



Metal Ions Volume 5

**Astrid Sigel, Helmut Sigel, Roland K. O.
Sigel**



Metal Ions Volume 5:

Neurodegenerative Diseases and Metal Ions Astrid Sigel, Helmut Sigel, Roland K. O. Sigel, 2006-07-11 About the Series Metal Ions in Life Sciences links coordination chemistry and biochemistry in their widest sense and thus increases our understanding of the relationship between the chemistry of metals and life processes The series reflects the interdisciplinary nature of Biological Inorganic Chemistry and coordinates the efforts of scientists in fields like biochemistry inorganic chemistry coordination chemistry molecular and structural biology enzymology environmental chemistry physiology toxicology biophysics pharmacy and medicine Consequently the volumes are an essential source for researchers active in these and related fields as well as teachers preparing courses e g in Bioinorganic Chemistry About this Book Volume 1 devoted solely to the vital research area concerning the role of metal ions in neurodegenerative diseases offers in 15 stimulating chapters an authoritative and timely view of this fascinating subject Written by 41 internationally recognized experts *Neurodegenerative Diseases and Metal Ions* highlights supported by 130 illustrations the recent progress made in understanding the role metal ions play in diseases like transmissible spongiform encephalopathies Creutzfeldt Jakob and related diseases Alzheimer s Parkinson s Huntington s Wilson s and Menkes diseases as well as in familial amyotrophic lateral sclerosis and others The interplay between metal ions catecholamines and the formation of reactive oxygen species resulting in oxidative stress is considered as is the metalloneurochemistry of zinc and the neurotoxicity of aluminum cadmium lead and mercury The need for novel drugs which manipulate metal centered neuropathology is emphasized

Metal Ions in Toxicology: Effects, Interactions, Interdependencies Astrid Sigel, Helmut Sigel, Roland K.O. Sigel, 2015-07-24 Volume 8 solely devoted to the toxicology of metals and metalloids as well as their compounds focuses on human health Not surprisingly all related research areas are rapidly developing due to the role of metals and metalloids in the environment for the work place for food and water supply etc Written by 40 internationally recognized experts the 14 stimulating chapters provide an authoritative and timely resource for scientists working in the wide range from analytical physical inorganic and environmental biochemistry all the way through to toxicology physiology and medicine Volume 8 highlights supported by nearly 1900 references in a comprehensive and timely manner the principles of risk assessment regarding the effects of metals on human health It examines how metal ions and their compounds affect the pulmonary cardiovascular gastrointestinal including liver hematological immune and neurological systems the kidney skin and eyes as well as human reproduction and development MILS 8 terminates with the role of metal ions as endocrine disrupters in genotoxicity and cancer risk **Essential Metals in Medicine: Therapeutic Use and Toxicity of Metal Ions in the Clinic** Peggy L. Carver, 2019-01-14 Volume 19 entitled *Essential Metals in Medicine Therapeutic Use and Toxicity of Metal Ions in the Clinic* of the series Metal Ions in Life Sciences centers on the role of metal ions in clinical medicine Metal ions are tightly regulated in human health while essential to life they can be toxic as well Following an introductory chapter briefly discussing several

important metal related drugs and diseases and a chapter about drug development the focus is first on iron its essentiality for pathogens and humans as well as its toxicity Chelation therapy is addressed in the context of thalassemia its relationship to neurodegenerative diseases and also the risks connected with iron administration are pointed out A subject of intense debate is the essentiality of chromium and vanadium For example chromium III compounds are taken as a nutritional supplement by athletes and bodybuilders in contrast chromate Cr VI is toxic and a carcinogen for humans The beneficial and toxic effects of manganese cobalt and copper on humans are discussed The need for antiparasitic agents is emphasized as well as the clinical aspects of metal containing antidotes for cyanide poisoning In addition to the essential and possibly essential ones also other metal ions play important roles in human health causing harm like the metalloid arsenic lead or cadmium or being used in diagnosis or treatment of human diseases like gadolinium gallium lithium gold silver or platinum The impact of this vibrant research area on metals in the clinic is provided in 14 stimulating chapters written by internationally recognized experts from the Americas Europe and China and is manifested by approximately 2000 references and about 90 illustrations and tables **Essential Metals in Medicine Therapeutic Use and Toxicity of Metal Ions in the Clinic** is an essential resource for scientists working in the wide range from pharmacology enzymology material sciences analytical organic and inorganic biochemistry all the way through to medicine not forgetting that it also provides excellent information for teaching

