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Book reviews

Ruthenium and Other Non-Platinum Metal Complexes in Cancer Chemotherapy; numerous contributors, Progress in Clinical Biochemistry and Medicine, Vol. 10, Springer-Verlag, Berlin, 1989, 226 pages, DM 138. ISBN 3-540-51146-6.

This volume contains the plenary lectures of a symposium on Ruthenium and Other Non-Platinum Metal Complexes in Cancer Chemotherapy held in Trieste. Despite the title, the first chapter is devoted to a review of the mechanism of action of *cis*-platin. This has been extremely extensively studied in the last ten years, and it is thought that the site of action of cytotoxic ruthenium complexes is the same as for the platinum derivatives.

The second section, by Michael J. Clarke, initiates the discussion of ruthenium chemistry relevant to the design of anti-tumour ruthenium complexes. The site of action is DNA, and modes of binding have been studied. Redox chemistry seems to be considerably more important here than for the platinum complexes. The next two sections discuss the action of specific ruthenium complexes, both *in vitro* and *in vivo*, and studies towards an understanding of their mechanism of action. Ruthenium complexes seem to be generally less toxic than the platinum derivatives in current clinical use, but do require the use of higher doses for effective action.

The next section, by N. Farrell, discusses the use of metal complexes as radiosensitisers. These compounds are used to enhance the effect of radiotherapy, particularly in resistant hypoxic cells. A wide range of complexes is considered, together with the variety of mechanisms by which they act. Diagnostic tumour imaging is the subject of the next review, using particularly radioruthenium labelled compounds. ^{97}Ru has considerable potential for applications which require periodic or delayed imaging for several days following a single clinical administration. New and more reliable sources of this isotope will make significant amounts available for clinical studies.

The review, by P. Köpf-Maier, of the anti-tumour action of transition metal and main group metal cyclopentadienyl complexes represents the only truly organometallic chemistry in this volume. There is some overlap with another review from the Köpf-Maier group, published in *Structure and Bonding*, Vol. 70, but less than one might initially have feared. I am not quite sure how an expert in a fairly narrow field, with few competitors, solves the problem of being asked to give effectively the same plenary lecture, or write effectively the same review, several times. The intended audience in this case, at least, is substantially different.

The final chapters are all relatively brief, but all clearly show much promise for the future. NMR relaxation footprinting makes use of the $[Cr(NH_3)_6]^{3+}$ cation as a probe for the structural features of oligonucleotides, before and after drug binding, and it seems that a wide range of phosphine complexes of the Group VIII metals have antitumour action. The final section discusses Budotitane, diethoxy bis(1-phenyl-1,3-dionato)titanium(IV), as an anti-tumour agent.

As always from this publisher, the volume is very well produced with clear typeface and figures. The author index for volumes 1–10 of the series is included, but there is no subject index. Those working in this field will find this a stimulating volume. Moreover, inorganic and organometallic chemists will also find much of interest, and may well realise that there are aspects of their own work which could have applications in a clinical context.

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Transition Metal Complexes as Drugs and Chemotherapeutic Agents; by Nicholas Farrell, Catalysis by Metal Complexes, Vol. 11, Kluwer Academic Publishers, Dordrecht, 1989, xii + 291 pages, Dfl. 180.00, $89.00, £59.00. ISBN 90-277-2828-3.

This book presents an overview of the uses of transition metal complexes in medicine. Main group complexes are excluded from the discussion, but the author notes that there is much information on these systems in the volume entitled *Organometallic Compounds and Living Organisms*, by J.S. Thayer.

After a brief introduction, the first chapter deals with the interaction of metal complexes with DNA. The biological background and the techniques used for the study of these systems are well introduced, and both the direct binding and the intercalation of metal complexes are discussed. The next four chapters are devoted to consideration of platinum anti-tumour drugs, with the range of complexes tested, structure–activity relationships, interaction with DNA, and the platinum blues occupying most of the discussion. This is a good clear account, and an excellent introduction to the subject. Chapter 6 reviews the anti-tumour effects of complexes of other metals, notably the others of the platinum group, copper, silver and gold, and some transition metal cyclopentadienyl complexes.

Chapter 7 moves on to consider metal-mediated antibiotic action, with a particular focus on the naturally occurring compound bleomycin. Chapter 8 is entitled "Metals, Metal Complexes and Radiation", and most of the discussion centres on the use of metal complexes as radiosensitisers for tumour radiotherapy.

The use of metal complexes as antibacterial agents is discussed in Chapter 9; most of the work discussed uses silver or mercury compounds, but rhodium and platinum complexes are also becoming important. Antiviral and antiparasitic effects are considered in Chapter 10, with mention of many notable successes against trypanosomes. Amongst the earliest modern large-scale clinical uses of metal complexes were the uses of gold drugs in treatment of arthritis. The role of the gold, discussed in Chapter 11, is probably in interfering with the natural thiol/sulphide balance. A final chapter presents a few isolated examples of medical applications which did not fit in readily elsewhere.

There is a useful list of names and abbreviations, and one of terms and definitions, and these are particularly helpful to the chemist struggling with clinical terminology. Appendices give the structure of the main DNA and RNA bases, and discuss the mouse tumour models which are often used as preliminary screens for potential anti-tumour agents. There is a clear and useful index, and chapter references seem to run well into 1987.