

More to life than C,N,H and O

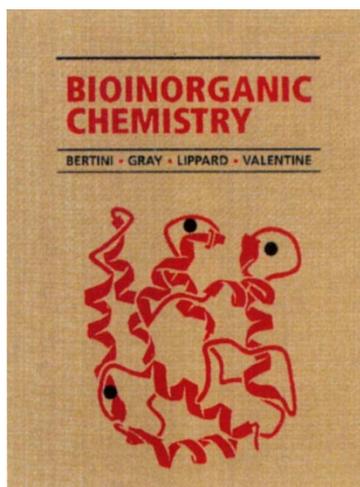
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Bioinorganic Chemistry

Edited by Ivano Bertini, Harry B Gray, Stephen J Lippard & Joan Silverstone Valentine. University Science Books, 20 Edgehill Road, Mill Valley, California 94941 (Distributed in Europe, the Middle East and Africa by W.H. Freeman and Co. Ltd, 20 Beaumont Street, Oxford, UK.): 1994. 592 pages, £ 28.95; \$58.00

On seeing the title of this book I looked forward to reading about what I take to be the heart of bioinorganic chemistry: the involvement and modelling of inorganic elements in biological processes. I was encouraged in this belief by the foreword which told me that the book contained material suitable for a graduate course, or even an undergraduate course for bright students, on the subject. I was in for a mild shock. The editors clearly think the topic is nothing like so general and can be summarised in nine chapters on particular research areas limited by the personal interest of chosen authors. From my point of view it is as if they had decided to describe the mountain ranges of the earth in terms of some particular high hills the authors had themselves climbed. Thus the book lacks the coherence one must expect from its title and hence cannot be said to be suitable as a course book.

Let me explain immediately that taken as a set of reviews on special areas in bioinorganic chemistry it has much of value. This can be seen by looking at the list of authoritative contributors and the titles of their articles. The book opens with Theil and Raymond on "Transition-Metal Storage, Transport and Biomineralisation" and is followed in succession by "The Reactive Pathways of Zinc Enzymes and Related Biological Catalysts" (Bertini and Luchinat), "Calcium in Biological Systems" (Forsén and Kordel), "Biological and Synthetic Dioxygen Carriers" (James and Ibers), "Dioxygen Reactions" (Valentine), "Electron Transfer" (Gray and Ellis), "Ferredoxins, Hydrogenases and Nitrogenesis: Metal Sulphide Proteins" (Stiefel and George), "Metal/Nucleic-Acid Interactions" (Barton), "Metals in Medicine" (Lippard).



Nobody can doubt the ability of these authors separately to cover their chosen topics but everybody knows the risk built into multi-author 'course' books relative to single author texts. Each author rides a hobby-horse and over-stresses his or her contribution forgetting the supposed general nature of the subject and often not attempting a balanced view. Thus the chapter by Bertini and Luchinet over-stresses the contribution of spectroscopic techniques to our knowledge of zinc enzymes and the chapter on electron transfer gives the impression that theories are more important than the knowledge of the electron transfer processes themselves. Here there is also a hobby-horse, that a through-bond theoretical description is better than a through dielectric-medium approach. This is advocacy not suitable for a course book unless it happens to be right — but is it? As yet, who knows?

So what is bioinorganic chemistry? It must perforce contain the selective binding of elements to ligands of all shapes and sizes, both in model

systems and in biology; the properties and kinetic differences between elements and how they too are put to special use; and all the elements important in biological systems. The stress in this book on a very few elements, especially Fe, Zn and Ca, often in special systems, gives the wrong impression. There has to be considerable, if not equal, weight given to the elements Na, K, Mg, Si, P, S, Cl, Mn, Co, Ni, Cu and Se not to mention V, Mo, W and I if the subject is to be seen in perspective.

The book has two other peculiar and very different faults. The chapters appear to have been written, as judged by text and references at about the end of 1989 with a few bits of more recent knowledge added (in proof?). Secondly the colour plates are stuck all together in the middle of the book no matter to which chapter they belong as in a book on flowers or birds. Is this a good idea or are the plates an afterthought too?

To conclude: if you wish to read about some aspects of the bio-inorganic chemistry of in particular three or four elements and some features of such topics as DNA reactions with inorganic complexes and inorganic drugs then there are some good reviews here. For a course book on bioinorganic chemistry however you must look elsewhere. In fact a good, short and simple text for a bright undergraduate or graduate has yet to be written. The subject is no longer young and is becoming of ever increasing importance. It needs a chemist with a broad, overall view to write it, especially for the young.

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