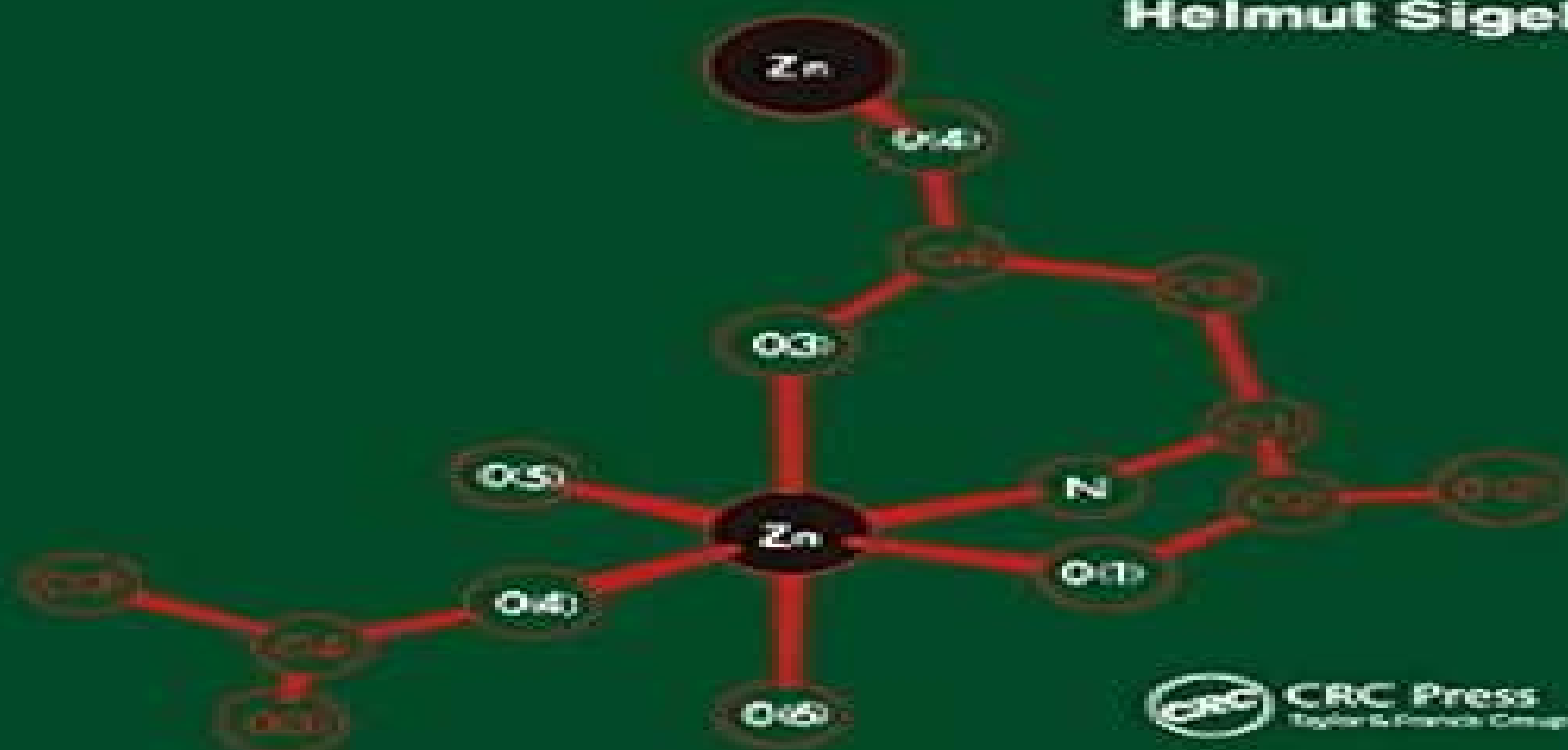


metal ions in biological systems

volume 9

*amino acids and derivatives
as ambivalent ligands*

edited by
Helmut Sigel



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Metal Ions In Biological Systems Amino Acids And Derivatives As Ambivalent Ligands

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



Metal Ions In Biological Systems Amino Acids And Derivatives As Ambivalent Ligands:

Metal Ions in Biological Systems Helmut Sigel, 1979-07-01 This book focuses on the connection between the chemistry of metal ions and their role for life and covers complexes with a number of amino acids with chelatable side chain donor atoms It discusses metal ion protein interactions and the ligating ambivalency of nucleotides *Metal Ions in Biological Systems*, 1979 **Amino Acids and Derivatives as Ambivalent Ligands**, 1979 **Metal Ions in Biological Systems**

Helmut Sigel, 2024-11-01 This book focuses on the connection between the chemistry of metal ions and their role for life and covers complexes with a number of amino acids with chelatable side chain donor atoms It discusses metal ion protein interactions and the ligating ambivalency of nucleotides [Metal Ions in Biological Systems](#) Astrid Sigel, Helmut

