

# **Multicopper Oxidases**

**Dietmar Schlosser** 

## **Multicopper Oxidases:**

Identification of Fungal Multi-copper Oxidase Gene Families Sreedhar Kilaru,2006 <u>Biological Inorganic Chemistry</u>
Ivano Bertini,2007 Part A Overviews of biological inorganic chemistry 1 Bioinorganic chemistry and the biogeochemical cycles 2 Metal ions and proteins binding stability and folding 3 Special cofactors and metal clusters 4 Transport and storage of metal ions in biology 5 Biominerals and biomineralization 6 Metals in medicine Part B Metal ion containing biological systems 1 Metal ion transport and storage 2 Hydrolytic chemistry 3 Electron transfer respiration and photosynthesis 4 Oxygen metabolism 5 Hydrogen carbon and sulfur metabolism 6 Metalloenzymes with radical intermediates 7 Metal ion receptors and signaling Cell biology biochemistry and evolution Tutorial I Fundamentals of coordination chemistry Tutorial II

Biophysics of Electron Transfer and Molecular Bioelectronics C. Nicolini, 2013-11-22 Proceedings of the 1997 International Workshop on Biophysics of Electron Transfer Fundamental Aspects and Applications held in Bressanone Italy October 8 10 1997 Multi-copper Oxidases Albrecht Messerschmidt, 1997-06-12 The biological activation of dioxygen is a key reaction in biological systems Enzymes involved in direct oxygen activation are oxidases and oxygenases Multi copper oxidases are an important class of oxidases reducing dioxygen in a four electron reduction to water with concomitant one electron oxidation of the reducing substrate The progress in the characterization and understanding of the structure and function of these enzymes has advanced so tremendously over the last ten years that the publication of a book documenting these achievements has been overdue Especially the recent discovery of a key role of the FET3 protein of Saccharomyces cerevisae a multi copper oxidase in iron metabolism of this eukaryote has underpinned the function of the plasma multi copper oxidase ceruloplasmin in vetebrate iron transport. The lately determined x ray structure of human ceruloplasmin confirms its close structural relatedness to the plant multi copper oxidases ascorbate oxidase and laccase and due to strong amino acid sequence similarities has allowed to construct a useful model of the more distantly related blood clotting factor VIII This book contains review articles from experts in the field dealing with modern spectroscopy enzyme kinetics bioinorganic chemistry x ray crystallography electron transfer reactions molecular biology medical aspects and potential industrial applications of the three main members of multi copper oxidases i e laccase ascorbate oxidase and ceruloplasmin

Iron Metabolism Glória C. Ferreira, José João G. Moura, Ricardo Franco, 2008-09-26 Iron plays a crucial role in many biochemical processes In recent years intensive research has led to a better understanding of the function of iron in cellular metabolism In more than twenty articles internationally renowned experts give a thorough account of the recent developments of this fascinating field The book focuses on the central questions e g transport storage and utilization of iron in cells the three dimensional structure of iron containing proteins the physiological function of heme and iron sulfur containing proteins and the regulatory mechanisms in heme biosynthesis and redox regulation of signal transduction The interdisciplinary character of the book is designed to explore the many facets of the new findings and to provide a

