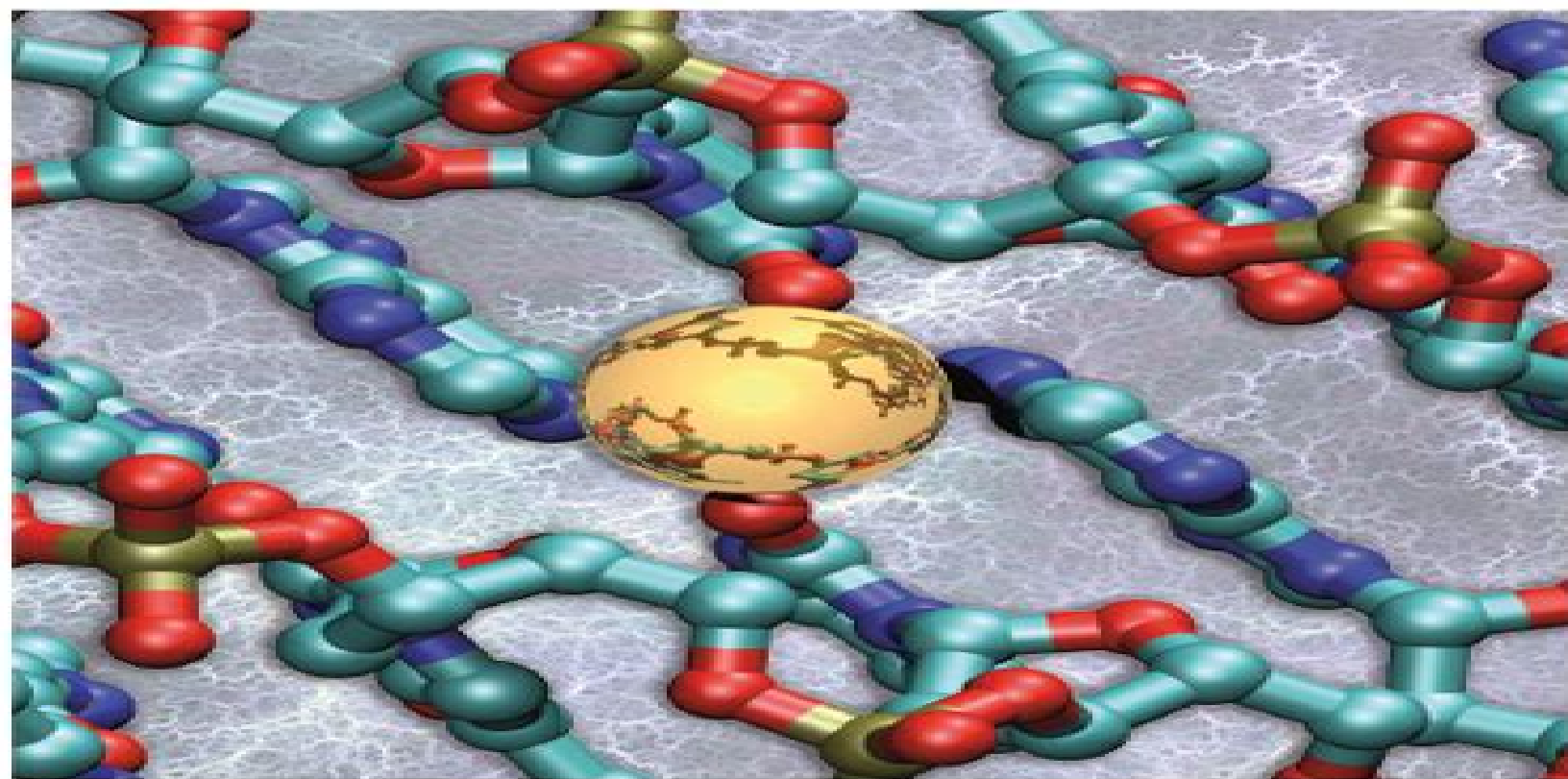


RSC Biomolecular Sciences

Edited by Nicholas V Hud

Nucleic Acid-Metal Ion Interactions



RSC Publishing

Nucleic Acid Metal Ion Interactions Rsc Rsc Biomolecular Sciences

**Mark S. P. Sansom, Philip Charles
Biggin**



Nucleic Acid Metal Ion Interactions Rsc Rsc Biomolecular Sciences:

