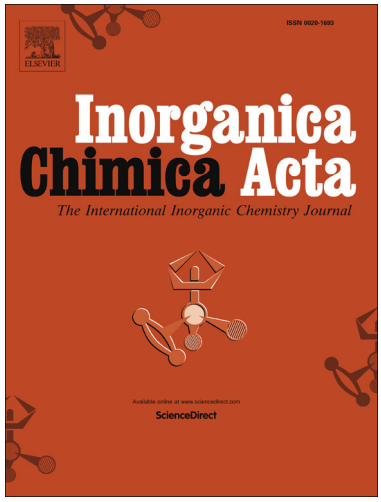

Preface

Metal-Nucleic Acid Interactions: State of the Art

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PII: S0020-1693(16)30142-6
DOI: http://dx.doi.org/10.1016/j.ica.2016.03.039
Reference: ICA 16974

To appear in: *Inorganica Chimica Acta*

Please cite this article as: B. Lippert, J. Müller, Metal-Nucleic Acid Interactions: State of the Art, *Inorganica Chimica Acta* (2016), doi: http://dx.doi.org/10.1016/j.ica.2016.03.039

Preface

Metal-Nucleic Acid Interactions: State of the Art

This is the first special issue of *Inorganica Chimica Acta (ICA)* dealing with aspects of metal ion interactions with nucleic acids or their constituents, respectively. Previous special issues of *ICA* on the use of metal compounds in medicine and in particular on the treatment of cancer touched the topic of the present volume in a way that the mode of action of these compounds in many cases involved DNA binding. Inevitably, medicinal aspects of metal-nucleic acid binding are also relevant to contributions in this special issue, yet these do not represent the major focus. This volume rather tries to reflect the numerous facets this field has gained since its start some 60 years ago.

Because of their polyanionic nature, DNA and RNA require cations, and notably metal ions such as K^+, Na^+, and Mg^{2+} for (partial) charge neutralization. In addition, if more firmly bonded, these metal ions are responsible for the stabilization of particular tertiary structures, e.g. in ^{t}RNA or RNA in general, in triplex and quadruplex structures, as well as for catalytic functions, e.g. in ribozymes or DNAzymes. Systematic studies of the interaction of nucleic acids with non-physiological metal ions, notably Ag^+, Hg^{2+}, and RHg^+, started in the 1950s. Originally pioneered by physicochemists and biochemists, the field soon attracted coordination chemists as well. This development was spurred by the emergence of a new field called Bioinorganic Chemistry and certainly, a decade later, by the discovery of the antitumor activity of Pt coordination complexes by the biophysicist Barnett Rosenberg. The advent of routine X-ray crystallography as well as the availability of NMR spectroscopic methods greatly assisted this development.

Not all ideas and concepts on metal-nucleic acid interactions put forward in the early days of this research stood the test of time, but many did! For example, the view that the exocyclic amino groups of the nucleobases cytosine, adenine, and guanine bind transition metal ions through their "lone" electron pairs eventually proved wrong, but the proposal of Sidney Katz that Hg^{2+} binding to