PREFACE

Bioinorganic chemistry became an independent scientific discipline before more than 50 years and achieved fast growth over the past 20 years. The purification and crystallization of metal-containing enzymes led to the discovery of the crystal structures of large number enzymes in Protein Data Bank. In addition, the development of the spectroscopic methods and massive spectroscopic instruments, including synchrotrons, refined and complemented the picture of how metals interact with the protein ligands and cofactors, providing further insight about the coordination states, geometries, oxidation states, and covalent character of metal sites in proteins. The fast development of theoretical methods in combination with the growth of the computer facilities made possible the application of the quantum mechanics, molecular dynamics, and combined quantum mechanical and molecular mechanical methods for exploring the electronic structure, chemical bonding, and mechanisms of metal-containing enzymes, this way complementing the results made by experimental methods. It is important, however, the theoretical methods to be validated in respect to the spectroscopic and crystallographic data in order to represent accurately the geometric and electronic structure of the metal sites in proteins.

This issue of *APCSB* is centered on the recent advances in metalloenzymology and represents some of the most advanced achievements in the understanding of the structure, structure–functions relationships, mechanisms, and biomedical roles of the metal-containing enzymes. The volume includes contributions on type-3 copper proteins, matrix metalloproteinase, metallohydrolases with two metal ions, metal-containing enzymes participating in nucleic acid biosynthesis, and Zn-containing enzymes involved in conformational diseases.

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