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The molecular structure, biological roles, and inhibition of plant pathogenic fungal chitin deacetylases

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Chitin/polysaccharide deacetylases belong to the carbohydrate esterases family 4 (CE4 enzymes). They play a crucial role in modifying the physiochemical characteristics of structural polysaccharides and are also involved in a wide range of biological processes such as fungal autolysis, spore formation, cell wall formation and integrity, and germling adhesion. These enzymes are mostly common in fungi, marine bacteria, and a limited number of insects. They facilitate the deacetylation of chitin which is a structural biopolymer that is abundantly found in fungal cell walls and spores and also in the cuticle and peritrophic matrices of insects. The deacetylases exhibit specificity towards a substrate containing a sequence of four GlcNAc units, with one of these units being subjected to deacetylation. Chitin deacetylation results in the formation of chitosan, which is a poor substrate for host plant chitinases, therefore it can suppress the host immune response triggered by fungal pathogens and enhance pathogen virulence and colonization. This review discusses plant pathogenic fungal chitin/polysaccharide deacetylases including their structure, substrate specificity, biological roles and some recently discovered chitin deacetylase inhibitors that can help to mitigate plant fungal diseases. This review provides fundamental knowledge that will undoubtedly lead to the rational design of novel inhibitors that target pathogenic fungal chitin deacetylases, which will also aid in the management of plant diseases, thereby safeguarding global food security.

KEYWORDS

plant pathogenic fungi, chitin deacetylases, molecular structure, biological roles, inhibition

Molecular Structure Biological Specifi

Linus Pauling, Harvey A. Itano



Molecular Structure Biological Specifici:

Molecular structure and biological specificity: a symposium sponsored by the Office of Naval Research and arranged by the American Institute of Biological Sciences, held in Washington, D.C. October 28,29, 1955; ed

Symposium on Molecular Structure and Biological Specificity, Washington, 1955, Linus Pauling, Harvey Akio Itano,

Specification of Drug Substances and Products Christopher M. Riley, K. Lien Nguyen, 2024-09-22 *Specification of Drug Substances and Drug Products* is a fully comprehensive reference on Specification Setting for Pharmaceuticals. There have been several recent developments in the ICH Guidelines which were not captured in previous editions, notably the new guideline on Development of Analytical Procedure and the revisions to the validation guidelines and the specification guidelines. This edition contains chapters discussing the unique requirements for the universal critical quality attributes as well as the specific tests required to characterize and control different types of products ranging in complexity from small molecules in immediate release oral dosage forms to complex products such as drug antibody conjugates and mRNA based products. This substantially expanded revision of the 2nd edition will serve as a practical comprehensive reference for scientists, managers, educators, and consultants involved in the development and regulation of pharmaceutical products. Presents critical assessment, potential impact, and application of the recent revisions to ICH guidelines on method validation Q2 as well as the latest guideline on Analytical Method Development Q14 and the special regional requirements in non-ICH regions. Addresses comprehensive treatment of the development and validation of analytical methodologies used in the analysis, control, and specification of a variety of different types of dosage forms ranging from traditional oral solid dosage forms to proteins, mRNA based drugs, vaccines, and gene therapy. This book will also address drug device combination products such as digital drug delivery systems, transdermal systems, and inhalation products. Presents detailed treatment of latest statistical approaches including new approaches to the treatment of validation data, method specification setting, and shelf life prediction based on stability data. *Molecular Structure and Biological Specificity* Linus Pauling, Harvey A. Itano, 1957

The Challenge of CMC Regulatory Compliance for Biopharmaceuticals John Geigert, 2014-07-08 This book highlights the challenges facing quality assurance, quality control, QA, QC in today's biopharmaceutical environment and presents the strategic importance and value generated by QA, QC for their involvement in control of manufacturing. It will put into perspective the need for a graded approach to QA, QC from early clinical trials through market approval. Since the first edition published in 2004, there have been more than 50 new regulatory guidances released by the Food and Drug Administration (FDA), European Medicines Agency (EMA), and ICH that affect the CMC regulatory compliance of biopharmaceuticals. Also, the application of biosimilars has been developed in Europe and is under development in the USA. The revised update will be broadened to include not only biopharmaceuticals, biotech drugs, but also other biologics, vaccines, cell therapy, plasma derived proteins, etc.

