

Molecular Basis of Specificity in Nucleic Acid-Drug Interactions

Edited by B. Pullman and J. Jortner

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Molecular Basis Of Specificity In Nucleic Acid Drug Interactions

Thomas L. James



Molecular Basis Of Specificity In Nucleic Acid Drug Interactions:

Molecular Basis of Specificity in Nucleic Acid-Drug Interactions A. Pullman, Joshua Jortner, 2012-12-06 One of the central problems in the study of the mechanism of DNA ligand interactions is the existence and nature of sequence specificity with respect to the base pairs of DNA The presence of such a specificity could be of particular significance because it might possibly mean the involvement of specific genes in the effectiveness of the different drugs The elucidation of the factors responsible for the specificity could then be important for the development of compounds susceptible to contribute to the control of gene expression and also to the development of rationally conceived improved new generations of effective and specific chemotherapeutic agents Important recent achievements experimental and theoretical in the analysis of such sequence specificities open prospects for possible rapid progress in this field The 23rd Jerusalem symposium was devoted to the exploration of these recent achievements in relation to many types of ligand with special emphasis on antitumor drugs All major types of interaction intercalation groove binding covalent linking coordination have been considered So was also the effect of the interaction on the structure and properties of the nucleic acids and the relationship between the interaction and biological or pharmacological activities We feel that this Volume presents a relatively complete up to date account of the state of the art in this important field of research

Molecular Aspects of Anticancer Drug DNA Interaction

Neidle, 1993-08-16 This cutting edge book surveys the current knowledge on the mode of action of the major classes of DNA interactive antitumor agents providing information that could be crucial for the discovery of new therapeutic substances It is an important reference for molecular biologists cancer researchers biochemists biophysicists and pharmacologists

Molecular Aspects of Anticancer Drug DNA Interactions Stephen Neidle, 1994-05-03 This cutting edge book surveys the current knowledge on the mode of action of the major classes of DNA interactive antitumor agents providing information that could be crucial for the discovery of new therapeutic substances It is an important reference for molecular biologists cancer researchers biochemists biophysicists and pharmacologists

DNA-Protein Interactions Tom Moss, 2008-02-02 Dr Tom Moss assembles the new standard collection of cutting edge techniques to identify key protein DNA interactions and define their components their manner of interaction and their manner of function both in the cell and in the test tube The techniques span a wide range from factor identification to atomic detail and include multiple DNA footprinting analyses including in vivo strategies gel shift EMSA optimization SELEX surface plasmon resonance site specific DNA protein crosslinking and UV laser crosslinking Comprehensive and broad ranging DNA Protein Interactions Principles and Protocols 2nd Edition offers a stellar array of over 100 up to date and readily reproducible techniques that biochemists and molecular cellular and developmental biologists can use successfully today to understand DNA protein interactions

In Vitro Transcription and Translation Protocols Martin J. Tymms, 2008-02-02 Most laboratories conducting studies that use molecular biology techniques employ in vitro transcription and translation systems as a routine part of their day to day research The commercial availability of

purified bacterial RNA polymerase and the availability of robust translation systems has made in vitro systems attractive not only as an alternative to the in vivo expression of genes but also as good model systems for studying specific aspects of transcription and translation. Although fairly efficient eukaryotic translation systems have been established for a number of years, reconstitution of transcription in vitro has proved to be more difficult. Recent improvements in fractionation techniques and the cloning of proteins involved in transcription have made this a fast moving area of research. Considerable progress has also been made in recent years in developing in vitro systems to study transcription and translation in chloroplasts and mitochondria together with systems for the study of protein import. *In Vitro Transcription and Translation Protocols* provides many detailed experimental procedures for prokaryotic transcription and translation systems together with protocols for many key techniques used in the analysis of eukaryotic transcription. In keeping with the successful format of preceding volumes of the *Methods in Molecular Biology* series, step by step instructions are provided together with extensive notes that cover troubleshooting and special tips considered important.

Small Molecule DNA and RNA Binders Martine Demeunynck, Christian Bailly, W. David Wilson, 2006-03-06 The development of molecules that selectively bind to nucleic acids has provided many details about DNA and RNA recognition. The range of such substances such as metal complexes, peptides, oligonucleotides and a wide array of synthetic organic compounds is as manifold as the functions of nucleic acids. Nucleic acid recognition sequences are often found in the major or minor groove of a double strand while other typical interactions include intercalation between base pairs or the formation of triple or quadruple helices. One example of a binding mode that has recently been proposed is end stacking on such complex structures as the telomere tetraplex. In this comprehensive book, internationally recognized experts describe in detail the important aspects of nucleic acid binding and in so doing present impressive approaches to drug design. Since typical substances may be created naturally or synthetically, emphasis is placed on natural products, chemical synthesis, the use of combinatorial libraries and structural characterization. The whole is rounded off by contributions on molecular modeling as well as investigations into the way in which any given drug interacts with its nucleic acid recognition site.

