Abstract

The central idea behind the present project was the synthesis of the cationic di- and trinucleotide analogs with a positively charged Pt^{2+} backbone. The nucleobases can attach to the metal centers either through

a) N1 (unsubstituted isocytosine base), via

b) N9 (unsubstituted guanine base),

c) N7 (9-EtGH) or

d) N9 (7-MeGH)

These cationic oligonucleotides are expected to be kinetically robust. Moreover, the nucleobases attached to the metal centers are forced in a more or less coplanar orientation and the hydrogen bonding properties are usually maintained. The cationic oligonucleotides can function as antisense and antigene reagents due to their ability to bind both DNA and RNA targets with high specificity and affinity.

The ligands of choice for the present work were common and rare nucleobases such as isocytosine, guanine, 9-ethylguanine and 7-methylguanine. These ligands were studied with regard to the effects of metallation on hydrogen bonding properties and tautomerism.

As it turned out, the planned fixation of a suitable metal entity to a particular site of a nucleobase or to a particular tautomer of a nucleobase in most cases is anything but trivial. Understanding factors which determine the reactivity of individual nucleobase tautomers toward metal species eventually proved to be essential.