Nucleic Acid-metal Ion Interactions Nicholas V. Hud, 2009 Provides a perspective on nucleic acid metal ion interactions with an emphasis on experimental biophysical studies which will prove indispensable to biophysicists and molecular biologists

Innovations in Biomolecular Modeling and Simulations Tamar Schlick, 2012 The chemical and biological sciences face unprecedented opportunities in the 21st century A confluence of factors from parallel universes advances in experimental techniques in biomolecular structure determination progress in theoretical modeling and simulation for large biological systems and breakthroughs in computer technology has opened new avenues of opportunity as never before Now experimental data can be interpreted and further analysed by modeling and predictions from any approach can be tested and advanced through companion methodologies and technologies This two volume set describes innovations in biomolecular modeling and simulation in both the algorithmic and application fronts With contributions from experts in the field the books describe progress and innovation in areas including simulation algorithms for dynamics and enhanced configurational sampling force field development implicit solvation models coarse grained models quantum mechanical simulations protein folding DNA polymerase mechanisms nucleic acid complexes and simulations RNA structure analysis and design and other important topics in structural biology modeling The books are aimed at graduate students and experts in structural biology and chemistry and the emphasis is on reporting innovative new approaches rather than providing comprehensive reviews on each subject

DNA Conjugates and Sensors Keith R Fox, Tom Brown, 2012-11-30 Applications of nucleic acids have developed recently to provide solutions for biosensors diagnostic tools and as platforms for the assembly of complex structures These developments have been possible as their base sequence can be used to assemble precise structures following simple and predictable rules Self assembled DNA can then be amplified using polymerase chain reaction PCR and this ultimately enables the preparation of synthetic nucleic acids Their use as molecular tools or DNA conjugates has recently been enhanced by the addition of other groups including enzymes fluorophores and small molecules Written by leaders in the field this volume describes the preparation and application of these DNA conjugates Several have been used as sensors aptamers riboswitches and nanostructures based on the ability of nucleic acids to adopt specific structures in the presence of ligands whilst others link reporter groups such as proteins or fluorophores to RNA or DNA for detection single molecule studies and increasing the sensitivity of PCR The book is relevant to researchers in areas related to analytical chemistry chemical biology medicinal chemistry molecular pharmacology and structural and molecular biology

RNA Helicases Eckhard Jankowsky, 2010-07-01 RNA helicases and RNA helicase like proteins are the largest group of enzymes in eukaryotic RNA metabolism and although they are subject to intense ongoing research there is much confusion about function and classification of these enzymes Although these enzymes are essential for virtually all processes involving RNA there is no overview detailing structure function and or biological roles of these pivotal proteins This book provides the first

comprehensive and systematic overview of biology mechanism and structure of RNA helicases and RNA helicase like enzymes Research into RNA helicases takes place in many different fields from cell and developmental biology to mechanistic enzymology and structural biology and this book integrates the knowledge of these diverse fields into one valuable resource It also provides an informative overview on the entire group of enzymes Individual chapters on each subfamily of RNA helicases and RNA helicase like proteins are written by experts in the respective fields All chapters are systematically integrated and the reader is guided by a didactic introductory chapter The main strengths of the book are the combination of systematics and details that will allow the reader to gain insight into results from diverse fields while maintaining a view of the entire field It will be a key reference for academics advanced students researchers and professionals working in or joining this field

Fluorescent Analogs of Biomolecular Building Blocks Marcus Wilhelmsson, Yitzhak Tor, 2016-03-16 Fluorescent Analogs of Biomolecular Building Blocks focuses on the design of fluorescent probes for the four major families of macromolecular building blocks Compiling the expertise of multiple authors this book moves from introductory chapters to an exploration of the design synthesis and implementation of new fluorescent analogues of biomolecular building blocks including examples of small molecule fluorophores and sensors that are part of biomolecular assemblies