comprehensive overview of recent advances for biochemists bioinorganic chemists molecular biologists microbiologists and immunologists The reviews are supplemented with valuable background information results and numerous references This book emphasizes the relationships between the different disciplines concerned with iron metabolism and opens new perspectives for future research Mycotechnology Mahendra Rai, 2013-12-30 Mycotechnology has a crucial role to play in the 21st century Fungi are bioprotectors bioremediators bio fertilizers drug producers and involved in everyday life Mycotechnology Present Status and Future Prospects includes current and rare topics on mycotechnology such as molecular techniques for analysis of soil fungi diagnosis of ochratoxin A producing fungi identification of ectomycorrhizal fungi SPPADBASE bioactive sesquiterpenes mycological applications of Raman spectroscopy etc Key Features Discusses latest developments in mycotechnology Addresses molecular diagnosis of mycotoxins soil microbes and ectomycorrhizal fung Includes role of type culture collection in mycological research and applications e g drug discovery from fungi Deals with the role of fungal chitinase Focuses on strategic role of AMF in agroecosystem and disease control Contains database of PCR primers for phytopathogenic fung This book is essential reading for mycologists biotechnologists microbiologists botanists agronomists physicists biochemists Geomicrobiology Jillian F. Banfield, Kenneth H. Nealson, 2018-12-17 Volume 35 of Reviews in Mineralogy defines and explore the topic of geomicrobiology It is organized so as to first introduce the nature diversity and metabolic impact of microorganisms and the types of solid phases they interact with This is followed by a discussion of processes that occur at cell surfaces interfaces between microbes and minerals and within cells and the resulting mineral precipitation dissolution and changes in aqueous geochemistry The volume concludes with a discussion of the carbon cycle over geologic time Basis for this volume was the Short Course on Geomicrobiology presented by the Mineralogical Society of America on October 18 and 19 1997 at the Alta Peruvian Lodge in Alta Utah **Mycofactories** Ana Lúcia Leitão, 2011 Fungi are extremely versatile microorganisms as a biotechnology tool having the advantage of being relatively easy to grow thus making them suitable for large scale production Fungi have been successfully employed for biotransformations ranging from fo Bioinorganic Chemistry of Copper K.D. Karlin, Z. Tyeklar, 2012-12-06 Bioinorganic Chemistry of Copper focuses on the vital role of copper ions in biology especially as an essential metalloenzyme cofactor The book is highly interdisciplinary in its approach the outstanding list of contributors includes coordination chemists biochemists biophysicists and molecular biologists Chapters are grouped into major areas of research interest in inorganic copper chemistry spectroscopy oxygen chemistry biochemistry and molecular biology The book also discusses basic research of great potential importance to pharmaceutical scientists This book is based on the first Johns Hopkins University Copper Symposium held in August 1992 Researchers in chemistry biochemistry molecular biology and medicinal chemistry will find it to be an essential reference on its subject Copper-Oxygen Chemistry Kenneth D. Karlin, Shinobu Itoh, Steven Rokita, 2011-08-24 Covers the vastly expanding subject of oxidative processes mediated by copper ions within biological

systems Copper mediated biological oxidations offer a broad range of fundamentally important and potentially practical chemical processes that cross many chemical and pharmaceutical disciplines This newest volume in the Wiley Series on Reactive Intermediates in Chemistry and Biology is divided into three logical areas within the topic of copper oxygen chemistry biological systems theory and bioinorganic models and applications to explore the biosphere for its highly evolved and thus efficient oxidative transformations in the discovery of new types of interactions between molecular oxygen and copper ion Featuring a diverse collection of subject matter unified in one complete and comprehensive resource Copper Oxygen Chemistry probes the fundamental aspects of copper coordination chemistry synthetic organic chemistry and biological chemistry to reveal both the biological and chemical aspects driving the current exciting research efforts behind copper oxygen chemistry In addition Copper Oxygen Chemistry Addresses the significantly increasing literature on oxygen atom insertion and carbon carbon bond forming reactions as well as enantioselective oxidation chemistries Progresses from biological systems to spectroscopy and theory and onward to bioinorganic models and applications Covers a wide array of reaction types such as insertion and dehydrogenation reactions that utilize the cheap abundant and energy containing O2 molecule With thorough coverage by prominent authors and researchers shaping innovations in this growing field this valuable reference is essential reading for bioinorganic chemists as well as organic synthetic and pharmaceutical chemists in <u>Lignins</u>, 2012-06-25 Lignins are nature s aromatic polymers and are the second most abundant academia and industry organic constituent of the biosphere next to cellulose Lignification mainly occurs in the walls of terrestrial vascular plants mainly in the secondarily thickened cells of supportive or conductive tissues which thus acquire novel properties This new volume of Advances in Botanical Research gives a special emphasis to the bioengineering of these enigmatic polymers It is divided in nine chapters containing up to date reviews by expert groups in their field Gives a special emphasis to the bioengineering of these enigmatic polymers ligning Divided in nine chapters Contains up to date reviews by expert groups in Encyclopedia of Interfacial Chemistry, 2018-03-29 Encyclopedia of Interfacial Chemistry Surface Science and their field Electrochemistry Seven Volume Set summarizes current fundamental knowledge of interfacial chemistry bringing readers the latest developments in the field As the chemical and physical properties and processes at solid and liquid interfaces are the scientific basis of so many technologies which enhance our lives and create new opportunities its important to highlight how these technologies enable the design and optimization of functional materials for heterogeneous and electro catalysts in food production pollution control energy conversion and storage medical applications requiring biocompatibility drug delivery and more This book provides an interdisciplinary view that lies at the intersection of these fields Presents fundamental knowledge of interfacial chemistry surface science and electrochemistry and provides cutting edge research from academics and practitioners across various fields and global regions Laccase and Polyphenol Oxidase Ivanhoe K.H. Leung, 2024-10-30 Laccase and Polyphenol Oxidase Biochemistry and Biotechnological Applications a new volume in the

