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Book Review

ROBERT CRICHTON

Inorganic biochemistry of iron metabolism—from molecular mechanism to clinical consequences

John Wiley & Sons, Ltd, Chichester, 2001
xv + 326 pages. £125
ISBN 0-471-49223-X

The essentiality of iron has been known for much longer than the biochemical and physiological impact of iron. Deficiency of iron (anaemia) is probably the most widespread trace-element deficiency today. On the other hand, there are diseases that are caused from too much iron, where one of the many proteins or enzymes is malfunctioning and the affected take up of iron occurs in an uncontrolled manner. As for all other trace elements, there is an optimal concentration range of iron for life: too little is the reason for deficiency and too much is the cause of toxic side effects. Iron metabolism is therefore carefully balanced between necessity and toxicity. Iron metabolism is better known than the metabolism of other trace elements because there are well-defined pathological states in case the metabolic pathway is not functioning properly.

The chapters of the book 'Inorganic Biochemistry of Iron Metabolism—from Molecular Mechanism to Clinical Consequences' are carefully constructed; occasionally there are problems with the coloured graphics, where one has to leaf back and forth; despite this, it is up to date with extensive references until 2001 at the end of each chapter.

It starts with a short and very compact chapter about the evolutionary developments from the anoxic to oxic environment, describing the changes of solubility, especially of iron and copper. This chapter is very useful to read for someone not too familiar with iron. This is followed by a compact description of different families of iron proteins (haem, Fe–S-cluster and others).

The chapters about the metabolism of iron in bacteria, plant and fungi focus on the now well-known aspects of iron uptake and storage. The intracellular metabolism, which is still rather unknown, is only mentioned briefly. The known parts of the iron metabolism of *Escherichia coli* and yeast are described in some detail as examples for their classes. The main part of the book deals with iron metabolism in mammals, mainly the human metabolism of iron (cellular uptake of transferrin- and non-transferrin-bound iron, intracellular storage and biomineralization (ferritin), synthesis of iron-containing proteins, iron homeostasis, iron absorption). The following three chapters are dedicated to the known disorders of iron metabolism, the connection between iron and oxidative stress and the influence of iron on infections and infectious bacteria. There is a quite short final chapter where known interactions between iron and some other essential and toxic trace elements are described (Fe/Cu, Fe/Zn, Fe/Mn, Fe/Co, Fe/Al, Fe/Pb).

Crichton gives a detailed overview of the recent and ongoing research in the field of iron metabolism, both from the proteomic and the genetic side. Some of the chapters focus quite heavily on the genetic side and are difficult to read for someone not familiar with that specific language. But the long active involvement of the author in the field and his experience at explaining complicated matters makes the book understandable and an interesting read for people with a certain level of knowledge about trace-element metabolism who are either working in the field or are just curious. The book is clearly not written for people without any experience in trace-element research.

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