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Book Review

"Selenium: Its Molecular Biology and Role in Human Health", by L. Dolph Hatfield, (Ed.); Kluwer Academic Publishers, Boston/Dordrecht/London, 2001, 326 Pages, ISBN 0-7923-7335-9, EUR 137.5 USD 125 GBP87.5

This book is a comprehensive review on modern selenium biology covering novel surprising aspects of biochemistry, molecular biology and medicine of this important micronutrient. The chapters are overviews with up to 20 pages and a well-sorted citation list allowing rapid orientation in the respective field of interest.

As known for some time now, incorporation of selenocysteine into proteins is encoded by a terminator codon, representing the only addition to the genetic code since its deciphering. The current knowledge on the detailed mechanism concerning the biosynthesis of selenocysteyl-tRNA and the insertion system is summarized in Part I of this book.

An overview of structural and functional aspects of selenocysteine-containing proteins is given in Part II. The articles cover selenoproteins with established functions in the control of cellular redox processes or the endocrine system along with proteins of yet unknown function. In addition, a novel set of criteria for the identification of selenoproteins by DNA sequence analysis is presented.

Part III addresses the question: Which role do these proteins have in human health? Diseases associated with selenium deficiency and evidence showing selenium to act as a protective agent in pathological processes like cancer, muscular diseases, coronary heart disease and viral infections with influenza or HIV are discussed in the last part. Another fascinating aspect is the crucial role of glutathione peroxidase 4 in male fertility by acting as an anti-oxidative enzyme and as a structural component of the spermal midpiece representing a new and only incompletely understood function of selenoproteins.

Starting with the biosynthesis of bacterial selenocysteine going via structure and function of selenoproteins and finishing with a reflection on dietary standards for selenium intake, this book is a coherent review containing articles of many internationally well-known researchers who initiated much of the research in selenium biology and still are fascinated by the new aspects which continue to come out: this book presents the state-of-the-art on selenium, and Dr. Hatfield should be congratulated for getting it together.

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