Metallothioneins and Related Chelators Astrid Sigel, Helmut Sigel, Roland K.O. Sigel, 2015-07-24 These sulfur rich chelators being important in metal ion homeostasis find increasing attention MILS 5 written by 30 internationally recognized experts focuses on this hot topic The reader is supported by about 20 tables more than 80 illustrations and nearly 2000 references This book is an essential resource for scientists working in a wide range of disciplines from environmental toxicology and inorganic biochemistry all the way through to physiology and medicine

Metal Ions in Biological Systems Helmut Sigel, Astrid Sigel, 2024-11-01 Continuing to explore the relationship between the chemistry of metals and life processes this volume in the Metal Ions in Biological Systems series examines the degradation of environmental pollutants by micro organisms It covers the action of micro organisms and metalloenzymes on lignin tannins hemicelluloses cellulose and aromatic compounds as well as on halogenated aromatics and aliphatics analyzes mechanistic aspects considers the role of metalloproteases in biotechnology and wastewater sludge treatment and describes the metal dependent conversion of inorganic nitrogen and sulfur compounds

Metal Ions in Bio-Imaging Techniques Astrid Sigel, Eva Freisinger, Roland K.O. Sigel, 2021-03-08 Volume 22 entitled Metal Ions in Bio Imaging Techniques of the series Metal Ions in Life Sciences deals with metal ions as tools in imaging This dates back to the first half of the past century when barium sulfate was orally given to patients undergoing X ray examination The use of contrast agents has since developed into a large interdisciplinary field encompassing not only medicine but also chemistry material sciences physics biology engineering and computer sciences MILS 22 provides deep and current insights in 17 stimulating chapters on the new research frontiers of this fast

growing field on bio imaging and beyond For example adding bio sensing yields theranostic agents meaning diagnosis and therapy linked in the same molecule ions of Gd Mn Fe Co Ir ^{99m}Tc etc are involved Other important topics are e g metal complexes in paramagnetic Chemical Exchange Transfer paraCEST radiometals for Positron Emission Tomography PET imaging or paramagnetic metal ion probes for ¹⁹F magnetic resonance imaging MILS 22 is written by 57 internationally recognized experts from 12 countries that is from the US via Europe to China The impact of this vibrant research area is manifested by more than 2300 references and nearly 120 figures mostly in color and several informative tables To conclude Metal Ions in Bio Imaging Techniques is an essential resource for scientists working in the wide range from material sciences enzymology analytic organic and inorganic biochemistry all the way through to medicine including the clinic not forgetting that also excellent information for teaching is provided

Interplay between Metal Ions and Nucleic Acids Astrid Sigel, Helmut Sigel, Roland K.O. Sigel, 2012-01-02 Interplay between Metal Ions and Nucleic Acids provides in an authoritative and timely manner in 12 stimulating chapters written by 24 internationally recognized experts from 8 nations and supported by nearly 1500 references about 20 tables and 125 illustrations many in color a most up to date view on metal ion nucleic acid interactions the characterization of which is covered in solution and in the solid state The volume concentrates on modern developments encompassing topics in the wide range from G quadruplexes via DNAzymes catalysis at the DNA scaffold and metal mediated base pairs to peptide nucleic acids PNAs being thus of relevance e g for chemistry and nanotechnology but also for molecular biology and genetic diagnostics