DNA Topoisomerases: Biochemistry and Molecular Biology, 1994-11-07 Each volume of *Advances in Pharmacology* provides a rich collection of reviews on timely topics. Emphasis is placed on the molecular basis of drug action, both applied and experimental.

Advances in DNA Sequence-Specific Agents J.B. Chaires, 1996-07-09 DNA sequence specificity is a sub specialty in the general area of molecular recognition. This area includes macromolecular molecular interactions e.g. protein-DNA oligomer-DNA interactions e.g. triple strands and ligand-DNA interactions e.g. drug-DNA. It is this latter group of DNA sequence specificity interactions that is the subject of Volumes 1 and 2 of *Advances in DNA Sequence Specific Agents*. As was the case for Volume 1, Part A also covers methodology but in Volume 2 we include calorimetric titrations, molecular modeling, X-ray crystallographic and NMR structural studies and transcriptional assays. Part B also follows the same format as Volume 1 and describes the sequence specificities and covalent

and noncovalent interactions of small ligands with DNA This volume is aimed in general at scientists who have an interest in deciphering the molecular mechanisms for sequence recognition of DNA The methods have general applicability to small molecules as well as oligomers and proteins while the examples provide general principles involved in sequence recognition

Molecular Biology of DNA Topoisomerases and Its Application to Chemotherapy Toshiwo Andoh, Masao

Oguro, Hideo Ikeda, 1992-10-26 Molecular Biology of DNA Topoisomerases and Its Application to Chemotherapy is based on conference proceedings from the International Symposium on DNA Topoisomerases in Chemotherapy held in Nagoya Japan in November 1991 The book opens with a discussion of the structural and functional properties of various types of DNA topoisomerases identified in prokaryotes and eukaryotes in addition to their roles as cellular targets of anticancer and antimicrobial agents Other topics addressed include the genetics and biology of DNA topoisomerases inhibitors of microbial DNA topoisomerases and drug resistance inhibitors of mammalian DNA topoisomerases and drug resistance and preclinical and clinical studies of DNA topoisomerase inhibitors Molecular Biology of DNA Topoisomerases and Its Application to Chemotherapy will broaden the understanding of biology and genetics of DNA topoisomerases and contribute to the development of antimicrobial and anticancer agents inhibitors of topoisomerases It will be invaluable for oncologists molecular biologists cellular biologists geneticists biochemists and pharmaceutical researchers

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National Institute of General Medical Sciences (U.S.), 1975 *Research Awards Index*, 1989 *Biomedical Index to PHS-supported Research*, 1990 *Handbook of Chemical Biology of Nucleic Acids* Naoki Sugimoto, 2023-07-29 This handbook is the first to comprehensively cover nucleic acids from fundamentals to recent advances and applications It is divided into 10 sections where authors present not only basic knowledge but also recent research Each section consists of extensive review chapters covering the chemistry biology and biophysics of nucleic acids as well as their applications in molecular medicine biotechnology and nanotechnology All sections within this book are Physical Chemistry of Nucleic Acids Section Editor Prof Roland Winter Structural Chemistry of Nucleic Acids Section Editor Prof Janez Plavec Organic Chemistry of Nucleic Acids Section Editor Prof Piet Herdewijn Ligand Chemistry of Nucleic Acids Section Editor Prof Marie Paule Teulade Fichou Nucleic Acids and Gene Expression Section Editor Prof Cynthia Burrows Analytical Methods and Applications of Nucleic Acids Section Editor Prof Chaoyong Yang Nanotechnology and Nanomaterial Biology of Nucleic Acids Section Editor Prof Zhen Xi Nucleic Acids Therapeutics Section Editor Prof Katherine Seley Radtke Biotechnology and Synthetic Biology of Nucleic Acids Section Editor Prof Eriks Rozners Functional Nucleic Acids Section Editor Prof Keith R Fox The handbook is edited by outstanding leaders with contributions written by international renowned experts It is a valuable resource not only for researchers but also graduate students working in areas related to nucleic acids who would like to learn more about their important role and potential applications

Membrane Proteins: Structures, Interactions and

Models A. Pullman, Joshua Jortner, 2012-12-06 The 25th Jerusalem Symposium represents a most significant highlight in the development and history of these meetings Living within the decimal system we have celebrated with much pleasure the 19th and the 20th Jerusalem Symposia With this one we experience a feeling of particular satisfaction because 25 years is different from more than two decades and a half It is a quarter of a century It seems thus as if we have changed the dimension of our endeavour In no way do we lose the sense of modesty with respect to the significance of these meetings For the organizers however they do represent a continuity of efforts which we feel happy to have been able to carry out At this occasion it seems useful to say a few words about the origin of the Jerusalem Symposia and to recall the name of a colleague who played an essential role in their creation and has been a most efficient and devoted co organizer of the seven first of them This was Professor Ernst Bergmann one of the most distinguished founders of Israeli Science and a world famous physico organic chemist

