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# Book review

**Molecular and Cellular Iron Transport**
D.M. Templeton (editor), M. Dekker, New York, 2002, ISBN: 0-8247-0621-8, XIII+827 pages, US$ 235.00

The essentials of iron transport are discussed in 33 chapters, written by 62 experts who have contributed substantially to the understanding of mechanisms that are known since about a decade ago. The book is divided into four main parts. In part I, ''Molecular aspects of iron transport'' (13 chapters), the physical chemistry of iron-(II), iron-(III), and the rare iron-(IV), as well as their compounds (transferrins, ferritins) and chelating agents (siderophores) are described. Part II, ''Cellular iron transport'' (9 chapters), deals with the uptake of complexes by plants, yeasts, bacteria, mammalian cells, central nervous system, neoplastic cells, etc. Regulation of iron transport and storage, e.g., in liver and erythrocytes, are discussed in the four chapters of part III ''Physiology of iron transport.'' Part IV ''Disorders of iron transport'' (7 chapters) presents malfunctions such as hereditary cataract syndrome, aceruloplasminemia, hemochromatosis, and iron overload. Of particular interest for bioelectrochemists are the following topics.

Electron exchange and absorption of electromagnetic energy, starting with the electronic configurations and the ligand–field theory for complexes (especially iron–porphyrin), their electronic spectra, stability constants and redox potentials (especially for potentials of iron–proteins between $-0.45$ and $+0.4$ V (vs. NHE) are analyzed, including products of hydrolysis such as $Fe(OH)^{2+}$ etc.

In biological systems, the Fenton reaction yielding the hydroxyl anion plays an important role, however, the explanations of its mechanism are still contradictory, as are those of the water exchange kinetics. In particular, high-spin paramagnetic ferric ions and complexes which have five unpaired electrons are the targets of electromagnetic field effects, for instance by preferred treatment with low frequencies ($<100$ Hz) and low amplitudes in the millitesla range. The bioelectrochemist will find a large number of complexes in this book, which are suitable not only for absorption of magnetic energy but also for photodynamic action since their excited states produce singlet oxygen.

Chapters 14–22 deal with topics of another main research field of bioelectrochemistry, namely membrane structure and transport by proteins (transferrin, ferroportins) and many other active carriers or channel-forming proteins and siderophores, which are synthesized by cells (bacteria, fungi) themselves. Conformational mechanisms are illustrated in detail by three-dimensional models. The influence of pH (acidification of endosomes in reticulocytes) and fluorescence detection are mentioned, however, the role of the membrane potential as well as the artificial transport by electroporation are omitted. Nevertheless, this book presents the state of the art in transport processes, and last but not least, by hundreds of references until 2001.

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