Biophysical Approaches Determining Ligand Binding to Biomolecular Targets Alberto Podjarny, Annick P Dejaegere, Bruno Kieffer, 2011-04-01 The binding of small ligands to biological molecules is central to most aspects of biological function The past twenty years has seen the development of an increasing armoury of biophysical methods that not only detect such binding but also provide varying degrees of information about the kinetics thermodynamics and structural aspects of the process These methods have received increasing attention with the growth in more rational approaches to drug discovery and design This book reviews the latest advances in the application of biophysics to the study of ligand binding It provides a complete overview of current techniques to identify ligands characterise their binding sites and understand their binding mechanisms Particular emphasis is given to the combined use of different techniques and their relative strengths and weaknesses Consistency in the way each technique is described makes it easy for readers to select the most suitable protocol for their research The introduction explains why some techniques are more suitable than others and emphasizes the possible synergies between them The following chapters all written by a specialist in the particular technique focus on each method individually The book finishes by describing how several complimentary techniques can be used together for maximum effectiveness This book is suitable for biomolecular scientists at graduate or post doctoral level in academia and industry Biologists and chemists will also find it a useful introduction to the techniques available

RNA Polymerases as Molecular Motors Henri C. Buc, Terence Strick, 2009-04-16 This book focuses on two aspects of the transcription cycle the recognition of the promoter by the enzyme and the achievement of consecutive translocation steps during elongation of the RNA product

Molecular Simulations and Biomembranes Mark S. P. Sansom, Philip Charles Biggin, 2010 The need for

information in the understanding of membrane systems has been caused by three things an increase in computer power methodological developments and the recent expansion in the number of researchers working on it worldwide However there has been no up to date book that covers the application of simulation methods to membrane systems directly and this book fills an important void in the market It provides a much needed update on the current methods and applications as well as highlighting recent advances in the way computer simulation can be applied to the field of membranes and membrane proteins The objectives are to show how simulation methods can provide an important contribution to the understanding of these systems The scope of the book is such that it covers simulation of membranes and membrane proteins but also covers the more recent methodological developments such as coarse grained molecular dynamics and multiscale approaches in systems biology Applications embrace a range of biological processes including ion channel and transport proteins The book is wide ranging with broad coverage and a strong coupling to experimental results wherever possible including colour illustrations to highlight particular aspects of molecular structure With an internationally respected list of authors its publication is timely and it will prove indispensable to a large scientific readership

Protein-Nucleic Acid Interactions

Phoebe A. Rice, Carl C. Correll, 2008-05-22 The structural biology of protein nucleic acid interactions is in some ways a mature field and in others in its infancy High resolution structures of protein DNA complexes have been studied since the mid 1980s and a vast array of such structures has now been determined but surprising and novel structures still appear quite frequently High resolution structures of protein RNA complexes were relatively rare until the last decade Propelled by advances in technology as well as the realization of RNA's importance to biology the number of example structures has ballooned in recent years New insights are now being gained from comparative studies only recently made possible due to the size of the database as well as from careful biochemical and biophysical studies As a result of the explosion of research in this area it is no longer possible to write a comprehensive review Instead current review articles tend to focus on particular subtopics of interest This makes it difficult for newcomers to the field to attain a solid understanding of the basics One goal of this book is therefore to provide in depth discussions of the fundamental principles of protein nucleic acid interactions as well as to illustrate those fundamentals with up to date and fascinating examples for those who already possess some familiarity with the field The book also aims to bridge the gap between the DNA and the RNA views of nucleic acid protein recognition which are often treated as separate fields However this is a false dichotomy because protein DNA and protein RNA interactions share many general principles This book therefore includes relevant examples from both sides and frames discussions of the fundamentals in terms that are relevant to both The monograph approaches the study of protein nucleic acid interactions in two distinctive ways First DNA protein and RNA protein interactions are presented together Second the first half of the book develops the principles of protein nucleic acid recognition whereas the second half applies these to more specialized topics Both halves are illustrated with important real life examples The first half of the book develops