Metallomics and the Cell Lucia Banci, 2013-04-18 Metallomics and the Cell provides in an authoritative and timely manner in 16 stimulating chapters written by 37 internationally recognized experts from 9 nations and supported by more than 3000 references several tables and 110 illustrations mostly in color a most up to date view of the metallomes which as defined in the omics world describe the entire set of biomolecules that interact with or are affected by each metal ion The most relevant tools for visualizing metal ions in the cell and the most suitable bioinformatic tools for browsing genomes to identify metal binding proteins are also presented Thus MILS 12 is of relevance for structural and systems biology inorganic biological chemistry genetics medicine diagnostics as well as teaching etc

Metallo-Drugs: Development and Action of Anticancer Agents Astrid Sigel, Helmut Sigel, Eva Freisinger, Roland K.O. Sigel, 2018-02-05 Volume 18 entitled Metallo Drugs Development and Action of Anticancer Agents of the series Metal Ions in Life Sciences centers on biological medicinal inorganic chemistry The serendipitous discovery of the antitumor activity of cis diamminodichloroplatinum II cisplatin by Barnett Rosenberg in the 1960s is a landmark in metallodrug based chemotherapy The success of cisplatin in the clinic followed by oxaliplatin and carboplatin along with their drawbacks relating mainly to resistance development and severe toxicity initiated research on polynuclear platinum complexes and on Pt IV complexes as prodrugs Furthermore the indicated shortcomings led to the exploration of other transition and main group metal ions among them Ru II III Au I III Ti IV V IV V and Ga III including also the essential metal

ions Fe II III Cu I II and Zn II Ionic as well as covalent and non covalent interactions between structurally very different complexes and biomolecules like nucleic acids proteins and carbohydrates are studied and discussed with regard to their possible anticancer actions Hence MILS 18 summarizes the research at the forefront of medicinal inorganic chemistry including studies on the next generation tailor made anticancer drugs All this and more is treated in an authoritative and timely manner in the 17 stimulating chapters of this book written by 39 internationally recognized experts from 10 nations from the US via Europe to China and Australia The impact of this vibrant research area is manifested by more than 2700 references nearly 150 illustrations more than half in color and several comprehensive tables *Metallo Drugs Development and Action of Anticancer Agents* is an essential resource for scientists working in the wide range from enzymology material sciences analytical organic and inorganic biochemistry all the way through to medicine including the clinic not forgetting that it also provides excellent information for teaching

Interrelations between Essential Metal Ions and Human Diseases Astrid Sigel, Helmut Sigel, Roland K.O. Sigel, 2014-01-27 MILS 13 provides an up to date review on the relationships between essential metals and human diseases covering 13 metals and 3 metalloids The bulk metals sodium potassium magnesium and calcium plus the trace elements manganese iron cobalt copper zinc molybdenum and selenium all of which are essential for life Also covered are chromium vanadium nickel silicon and arsenic which have been proposed as being essential for humans in the 2nd half of the last century However if at all they are needed only in ultra trace amounts and because of their prevalence in the environment it has been difficult to prove whether or not they are required In any case all these elements are toxic in higher concentrations and therefore transport and cellular concentrations of at least the essential ones are tightly controlled hence their homeostasis and role for life including deficiency or overload and their links to illnesses including cancer and neurological disorders are thoroughly discussed Indeed it is an old wisdom that metals are indispensable for life Therefore Volume 13 provides in an authoritative and timely manner in 16 stimulating chapters written by 29 internationally recognized experts from 7 nations and supported by more than 2750 references and over 20 tables and 80 illustrations many in color a most up to date view on the vibrant research area of the Interrelations between Essential Metal Ions and Human Diseases

