Book Review

Zinc Enzymes (Metal Ions in Biology, Vol. 5), T. G. Spiro Editor, John Wiley, New York, 1983, 359 + ix pages, ISBN 0-471-89081-2

The fifth volume of the 'Metal Ions in Biology Series', edited by T. G. Spiro, is devoted to zinc enzymes. It comprises chapters on 'Zinc in Biology and Biochemistry' (B. L. Vallee), 'Carboxypeptidase A' (B. L. Vallee, A. Galdes, D. S. Auld and J. F. Riordan), 'Carbonic Anhydrase' (S. Lindskog), 'The Role of Zinc in Alcohol Dehydrogenase' (H. Eklund and C.-I. Bränden), 'Molecular Properties and Mechanism of Alkaline Phosphatase' (J. E. Coleman and P. Gettins), 'The Role of Zn(II) in RNA and DNA Polymerases' (J. E. Coleman) and 'Roles for the Metal Ion in Reactions of Coordinated Substrates and in Some Metalloenzymes' (N. E. Dixon and A. M. Sargeson).

The reader is introduced to the field by paradigmatic zinc enzymes. Solution studies in combination with the elucidation of three-dimensional structures have placed these zinc enzymes among the best-characterized enzymes. Transition metal ions have been used as spectroscopic reporter groups to study the role of the catalytic zinc ions in these enzymes. This methodology has attracted many inorganic chemists interested in novel aspects of transition metal chemistry pertinent to metalloproteins. The information obtained with such metal-substituted enzymes has provoked extensive discussions as to its applicability to the situation in the native zinc enzyme. The authors carefully evaluate the limits of this approach. The molecular details of the mechanism of these enzymes have remained obscure. Key features such as the coordination number and the function of the metal-bound water molecule(s) are not well understood. The last chapter in the book deals with the use of inorganic model complexes to study the structure and function of catalytic metal ions in general. The authors of this chapter cover a wide range of metalloenzymes. It would have been helpful at this point to focus only on the structural chemistry of zinc complexes. The need for a deeper understanding of the general chemistry of mixed-ligand zinc complexes becomes obvious.

I highly recommend this book because of its emphasis on a variety of biophysical methods. Such an account will certainly help to characterize the presently known 200 zinc enzymes in the future. In addition, the knowledge gathered with metal-substituted zinc metalloenzymes will be valuable to everybody interested in metalloenzymes. Finally, and very importantly, the book is really up to date. It covers the literature with complete references up to the year in which the book was published.

W. MARET