fundamental principles necessary to understand function An introductory chapter by the editors reviews the basics of nucleic acid structure Jen Jacobsen and Jacobsen discuss how solvent interactions play an important role in recognition illustrated with extensive thermodynamic data on restriction enzymes Marmorstein and Hong introduce the zoology of the DNA binding domains found in transcription factors and describe the combinational recognition strategies used by many multiprotein eukaryotic complexes Two chapters discuss indirect readout of DNA sequence in detail Berman and Lawson explain the basic principles and illustrate them with in depth studies of CAP while in their chapter on DNA bending and compaction Johnson Stella and Heiss highlight the intrinsic connections between DNA bending and indirect readout Horvath lays out the fundamentals of protein recognition of single stranded DNA and single stranded RNA and describes how they apply in a detailed analysis of telomere end binding proteins Nucleic acids adopt more complex structures Lilley describes the conformational properties of helical junctions and how proteins recognize and cleave them Because RNA readily folds due to the stabilizing role of its 2 hydroxyl groups Li discusses how proteins recognize different RNA folds which include duplex RNA With the fundamentals laid out discussion turns to more specialized examples taken from important aspects of nucleic acid metabolism Schroeder discusses how proteins chaperone RNA by rearranging its structure into a functional form Berger and Dong discuss how topoisomerases alter the topology of DNA and relieve the superhelical tension introduced by other processes such as replication and transcription Dyda and Hickman show how DNA transposases mediate genetic mobility and Van Duyne discusses how site specific recombinases cut and paste DNA Horton presents a comprehensive review of the structural families and chemical mechanisms of DNA nucleases whereas Li in her discussion of RNA protein recognition also covers RNA nucleases Lastly Ferr D Amar shows how proteins recognize and modify RNA transcripts at specific sites The book also emphasises the impact of structural biology on understanding how proteins interact with nucleic acids and it is intended for advanced students and established scientists wishing to broaden their horizons

Natural Product Chemistry for Drug Discovery Antony D. Buss, Mark S. Butler, 2010 This text provides a comprehensive summary of where natural product chemistry is today in drug discovery It covers emerging technologies and case studies and is a source of up to date information on the topical subject of natural products

Structural Virology Mavis Agbandje-McKenna, Robert McKenna, 2010-11-11 Over the last ten years much effort has been devoted to improving the biophysical techniques used in the study of viruses This has resulted in the visualization of these large macromolecular assemblages at atomic level thus providing the platform for functional interpretation and therapeutic design Structural Virology covers a wide range of topics and is split into three sections The first discusses the vast biophysical methodologies used in structural virology including sample production and purification confocal microscopy mass spectrometry negative stain and cryo electron microscopy X ray crystallography and nuclear magnetic resonance spectroscopy The second discusses the role of virus capsid protein structures in determining the functional roles required for receptor recognition cellular entry capsid assembly genome

packaging and mechanisms of host immune system evasion The last section discusses therapeutic strategies based on virus protein structures including the design of antiviral drugs and the development of viral capsids as vehicles for foreign gene delivery Each topic covered will begin with a review of the current literature followed by a more detailed discussion of experimental procedures a step in the viral life cycle or strategies for therapeutic development With contributions from experts in the field of structural biology and virology this exceptional monograph will appeal to biomedical scientists involved in basic and or applied research on viruses It also provides up to date reference material for students entering the field of structural virology as well as scientists already familiar with the area

Recent Developments in Biomolecular NMR

Marius Clore, Jennifer Potts, 2012 NMR spectroscopy is widely used in biomolecular science particularly for structure determination of proteins nucleic acids and carbohydrates Much of the innovation within NMR spectroscopy has been within the field of protein NMR spectroscopy an important technique in structural biology Filling a gap in the literature this book draws together experts in the field to discuss the real advances in NMR methods that have occurred or have an impact on the biomolecular field in the last few years The coverage includes recent developments in using NMR for determination of protein structures membrane proteins the dynamics of RNA and advances in NMR in drug discovery Edited by leading biological NMR spectroscopists the book is essential reference for researchers in industry and academia interested in or joining this bioanalytical field

Quantum Tunnelling in Enzyme-catalysed Reactions Rudolf Konrad Allemann, Nigel S.

