tetrafluoroborate ([C4mim][BF_4]), ammonium sulfate, guanidine hydrochloride, trichloroacetic acid, and other chemicals were all purchased from Kanto Chemical Co. Ltd.

Solutions of $dG_3(T_2AG_3)_3$ were prepared at 10 μM in all solvents. All samples and control were prepared and kept at 90 ^{o}C for 5 min, then cooled slowly down to room temperature before measurements.

The CD spectra of the G-quadruplex were obtained using a J-720 spectropolarimeter (JASCO Co., Ltd., Japan) at 20 ^{o}C with a 1.0 mm path length quartz cell. The measurement was carried out with wavelength range between 230 and 350 nm at a rate of 200 nm/min. Each spectrum was obtained as an average of five scans. For thermal denaturation studies, the samples were heated with rate of 1 ^{o}C/min from 20 ^{o}C.

References

[1] K. Fujita, D. R. MacFarlane, M. Forsyth, M. Yoshizawa-Fujita, K. Murata, N. Nakamura, H. Ohno, *Biomacromolecules* **2007**, *8*, 2080.

[2] J. Kagimoto, K. Fukumoto, H. Ohno, *Chem. Commun.*, **2006**, *21*, 2254

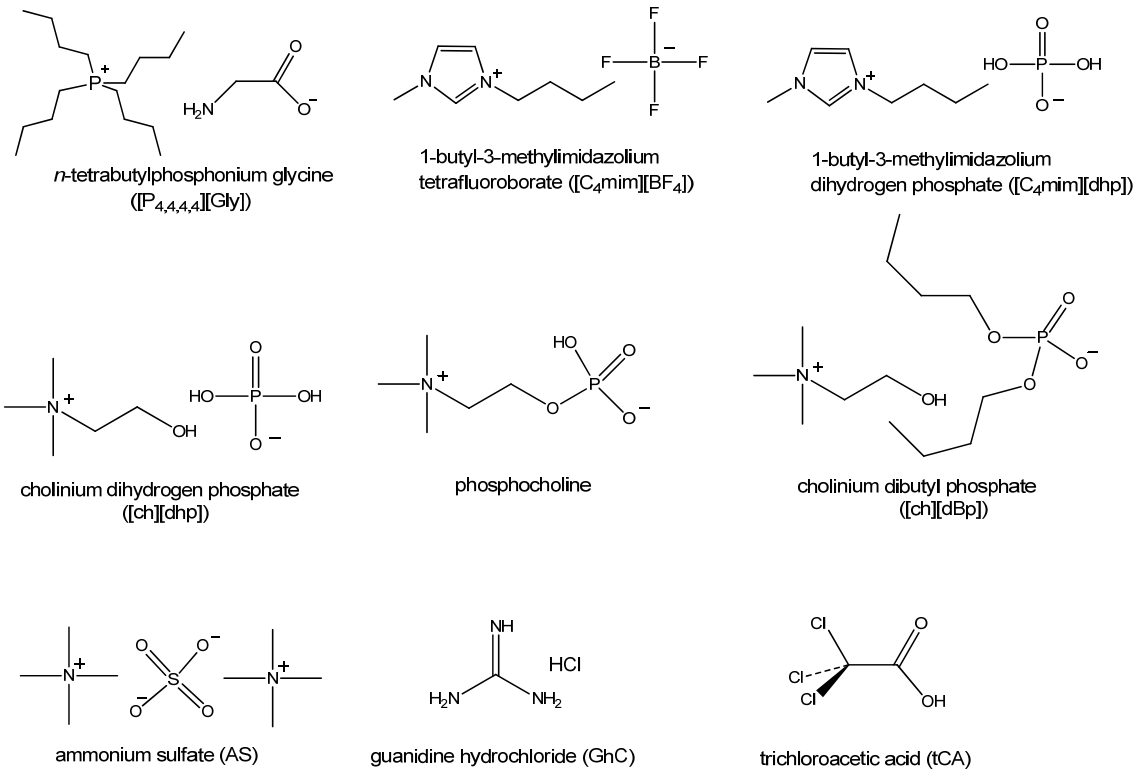

Figure S1. Structure of cations and anions for ILs examined in this study.

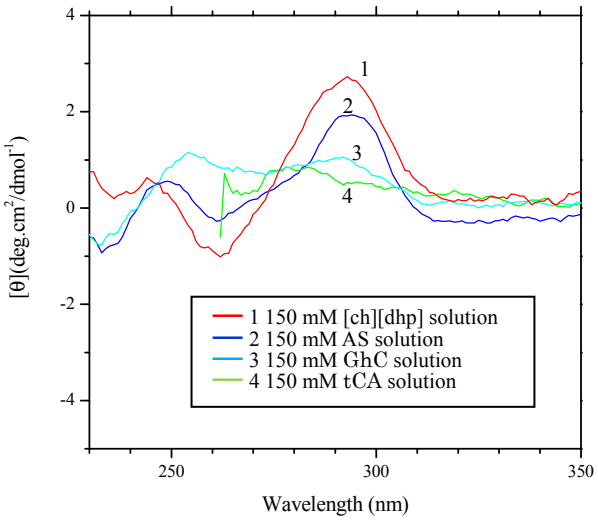

Figure S2. CD spectra of $dG_3(T_2AG_3)_3$ in aqueous solution with 150 mM [ch][dhp] and organic salts.

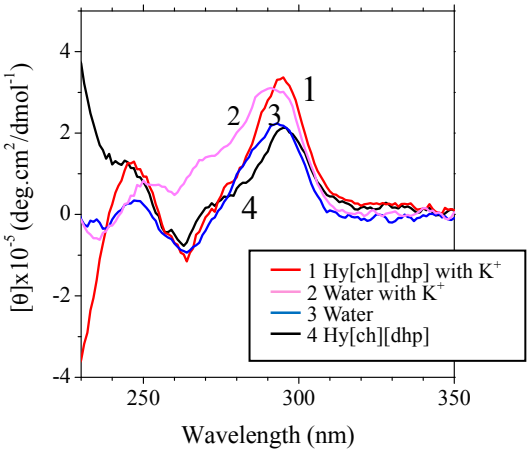

Figure S3. CD spectra of $dG_3(T_2AG_3)_3$ in water and Hy[ch][dhp] with and without potassium ion.