Structural and Catalytic Roles of Metal Ions in RNA Astrid Sigel, Helmut Sigel, Roland K.O. Sigel, 2015-07-24 The discovery of ribozymes nearly 30 years ago triggered a huge interest in the chemistry and biology of RNAs Much of the recently made progress focusing on metal ions is addressed in MILS 9 This book written by 28 internationally recognized experts from 8 nations provides a most up to date view and is thus of special relevance for colleagues teaching courses in biological inorganic chemistry and for researchers dealing e g with nucleic acids gene expression and enzymology but also for those in analytical and bioinorganic chemistry or biophysics *Structural and Catalytic Roles of Metal Ions in RNA* describes in an authoritative and timely manner in 12 stimulating chapters supported by nearly 1600 references 13 tables and 75 illustrations mostly in color metal ion binding motifs methods to detect and characterize metal ion binding sites and the role

of metal ions in folding and catalysis It deals with diffuse metal ion binding RNA quadruplexes the regulation of riboswitches metal ions and ribozymes including artificial ribozymes The spliceosome the ribosome ribozymes involving redox cofactors as well as the binding of kinetically inert metal ions to RNA are also covered **Biomineralization** Astrid Sigel, Helmut Sigel, Roland K. O. Sigel, 2008-04-30 Biomineralization is a hot topic in the area of materials and this volume in the Metals Ions in Life Sciences series takes a systematic approach dealing with all aspects from the fundamentals to applications Key biological features of biomineralization such as gene directed growth and the role of enzymes are covered as are new areas including copper zinc in the jaws of invertebrates or magnetic biomaterials that help birds with navigation

Metal-Carbon Bonds in Enzymes and Cofactors Astrid Sigel, Helmut Sigel, Roland K.O. Sigel, 2015-07-24 The occurrence of a wide variety of metal carbon bonds in living organisms ranging from bacteria to humans is only recently recognized Of course the historical examples are the B12 coenzymes containing cobalt carbon bonds but now such bonds are also known for nickel iron copper and other transition metal ions There is no other comparable book MILS 6 written by 17 experts summarizes the most recent insights into this fascinating topic *Energy Research Abstracts*, 1980 **Transition Metal Complexes — Structures and Spectra**, 2007-12-13 **Advances in Plant Physiology (Vol.13)** A. Hemantaranjan, 2012-08-01 The plant physiology and plant molecular biology research group has evidently endorsed the new directions taken by the treatise to attract the pre eminent scientists in plant biology plant sciences Certainly the preparation of Volume 13 of the International Treatise Series on Advances in Plant Physiology has been done entirely due to commendable contributions from Scientists of Eminence in unequivocal fields Unquestionably our objective is to publish innovative science of value across the broad disciplinary range of the treatise I restate that this plan has been undertaken with a view to strengthen the indistinguishable efforts to recognize the outcome of meticulous research in some of the very sensible and stirring areas of Plant Physiology Plant Molecular Physiology Biology Plant Biochemistry for holistic development of the science of agriculture and crop production under changing climate I am ardent to keep on the exceptionality and the prologue of excellent new ideas ensuring that the treatise calls to the best science done across the full extent of modern plant biology in general and plant physiology in particular In Volume 13 with inventive applied research attempts have been made to bring together much needed eighteen review articles by forty eight contributors especially from premier institutions of India for this volume All the eighteen review articles have been grouped in five broad sections which on the whole highlight the necessity to find out evidence from the fields of plant nutriophysiology physiology of plant mineral nutrients and abiotic stresses under changing climate along with their control *Sustaining Life on Planet Earth: Metalloenzymes Mastering Dioxygen and Other Chewy Gases* Peter M. H Kroneck, Martha E. Sosa Torres, 2015-02-23 MILS 15 provides an up to date review of the metalloenzymes involved in the activation production and conversion of molecular oxygen as well as the functionalization of the chemically inert gases methane and ammonia Found either in aerobes humans