Handbook of Pharmaceutical Manufacturing Formulations Safaraz K. Niazi, 2016-04-19 No other area of regulatory

compliance receives more attention and scrutiny by regulatory authorities than the regulation of sterile products for obvious reasons With the increasing number of potent products particularly the new line of small protein products joining the long list of proven sterile products the technology of manufacturing ster

Handbook of Pharmaceutical Manufacturing Formulations, Third Edition Sarfaraz K. Niazi, 2019-12-09 The Handbook of Pharmaceutical Manufacturing Formulations Third Edition Volume Six Sterile Products is an authoritative and practical guide to the art and science of formulating drugs for commercial manufacturing With thoroughly revised and expanded content this sixth volume of a six volume set compiles data from FDA and EMA new drug applications patents and patent applications and other sources of generic and proprietary formulations including author s own experience to cover the broad spectrum of cGMP formulations and issues in using these formulations in a commercial setting A must have collection for pharmaceutical manufacturers educational institutions and regulatory authorities this is an excellent platform for drug companies to benchmark their products and for generic companies to formulate drugs coming off patent Features Largest source of authoritative and practical formulations cGMP compliance guidance and self audit suggestions Differs from other publications on formulation science in that it focuses on readily scalable commercial formulations that can be adopted for cGMP manufacturing Tackles common difficulties in formulating drugs and presents details on stability testing bioequivalence testing and full compliance with drug product safety elements Written by a well recognized authority on drug and dosage form development including biological drugs and alternative medicines

Proceedings of the International Conference on Advances in Nano-Neuro-Bio-Quantum (ICAN 2023) R. Somashekhar, Preenon Bagchi, Kirthi S. Jawalkar, G. Dhanalakshmi, Richard Hill, Sanjay N. Harke, 2023-11-16 This is an open access book We are pleased to announce our Springer International Conference on Advances in Nano Neuro Bio Quantum I CAN 2023 which will be a unique conference where we will connect Biological Function through Computational sciences to the world of integrated quantum physics chemistry biology medicine and therapeutics The quantum science is seeking insights in Bioinformatics through quantum computing which again is an interdisciplinary field linking quantum physics chemistry and biology with computer science Quantum computers achieve unprecedented calculating capabilities by harnessing the bizarre properties of matter on the subatomic scale where electrons exist as clouds of probability and pairs of entangled particles can interact instantaneously irrespective of their distance apart But how far are we from fully realizing this new class of computers What are its prospects to advance the study of artificial intelligence And when if ever will psychological scientists be able to write programs that unlock some of the secrets of human cognition For now a daunting list of technological innovations stands in the way of answering these questions We can however take a glimpse at the current frontier of quantum computing and consider the technological gaps that remain This science along with traditional Indian sciences coupled with big data and bioinformatics aims to unfold the complex relationship between genotype and phenotype on a global genome wide scale to different biological processes Quantum neurobiology is a concept to which we are not yet

