Synthesis and DNA interactions of binuclear ruthenium complexes derived from the metallo-supramolecular cylinder structure.

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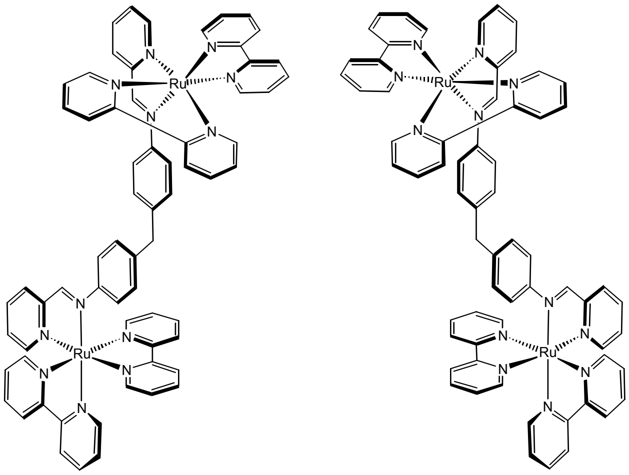
Previous work at Warwick has used supramolecular chemistry to design agents which are of similar size and shape to natural biomolecule recognition units. In particular a 4^+ charged di-iron triple helicate has demonstrated strong non-covalent binding and has also shown exciting possibilities in that it intramolecularly coils up DNA.[1] A more robust alternative to the di-iron helicate has been developed in this work where two ‘ruthenium tris chelates’ have been linked into one unit with a single long linker ligand common to both metals (see below).



Δ, Δ   Λ, Λ

Fiqure 1 Enantiomers of the dinuclear complex Ru_2Bpy_4L

Stereochemically pure enantiomers of the dinuclear ruthenium (II) complexes have been generated and their effects on DNA structure investigated. The binding behaviour of the bimetallo ruthenium enantiomeric forms with DNA has been investigated using UV, fluorescence, circular dichroism as well as linear dichroism spectroscopies. Attention has also been devoted to the synthesis of polypyridyl-based dinuclear ruthenium (II) complexes that bind to DNA by intercalation.

1. Meistermann, I.; Moreno, V.; Prieto, M. J.; Moldrheim, E.; Sletten, E.; Khalid, S.; Rodger, P. M.; Peberdy, J. C.; Isaac, C. J.; Rodger, A.; Hannon, M. J., Intramolecular DNA coiling mediated by metallo-supramolecular cylinders: differential binding of P and M helical enantiomers. *Proceedings of the National Academy of Sciences of the United States of America* **2002,** 99, (8), 5069-5074.