Foundations and Frontiers in Enzymology series provides a thorough discussion of the laccase and polyphenol oxidase enzyme families which play a key role in the oxidation of phenolic substrates and an important biological function in many organisms In recent years significant advances have been made in understanding these enzymes but few practical resources exist on their fundamental biology research methods and applications In this book leading world experts discuss the biochemistry of laccase and polyphenol oxidases research methods and uses across industries offering a practical overview of these important enzyme classes and empowering researchers to develop their own studies and hone applications The book deftly connects topics across these intricate enzyme systems with early chapters on physicochemical properties of PPO and laccase followed by separate sections on these related enzyme classes function in biological and industrial systems production purification active assays and application areas from food and wine to healthcare bioremediation and green and computational chemistry Step by step instructions and explanation offer clear guidance in replicating key research and application methodologies discussed Examines the fundamental biology of laccase and polyphenol oxidases research methods and their uses across industries Features chapter contributions from leading international experts in the field Offers step by step instructions in key research and application methodologies Metalloprotein Active Site Assembly Michael K. Johnson, Robert A. Scott, 2017-08-30 Summarizes the essential biosynthetic pathways for assembly of metal cofactor sites in functional metalloproteins Metalloprotein Active Site Assembly focuses on the processes that have evolved to orchestrate the assembly of metal cofactor sites in functional metalloproteins It goes beyond the simple incorporation of single metal ions in a protein framework and includes metal cluster assembly metal cofactor biosynthesis and insertion and metal based post translational modifications of the protein environments that are necessary for function Several examples of each of these areas have now been identified and studied the current volume provides the current state of the art understanding of the processes involved An excellent companion to the earlier book in this series Metals in Cells which discussed both the positive and negative effects of cellular interactions with metals this comprehensive book provides a diverse sampling of what is known about metalloprotein active site assembly processes It covers all major biological transition metal components Mn Fe Co Ni Mo as well as the other inorganic components metal binding organic cofactors e g heme siroheme cobalamin molybdopterin and post translationally modified metal binding sites that make up the patchwork of evolved biological catalytic sites The book compares and contrasts the biosynthetic assembly of active sites involving all biological metals This has never been done before since it is a relatively new fast developing area of research Metalloprotein Active Site Assembly is an ideal text for practitioners of inorganic biochemistry who are studying the biosynthetic pathways and gene clusters involved in active site assembly and for inorganic chemists who want to apply the concepts learned to potential synthetic pathways to active site mimics Bacterial Laccases Deepti Yadav, Tukayi Kudanga, 2023-11-14 Bacterial Laccases Engineering Immobilization Heterologous Production and Industrial Applications provides a list of approaches that upgrades

bacterial laccases to industrially relevant enzymes Providing protocols for enzyme production and downstream processing and including up to date information on bacterial laccases as well as techniques that can be explored to enhance properties and production levels this book clarifies research gaps and explains how they can be dealt with Written for research scholars working on enzymes this is a valuable tool for industries and policymakers Leads to a better understanding of traditional and novel methodologies for enhancing production and properties of bacterial laccases Serves as a useful guide for researchers industrialists and students Includes chapters written by experts known for their contributions in respective areas Describes the latest advances made in the field of bacterial laccases including strategies that could be undertaken to improve their utility at an industrial level Provides a comprehensive up to date review of bacterial laccases and their important applications

