

Preface

Metal ions and metal complexes have long been recognized as critically important components of nucleic acid chemistry both in regulation of gene expression and as promising therapeutic agents. Understanding how metal complexes interact with DNA has become an active research area at the interface between chemistry, molecular biology and medicine. In this volume, we attempt to bring together topics that span the breadth of this large area of research. The book is divided into four parts presenting recent developments in the field: Part A, *Basic Structural and Kinetic Aspects*, contains four chapters focusing on sequence-selective metal binding to DNA, thermodynamic models, metal coordination in G-quadruplexes and supramolecular networks of metal-nucleobases. Part B, *Medical Applications*, contains six chapters with the main focus on anticancer platinum drugs. Among the themes are the following: the role of interligand interactions, DNA repair in antitumour effects of platinum drugs, telomers and telomerase as potential targets, photodynamic therapy, and synthesis and applications of platinated oligonucleotides for control of gene expression. A new and exciting field presented in Part C, *DNA Recognition: Nucleases and Sensors*, describes probes for DNA recognition, artificial restriction agents, metallo-DNAzymes for metal sensing applications and metal-ion-dependent catalysis in nucleic acid enzymes. Part D, *Toxicological Aspects*, deals with structural studies of mercury-DNA interactions, chromium-induced DNA damage and repair and the effect of arsenic-induced carcinogenicity.

It has not been possible to cover all the topics that might find a place in a comprehensive coverage of metal-DNA interactions. The field is rapidly growing, spurred by significant improvements in experimental techniques. The applications of state-of-the art NMR spectroscopy, electrophoretic techniques, atomic force microscopy (AFM), etc. have dramatically expanded our knowledge on metal-DNA interactions during the last decade. The book presents pertinent up-to-date information for research scientists involved in, for example, the development of new and less toxic anticancer metallodrugs, the development of chemical nucleases and

sensors, and the field of environmental and toxicological chemistry. Each chapter is written by experts on the various topics, and we hope this edition will prove to be a valuable contribution to the scientific community.

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