animals plants microorganisms or in anaerobes so called impossible bacteria these enzymes employ preferentially iron and copper at their active sites in order to conserve energy by redox driven proton pumps to convert methane to methanol or ammonia to hydroxylamine or other compounds When it comes to the light driven production of molecular oxygen the tetranuclear manganese cluster of photosystem II must be regarded as the key player However dioxygen can also be produced in the dark by heme iron dependent dismutation of oxyanions Metalloenzymes Mastering Dioxygen and Other Chewy Gases is a vibrant research area based mainly on structural and microbial biology inorganic biological chemistry and environmental biochemistry All this is covered in an authoritative manner in 7 stimulating chapters written by 21 internationally recognized experts and supported by nearly 1100 references informative tables and over 140 illustrations many in color MILS 15 provides excellent information for teaching it is also closely related to MILS 14 The Metal Driven Biogeochemistry of Gaseous Compounds in the Environment Peter M H Kroneck is a bioinorganic chemist who is exploring the role of transition metals in biology with a focus on functional and structural aspects of microbial iron copper and molybdenum enzymes and their impact on the biogeochemical cycles of nitrogen and sulfur Martha E Sosa Torres is an inorganic chemist with special interests in magnetic properties of newly synthesized transition metal complexes and their reactivity towards molecular oxygen applying kinetic electrochemical and spectroscopic techniques Transition Metals and Sulfur - A Strong Relationship for Life Martha Sosa Torres, Peter Kroneck, 2020-04-06 Metal Sulfur clusters play an essential role in living organisms through the unique character of sulfur metal bonding The new volume in prestigious Metal Ions in Life Sciences explores different transition metal complexes with sulfur their biosynthesis and biological functions in regulation of gene expression catalysis of important metabolic reactions and protein structure arrangement The Metal-Driven Biogeochemistry of Gaseous Compounds in the Environment Peter M.H. Kroneck, Martha E. Sosa Torres, 2014-11-22 MILS 14 provides a most up to date view of the exciting biogeochemistry of gases in our environment as driven mostly by microorganisms These employ a machinery of sophisticated metalloenzymes where especially transition metals such as Fe Ni Cu Mo W play a fundamental role that is in the activation transformation and syntheses of gases like dihydrogen methane carbon monoxide acetylene and those of the biological nitrogen and sulfur cycles The Metal Driven Biogeochemistry of Gaseous Compounds in the Environment is a vibrant research area based mainly on structural and microbial biology inorganic biological chemistry and environmental biochemistry All this is covered in an authoritative manner in 11 stimulating chapters written by 26 internationally recognized experts and supported by nearly 1200 references informative tables and about 100 illustrations two thirds in color MILS 14 also provides excellent information for teaching Peter M H Kroneck is a bioinorganic chemist who is exploring the role of transition metals in biology with a focus on functional and structural aspects of microbial iron copper and molybdenum enzymes and their impact on the biogeochemical cycles of nitrogen and sulfur Martha E Sosa Torres is an inorganic chemist with special interests in magnetic properties of

newly synthesized transition metal complexes and their reactivity towards molecular oxygen applying kinetic electrochemical and spectroscopic techniques Metal Ions in Toxicology Astrid Sigel, Helmut Sigel, Roland K. O. Sigel, 2011 It is an old wisdom that metals are indispensable for life Indeed several of them like sodium potassium and calcium are easily discovered in living matter However the role of metals and their impact on life remained largely hidden until inorganic chemistry and coordination chemistry experienced a pronounced revival in the 1950s The experimental and theoretical tools created in this period and their application to biochemical problems led to the development of the field or discipline now known as Bioinorganic Chemistry Inorganic Biochemistry or more recently also often addressed as Biological Inorganic Chemistry By 1970 Bioinorganic Chemistry was established and further promoted by the book series Metal Ions in Biological Systems founded in 1973 edited by H S who was soon joined by A S and published by Marcel Dekker Inc New York for more than 30 years After this company ceased to be a family endeavor and its acquisition by another company we decided after having edited 44 volumes of the MIBS series the last two together with R K O S to launch a new and broader minded series to cover today's needs in the Life Sciences Therefore the Sigel's new series is entitled Metal Ions in Life Sciences After publication of the first four volumes 2006 2008 with John Wiley a most experienced Publisher in the Sciences

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