fully accustomed to it refers to a narrow field of the operation of quantum physics in the nervous system such as the emergence of higher cognitive functions like consciousness memory internal experiences and the processes of choice and decision making which are products of the warm wet noisy brain According to quantum neurobiology quantum physics is involved in biological processes and consciousness memory internal experiences and the processes of choice and decision making which are the products of the warm wet noisy brain may be the result of the operations of quantum physics In Silico Medicinal Chemistry Nathan Brown,2015-11-02 Exploring the methodologies and applications of computational tools in drug design this book is a practical introduction to chemoinformatics molecular modelling and computational chemistry for researchers *The Anatomy of Knowledge* Marjorie Grene,2015-06-05 Originally published in 1969 Since the seventeenth century the kind of knowledge afforded by mathematical physics has come more and more to furnish mankind with an ideal for all knowledge The ideal also carries with it a new conception of the nature of things all things whatsoever are held to be intelligible ultimately in terms of the laws of inanimate nature This reductionist formula can be overcome only by the fundamental rethinking of our philosophical premises To contribute towards this rethinking was the aim of the Study Group at whose meetings this collection originated The essayists come from a wide range of disciplines but all want to address the conflict in our culture The first part consists of discussions of various fundamental problems in the sciences There are essays on the inter relation of physics and psychology on the possible reduction of biology to physics and chemistry on new approaches to experimental psychology against the possibility of giving a purely factual account of social and political life and for a fundamental reform of our concept of responsibility The second section of the book suggests lines of philosophical inquiry which might help to resolve the epistemological and ethical problems arising at the foundations of physics biology psychology and the social sciences Biotechnology Syed Imtiaz Haider,Anika Ashtok,2009-04-13 All manufacturing companies face the daunting task of designing an employee training matrix that meets the gamut of national and international regulatory standards Answering the call for a one stop training resource that focuses exclusively on this multi faceted high tech industry Biotechnology A Comprehensive Training Guide for the Biotechnology Industry provides ready to implement training templates that save time and expense without cutting corners on critical elements Downloadable Resources Why Reinvent the Wheel This complete single source reference contains 28 complete biotechnology courses and a customizable downloadable resources with hands on training tools The book also provides time saving information on how to orient employees involved in writing and executing batch manufacturing and in process control documents Key Benefits Contains adaptable training text test summaries and papers test answers and certificates of completion Streamlines the training process maximizing efficiency Boosts the marketing edge over competitors This valuable training tool presents step by step guidance for optimizing research and development expenditures avoiding marketing delays gaining a competitive advantage reducing product development failures developing skilled manpower and maintaining local and international

regulatory compliance *Federal Register* ,1998-06-09 Antibody Patenting Jürgen Meier,Oswin Ridderbusch,2023-08-22

Antibodies have revolutionized medicine and biotechnology and have become indispensable tools in therapy diagnostics analytics and research Therapeutic antibodies for example have become firmly established in the ranks of blockbuster drugs currently accounting for about half of the top 10 best selling medicines At the same time a body of case law dealing specifically with the patentability of antibody related inventions and the enforcement of antibody patents has emerged in major jurisdictions The at times significant divergences between different jurisdictions have been compounded by recent decisions in the United States which have severely curtailed the possibilities to obtain broad antibody patents It is therefore essential to understand how antibody inventions are assessed in different jurisdictions in order to secure an optimal patent protection and to successfully enforce such patents This book provides practitioners with a comprehensive resource elucidating all aspects of the patenting of antibodies from initial drafting and prosecution to enforcement using a country by country format The updated and expanded Second Edition covers more than 30 of the most important IP jurisdictions worldwide i e the European Patent Office Belgium Denmark Finland France Germany Hungary Ireland Italy the Netherlands Poland Spain Sweden Switzerland the United Kingdom the United States of America Canada Mexico the Andean Community Bolivia Colombia Ecuador and Peru Argentina Brazil Chile China India Israel Japan Singapore South Korea Taiwan Australia and New Zealand The 49 contributors to this book all distinguished experts in this field provide clear and practice oriented advice on a range of topics including Which types of antibody inventions are patent eligible Which types of functional and structural features are accepted for claiming antibodies What needs to be considered when defining antibodies in terms of their antigen target affinity binding specificity epitope competitive binding and other characteristics in relation to reference antibodies as well as their effects on the target Which pitfalls must be avoided when defining amino acid sequences chemical modifications or glycosylation patterns and when relying on cell line deposits Which breadth of claims is accepted for antibody inventions and what experimental support is required Which specific medical applications of antibodies can be claimed How is inventive step assessed in the specific case of antibody inventions What has to be considered when enforcing antibody patents including in relation to biosimilars as well as the doctrine of equivalence All chapters follow the same structure which makes this book easily accessible and allows a direct comparison between different jurisdictions Practitioners will find the much needed tools and guidance to secure the best possible patent protection for antibody inventions in more than 30 of the most important jurisdictions worldwide This book is the fifth volume in the AIPPI Law Series which has been established together with the International Association for the Protection of Intellectual Property AIPPI a non affiliated non profit organization dedicated to improving and promoting the protection of intellectual property at both national and international levels **Biomedical Index to PHS-supported Research: pt. A. Subject access A-H** ,1992 **Quantum Biochemistry and Specific Interactions** Zeno Simon,1976 First published in 2004 Routledge is an

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