Clinical and Translational Perspectives on WILSON DISEASE Nanda Kerkar, Eve A Roberts, 2018-09-18 Clinical and Translational Perspectives on Wilson Disease brings together the genetics cell and structural biology of Wilson Disease into one contemporary easy to navigate handbook Created to meet the diverse needs of the clinical and research communities surrounding Wilson Disease this reference provides a worldwide approach that is concise and translational Specifically it provides a basis for clinicians to appreciate basic science aspects of Wilson disease presenting a guide for researchers to understand the clinical disorder on which their research is focused and fostering constructive dialogue and progress for this puzzling disorder Delivers numerous succinct expert chapters with summaries designed for guick reference Includes a How to appendix for diagnosis and management tips Contains access to a companion website with a self help teaching module links to key resources and an extended reference list **Laccases in Bioremediation and Waste Valorisation** Dietmar Schlosser, 2020-08-31 This Microbiology Monographs volume covers the latest advances in laccase applications in bioremediation and waste valorisation The first three chapters provide a comprehensive introduction to fungal and bacterial laccases the two most important enzyme groups from an application viewpoint and their practical use in bioremediation and lignocellulosic waste valorisation Subsequent chapters discuss possible combinations of laccases and further potentially collaborating enzymes and offer in depth insights into laccase immobilisation for wastewater treatment and environmental biosensor applications of laccases Lastly the book addresses the quest for enzymes with improved and better fitting properties covering laccase engineering by directed and computational evolution and novel enzymes from extreme environments As such it is a fascinating read for microbiologists in both industry and academia Copper-Containing Molecules Joan S. Valentine, Edith B. Gralla, 2002-11-01 A wide range of researchers are currently investigating different properties and applications for copper containing proteins Biochemists researching metal metabolism in organisms ranging from bacteria to plants to animals are working in a completely different area of discovery than scientists studying the transportation and regulation of minerals and small molecule nutrients They are both working with copper containing proteins but in very different ways and with differing anticipated outcomes Protein Reviews M. Zouhair

Atassi, 2023-04-08 The Protein Reviews series serves as a publication vehicle for reviews that focus on crucial contemporary and vital aspects of protein structure function evolution and genetics Volumes are published online first prior to publication in a printed book Chapters are selected according to their importance to the understanding of biological systems relevance to the unravelling of issues associated with health and disease or impact on scientific or technological advances and developments Volume 23 presents four review chapters authored by experts in related fields The first chapter covers the structure and function of SNM1 family nucleases Chapter two examines the molecular details of DNA integration by CRISPR associated Cas proteins during adaptation in bacteria and archaea The third chapter reviews the ordered motions in the nitric oxide dioxygenase NOD mechanism of flavohemoglobin and assorted globins with tightly coupled reductases Chapter four reviews structural analyses of the multicopper site of CopG support a role as a redox enzyme This volume is intended for research scientists clinicians physicians and graduate students in the fields of biochemistry cell biology molecular biology immunology and genetics Value Addition and Product Diversification in Sugarcane Giriyapura Shivalingamurthy Suresha, Gopalareddy Krishnappa, Murali Palanichamy, Huskur Kumaraswamy Mahadeva Swamy, Hari Kuppusamy, Hemaprabha Govindakurup, 2024-11-23 This contributed volume covers sugarcane byproducts preservation functional foods bioethanol and liquid fuels It focuses on advancements in value addition and its applications in food and other industries sugarcane biomass and its utilization in the energy sector Sugarcane production has been increasing for several decades however it has only recently gained importance for product diversification and bioenergy applications The book also explores biopharming molecular pharming genomics for product diversification biotechnological manipulations for bioenergy applications metabolic engineering bioenergy policy economics and market intelligence This book provides an opportunity to compile recent technological advancements in value addition and product diversification offering insights into the role of sugarcane in green fuels and global energy security in a sustainable manner This book caters to the needs of various stakeholders including students researchers policymakers and academicians working in functional foods nutraceutical research bioenergy and synthetic biology It is also designed for personnel in the sugar and food industries green fuels chemical industries and textile and recycling industries

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