

Poster Presentations

[MS5-P35] **Binding of a G-quadruplex from *Streptococcus pneumoniae* to [Ru(phen)2dppz]²⁺** Sarah P. Gurung, James P. Hall, Christine J. Cardin, John A. Brazier,

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Ruthenium polypyridyl complexes have recently been shown to interact with a range of nucleic acid structures.[1-3] ([Ru(phenanthroline)2dipyrido[3,2-*a*:2',3'*c*]phenazine]²⁺) emits luminescence brightly in the presence of duplex DNA and acts as a “light switch” for G-quadruplexes.[3] A racemic mixture of Λ - and Δ - [Ru(phen)2dppz]²⁺ was added to an in-house synthesised G-quadruplex forming sequence, d(GGGCTAATAGGGAGAGCAGGGACGGG), which is predicted (via QuadFinder) to form within 14 strains of *Streptococcus pneumoniae* but in varied locations. The nucleotide search tool, blastn, shows that *Streptococcus pneumoniae* and *Streptococcus pseudopneumoniae* are the only identified bacteria within which the particular G-rich sequence is always present. The binding of the complex to the G-quadruplex was studied under UV-Vis over a temperature range (20-90°C) both with/out dilute K⁺ where the quadruplex formed readily in K⁺ (100 mM).[4] The sequence complementary to the G-quadruplex, the i-motif, was also synthesised and its UV-Vis spectra showed stability, as indicated by the presence of protonated-cytosine base pairs,[5] under acidic conditions with a mean melting temperature (T_m) of 46°C. Binding of the complex to the i-motif will be studied. Structures of these two sequences from *Streptococcus pneumoniae* are to be examined with circular dichroism (CD) spectroscopy and their crystallisation attempts to be made with [Ru(phen)2dppz]²⁺ as well as other Ru-containing complexes, which, if positive with the capability to diffract well, could help understand the notion of i-motifs as possible therapeutic targets.

- [1] Hall J.P., O’Sullivan K., Naseer A., Smith J.A., Kelly J.M. & Cardin C.J. (2011). *PNAS*. **108**, 17610-17614
- [2] Niyazi H., Hall J.P., O’Sullivan K., Winter G., Sorensen T., Kelly J. M. & Christine J. Cardin. (2012). *Nature Chemistry*. **4**, 621-628
- [3] Shi S., Zhao J., Geng X., Yao T., Huang H., Liu T., Zheng L., Li Z., Yanga D. & Jia L. (2010) *Dalton Trans.* **39**, 2490–2493
- [4] Kan Z., Lin Y., Wang F., Zhuang X., Zhao Y., Pang D., Hao Y. & Tan Z. (2007). *Nucleic Acids Research*. **35**, 3646-3653
- [5] Brazier J.A., Shah A. & Brown G.D. (2012). *Chem. Commun.* **48**, 10739-10741

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