Scrutton, 2009 In recent years there has been an explosion in knowledge and research associated with the field of enzyme catalysis and H tunneling Rich in its breath and depth this introduction to modern theories and methods of study is suitable for experienced researchers those new to the subject Edited by two leading experts and bringing together the foremost practitioners in the field this up to date account of a rapidly developing field sits at the interface between biology chemistry and physics It covers computational kinetic and structural analysis of tunnelling and the synergy in combining these methods with a major focus on H tunneling reactions in enzyme systems The book starts with a brief overview of proton and electron transfer history by Nobel Laureate Rudolph A Marcus The reader is then guided through chapters covering almost every aspect of reactions in enzyme catalysis ranging from descriptions of the relevant quantum theory and quantum classical theoretical methodology to the description of experimental results The theoretical interpretation of these large systems includes both quantum mechanical and statistical mechanical computations as well as simple more approximate models Most of the chapters focus on enzymatic catalysis of hydride proton and H transfer an example of the latter being proton coupled electron transfer There is also a chapter on electron transfer in proteins This is timely since the theoretical framework developed fifty years ago for treating electron transfers has now been adapted to H transfers and electron transfers in proteins Accessible in style this book is suitable for a wide audience but will be particularly useful to advanced level undergraduates postgraduates and early postdoctoral workers

Oxidative Folding of Peptides and Proteins Luis

Moroder, Johannes Buchner, 2008-12-10 The formation of disulfide bonds is probably the most influential modification of peptides and proteins An elaborate set of cellular machinery exists to catalyze and guide this process In recent years significant developments have been made in both our understanding of the in vivo situation and the in vitro manipulation of disulfide bonds This is the first monograph to provide a comprehensive overview of this exciting and rapidly developing area It offers in depth insights into the mechanisms of in vivo and in vitro oxidative folding of proteins as well as mono and multiple stranded peptides Procedures applied for laboratory and industrial purposes are also discussed by top experts in the field The book describes the enzymes involved in the correct oxidative folding of cysteine containing proteins in prokaryotes and eukaryotes It then goes on to discuss the mimicking of these enzymes for successful in vitro folding of proteins including synthetic replicates and to deal with important issues concerning cysteine rich peptides The ability of natural bioactive peptides to fold correctly and in high yields to form defined structural motifs using cysteine sequence patterns is still puzzling With this in mind synthetic procedures for establishing native cysteine frameworks are discussed using selected examples such as the potential of selenocysteines The biotechnological and pharmaceutical relevance of proteins peptides their variants and synthetic replicates is continuously increasing Consequently this book is invaluable for peptide and protein chemists involved in related research and production

Handbook of Astrobiology Vera M. Kolb, 2018-12-07 Choice Recommended Title August 2019 Read an exclusive interview with Professor Vera Kolb here Astrobiology is the study of the origin evolution distribution and future of life on Earth This exciting and significant field of research also investigates the potential existence and search for extra terrestrial life in the Solar System and beyond This is the first handbook in this burgeoning and interdisciplinary field Edited by Vera Kolb a highly respected astrobiologist this comprehensive resource captures the history and current state of the field Rich in information and easy to use it assumes basic knowledge and provides answers to questions from practitioners and specialists in the field as well as providing key references for further study Features Fills an important gap in the market providing a comprehensive overview of the field Edited by an authority in the subject with chapters written by experts in the many diverse areas that comprise astrobiology Contains in depth and broad coverage of an exciting field that will only grow in importance in the decades ahead [Protein-Nucleic Acid Interactions](#)