Platinum-Based Drugs in Cancer Therapy Lloyd R. Kelland, Nicholas P. Farrell, 2000-03-24 Leading international experts comprehensively review all aspects of platinum anticancer drugs and their current use in treatment as well as examining their future therapeutic prospects Writing from a variety of disciplines these authorities discuss the chemistry of cisplatin in aqueous solution the molecular interaction of platinum drugs with DNA and such exciting new areas as DNA mismatch repair and replicative bypass apoptosis and the transport of platinum drugs into tumor cells The emergent platinum drugs of the future orally active agents the sterically hindered ZD0473 and the polynuclear charged platinum BBR3464 are also fully considered Timely and interdisciplinary Platinum Based Drugs in Cancer Therapy offers cancer therapeutics specialists an illuminating survey of every aspect of platinum drugs from mechanisms of action to toxicology tumor resistance and new analogs

Food Borne Carcinogens Minako Nagao, Takashi Sugimura, 2000-06-15 Current Toxicology Series Series Editors Diana Anderson Tno Bibra International Ltd Surrey UK Michael D Waters Consultant Chapel Hill NC USA Timothy C Marrs Department of Health London UK Food Borne Carcinogens Heterocyclic Amines Edited by Minako Nagao Tokyo University of Agriculture Japan Takashi Sugimura National Cancer Center Japan Food Borne Carcinogens provides a comprehensive review of the genotoxic and carcinogenic activities of heterocyclic amines HCAs found in cooked foods This unique and timely publication describes the latest research and offers an insight into new developments Key topics covered include Combination effects of HCAs in carcinogenesis Genetic alterations in animal tumours induced by HCAs Adduct levels yielded in humans by ordinary exposure levels Genetic polymorphisms in HCA metabolic enzymes and suspected individual differences in susceptibility to HCA carcinogenesis Written by world renowned experts in the field this book will be essential reading for toxicologists and cancer researchers working within industry academia and government particularly food scientists genetic toxicologists biochemists nutritionists and those investigating risk evaluation of HCAs and the regulation of environmental carcinogens It will also be of interest to other scientists involved in the identification of naturally occurring antimutagens and anticarcinogens

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National Institute of General Medical Sciences (U.S.). Division of Research Grants, 1975 **Specific Interaction and Biological Recognition Processes** Zeno Simon, Nicolae Voiculescu, Ioan Motoc, 1993-06-16 Specific Interaction and Biological Recognition Processes is devoted to two major aspects of biological processes specificity in biological recognition and the recognition processes themselves Topics covered in specificity include the theoretical basis for specificity in biological recognition the thermodynamic and chemical equilibrium background and consideration of the relationship between size of combining sites and specificity The use of semi empirical potentials for calculating interaction energies and the potential of quantum chemistry methods for calculating receptor effector affinities are also discussed The various recognition processes described include DNA replication transcription translation enzymatic reactions transmembrane transport processes mechanisms of action of hormones and other chemical messengers and self nonself recognition in immunology Specific Interaction and Biological Recognition Processes will be a useful reference for molecular biologists biochemists enzymologists immunologists oncologists pharmaceutical researchers and others interested in the topic

DNA-targeting Molecules as Therapeutic Agents Michael J Waring, 2018-03-08 There have been remarkable advances towards discovering agents that exhibit selectivity and sequence specificity for DNA as well as understanding the interactions that underlie its propensity to bind molecules This progress has important applications in many areas of biotechnology and medicine notably in cancer treatment as well as in future gene targeting therapies The editor and contributing authors are leaders in their fields and provide useful perspectives from diverse and interdisciplinary backgrounds on the current status of this broad area The role played by chemistry is a unifying theme Early chapters cover methodologies to evaluate DNA interactive agents and then the book provides examples of DNA interactive molecules and technologies in development as therapeutic agents DNA binding metal complexes peptide and polyamide DNA interactions and gene targeting tools are some of the most compelling topics treated in depth This book will be a valuable resource for postgraduate students and researchers in chemical biology biochemistry structural biology and medicinal fields It will also be of interest to supramolecular chemists and biophysicists Nuclear Magnetic Resonance and Nucleic Acids Thomas L. James, 1995-11-06 The critically acclaimed laboratory standard for forty years Methods in Enzymology is one of the most highly respected publications in the field of biochemistry Since 1955 each volume has been eagerly awaited frequently consulted and praised by researchers and reviewers alike More than 250 volumes have been published all of them still in print and much of the material is relevant even today truly an essential publication for researchers in all fields of life sciences

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