Sigel, 1995-02-22 Volume 31 devoted solely to the role of vanadium in life processes offers a comprehensive and timely account of this fascinating field by 37 distinguished international authorities Highlights the properties of the various oxidation states of vanadium their affinity for biogenic ligands the effects of vanadium species on enzyme activity the role of vanadium in nitrogenases and haloperoxidases and more [Metal Ions in Biological Systems, Volume 43 - Biogeochemical Cycles of Elements](#)

Helmut Sigel, Roland Sigel, 2005-02-28 Metal Ions in Biological Systems is devoted to increasing our understanding of the relationship between the chemistry of metals and life processes The volumes reflect the interdisciplinary nature of bioinorganic chemistry and coordinate the efforts of researchers in the fields of biochemistry inorganic chemistry coordination chemis **Metal Ions In Biological Systems, Volume 44** Helmut Sigel, Roland

Sigel, 2005-03-01 Volume 44 devoted solely to the vital research areas concerning the biogeochemistry of metals and their transport in the environment and availability to living systems offers 9 timely and authoritative chapters on these fascinating topics by 19 internationally recognized experts [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 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 99mTc 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 ^{19}F 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

The Alkali Metal Ions: Their Role for Life Astrid Sigel, Helmut Sigel, Roland K. O. Sigel, 2016-02-09 MILS 16 provides an up to date review of the impact of alkali metal ions on life Their bioinorganic chemistry and analytical determination the solid state structures of bio ligand complexes and the properties of alkali metal ions in solution in the context of all kinds of biologically relevant ligands are covered this includes proteins enzymes and nucleic acids G quadruplexes Minerals containing sodium Na and potassium K are abundant in the Earth's crust making Na and K easily available In contrast the alkali elements lithium Li rubidium and cesium are rare and the radioactive francium occurs only in traces Since the intra and extracellular as well as the compartmental concentrations of Na and K differ significantly homeostasis and active transport of these ions are important this involves transporters carriers and pore forming ion channel proteins Systems like Na K ATPases H K ATPases or Na H antiporters are thoroughly discussed The role of K in photosynthesis and the role of Na in charging the battery of life are pointed out Also the relationships between alkali metal ions and diseases e g Parkinson or traumatic brain injury are covered and the relevance of Li salts in medicine pharmacology and mechanism is reviewed This and more is treated in an authoritative and timely manner in the 16 stimulating chapters of Volume 16 The Alkali Metal Ions Their Role for Life which are written by 44 internationally recognized experts from 12 nations The impact of this vibrant research area is manifested in nearly 3000 references over 30 tables and more than 150 illustrations two thirds in color MILS 16 also provides excellent information for teaching Astrid Sigel Helmut Sigel and Roland K O Sigel have long standing interests in Biological Inorganic Chemistry Their research focuses on metal ion interactions with nucleotides and nucleic acids and on related topics They edited previously 44 volumes in the series Metal Ions in Biological Systems

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

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

Lead: Its Effects on Environment and Health Astrid Sigel, Helmut Sigel, Roland K.O. Sigel, 2017-04-10 Volume 17 entitled Lead Its Effects on Environment and Health of the series Metal Ions in Life Sciences centers on the interrelations between biosystems and lead The book provides an up to date review of the bioinorganic chemistry of this metal and its ions it covers the biogeochemistry of lead its use not only as gasoline additive and anthropogenic release into the environment its cycling and speciation in the atmosphere in waters soils and sediments and also in mammalian organs The analytical tools to determine and to quantify this toxic element in blood saliva urine hair etc are described The properties of lead II complexes formed with amino acids peptides proteins including metallothioneins nucleobases nucleotides nucleic acids and other ligands of biological relevance are summarized for the solid state and for aqueous solutions as well All this is important for obtaining a coherent picture on the properties of lead its effects on plants and toxic actions on mammalian organs This and more is treated in an authoritative and timely manner in the 16 stimulating chapters of Volume 17 which are written by 36 internationally

recognized experts from 13 nations The impact of this recently again vibrant research area is manifested in nearly 2000 references over 50 tables and more than 100 illustrations half in color Lead Its Effects on Environment and Health is an essential resource for scientists working in the wide range from material sciences inorganic biochemistry all the way through to medicine including the clinic not forgetting that it also provides excellent information for teaching **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 *Cadmium: From Toxicity to Essentiality* Astrid Sigel, Helmut Sigel, Roland KO Sigel, 2013-02-26 Volume 11

provides in an authoritative and timely manner in 16 stimulating chapters written by 40 internationally recognized experts from 11 nations and supported by more than 2600 references 35 tables and over 100 illustrations many in color a most up to date view on the role of cadmium for life presently a vibrant research area MILS 11 covers the bioinorganic chemistry of Cd II its biogeochemistry anthropogenic release into the environment and speciation in the atmosphere waters soils and sediments The analytical tools for Cd determination its imaging in cells and the use of ^{113}Cd NMR to probe Zn II and Ca II proteins are summarized as are Cd II interactions with nucleotides nucleic acids amino acids and proteins including metallothioneins The phytoremediation by Cd II accumulating plants etc the toxicology of Cd II its damage to mammalian organs and its role as a carcinogen for humans are highlighted **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 *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

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 Sigels 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

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

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