Phoebe A. Rice, Carl C. Correll, 2008 *Venoms, Animal and Microbial Toxins, Volume II* Jean-Marc Sabatier, Herve Kovacic, Delavar Shahbazzadeh, Jing-Lin Wang, Zhijian Cao, Patrick Michael McNutt, Heike Wulff, Yuri N. Utkin, 2022-09-29 **Comprehensive Biomaterials II** Kevin Healy, Dietmar W. Hutmacher, David W. Grainger, C. James Kirkpatrick, 2017-05-18 Comprehensive Biomaterials II Second Edition Seven Volume Set brings together the myriad facets of biomaterials into one expertly written series of edited volumes Articles address the current status of nearly all biomaterials in the field their strengths and weaknesses their future prospects appropriate analytical methods and testing device applications and performance emerging candidate materials as competitors and disruptive technologies research and

development regulatory management commercial aspects and applications including medical applications Detailed coverage is given to both new and emerging areas and the latest research in more traditional areas of the field Particular attention is given to those areas in which major recent developments have taken place This new edition with 75% new or updated articles will provide biomedical scientists in industry government academia and research organizations with an accurate perspective on the field in a manner that is both accessible and thorough Reviews the current status of nearly all biomaterials in the field by analyzing their strengths and weaknesses performance and future prospects Covers all significant emerging technologies in areas such as 3D printing of tissues organs and scaffolds cell encapsulation multimodal delivery cancer vaccine biomaterial applications neural interface understanding materials used for in situ imaging and infection prevention and treatment Effectively describes the many modern aspects of biomaterials from basic science to clinical applications

Nuclear Magnetic Resonance, 2015-05-12 Applications of nuclear magnetic resonance span a wide range of scientific disciplines from physics to medicine This series has provided an essential digest of the NMR literature for more than four decades and each volume provides unrivalled coverage of the literature on this topic Continuous coverage on some topics such as theoretical and physical aspects of nuclear shielding is balanced by the desire for coverage on newer topics like applications in biological systems and materials science For those wanting to become rapidly acquainted with NMR or seasoned practitioners this is an invaluable source of current methods and applications

Interplay between Metal Ions and Nucleic Acids Astrid Sigel, Helmut Sigel, Roland KO 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

The Top Books of the Year Nucleic Acid Metal Ion Interactions Rsc Rsc Biomolecular Sciences The year 2023 has witnessed a remarkable surge in literary brilliance, with numerous captivating novels captivating the hearts of readers worldwide. Lets delve into the realm of popular books, exploring the captivating narratives that have enthralled audiences this year. The Must-Read : Colleen Hoover's "It Ends with Us" This heartfelt tale of love, loss, and resilience has captivated readers with its raw and emotional exploration of domestic abuse. Hoover expertly weaves a story of hope and healing, reminding us that even in the darkest of times, the human spirit can succeed. Uncover the Best : Taylor Jenkins Reid's "The Seven Husbands of Evelyn Hugo" This captivating historical fiction novel unravels the life of Evelyn Hugo, a Hollywood icon who defies expectations and societal norms to pursue her dreams. Reid's compelling storytelling and compelling characters transport readers to a bygone era, immersing them in a world of glamour, ambition, and self-discovery. Discover the Magic : Delia Owens' "Where the Crawdads Sing" This captivating coming-of-age story follows Kya Clark, a young woman who grows up alone in the marshes of North Carolina. Owens weaves a tale of resilience, survival, and the transformative power of nature, entrancing readers with its evocative prose and mesmerizing setting. These popular novels represent just a fraction of the literary treasures that have emerged in 2023. Whether you seek tales of romance, adventure, or personal growth, the world of literature offers an abundance of compelling stories waiting to be discovered. The novel begins with Richard Pappen, a bright but troubled young man, arriving at Hampden College. Richard is immediately drawn to the group of students who call themselves the Classics Club. The club is led by Henry Winter, a brilliant and charismatic young man. Henry is obsessed with Greek mythology and philosophy, and he quickly draws Richard into his world. The other members of the Classics Club are equally as fascinating. Bunny Corcoran is a wealthy and spoiled young man who is always looking for a good time. Charles Tavis is a quiet and reserved young man who is deeply in love with Henry. Camilla Macaulay is a beautiful and intelligent young woman who is drawn to the power and danger of the Classics Club. The students are all deeply in love with Morrow, and they are willing to do anything to please him. Morrow is a complex and mysterious figure, and he seems to be manipulating the students for his own purposes. As the students become more involved with Morrow, they begin to commit increasingly dangerous acts. The Secret History is a brilliant and gripping novel that will keep you guessing until the very end. The novel is a cautionary tale about the dangers of obsession and the power of evil.

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