

Noble Metals in Medicine

Transition Metal Complexes as Drugs and Chemotherapeutic Agents

BY NICHOLAS FARRELL, Kluwer Academic Publishers, Dordrecht, 1989, 291 pages, ISBN 90-277-2828-3, Dfl.180.00, £59.00

A number of books dealing with the biological activity, particularly the therapeutic activity, of metal complexes have been published in recent years. Interest in the field has been promoted by the clinical use of a number of precious metal complexes, including platinum anti-cancer, gold anti-arthritis and silver anti-bacterial agents. Now a useful new addition to the literature has been published, somewhat oddly, as Volume 11 in the series "Catalysis by Metal Complexes".

In addition to an introduction and appendices the book contains 12 chapters, the first six of which are devoted primarily to the anti-tumour activity of metal complexes, an area to which the author has made a number of interesting contributions through his publications on platinum complexes. After discussing the variety of interactions possible between metal complexes and DNA, two chapters are devoted to the discovery and development of platinum anti-tumour agents. As is inevitable due to the length of time required to complete a book of this type, the author is unable to provide details of the most recent work, such as the clinical development of the second generation platinum drugs, but provides a broadly based review of structure-activity studies.

A detailed account of the interaction of platinum complexes with DNA components and its relevance to the molecular mechanism of their anti-tumour action is followed by a chapter on platinum-pyrimidine blues. Although these compounds are unlikely to achieve clinical use because of their lack of homogeneity and variability in synthesis, they are of chemical interest due to their unusual oligomeric structure incorporating platinum atoms of differing oxidation states.

A chapter on the anti-tumour properties of other metal compounds emphasises the variety of structures for which activity has been noted,

generally having mechanisms of action different from that of cisplatin. In some cases metal ions are acting by enhancing cellular uptake of active ligands, a principle which is exemplified several more times in subsequent chapters dealing with anti-bacterial, anti-viral and anti-arthritis activity.

The utilisation of the redox properties of metal compounds is illustrated by a chapter devoted to metal ions as mediators of the anti-tumour action of antibiotics such as the bleomycins. Binding of a metal ion, for example iron(II), to the antibiotic is believed to be involved in generating activated oxygen species leading to oxidative cleavage of DNA.

Another chapter discusses the interaction of metal complexes with radiation in biological systems, through which increased effectiveness of radiotherapy may be achieved; while a miscellany of applications including the use of metal compounds as diuretics and vasodilators is given in the final chapter.

Throughout the book the author is keen to emphasise the diversity of mechanisms by which different metal complexes exert their action, while at the same time noting that compounds are often active against a number of disease states, for example cisplatin, although this has utility only in the treatment of cancer.

The book is clearly written and structured so that each chapter stands alone with its own introduction, summary and references. Information is included on the historical development of metal-based chemotherapy and overall the book provides an excellent series of pieces for use in support of undergraduate courses as well as providing suitable introductory material for graduate students setting out on research in this field. Students using the book will also find a useful list of abbreviations, a glossary of terms and definitions and an appendix dealing with DNA structure.

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