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Cell Cycle Regulation Jul 14 2022 Cell Cycle Regulation describes the interaction of the nuclear genome, the cytoplasmic pools, the organelles, the cell surface, and the extracellular environment that govern the cell cycle regulation. Comprised of 12 chapters, this book includes cell cycle regulation around nuclear chromatin modulation and some aspects of chromatin modification and its effects on gene expression. The opening chapters describe the macromolecular structure of chromatin subunits and the types and kinds of postsynthetic modifications occurring on histones, such as acetylation, methylation, and phosphorylation. The subsequent chapter deals extensively on histone phosphorylation, especially histone H1, H1M, H2A, and H3, during the cell cycle. Another chapter describes a selective histone leakage from nuclei during isolation accounting for the role of histone acetylation and phosphorylation in gene expression. This book goes on examining the assembly of microtubules and structural analysis on the regulatory role of calcium into a pattern for mitosis regulation. Other chapters discuss the methods used to measure intracellular pH changes as a function of the cell cycle of Physarum and the quantitative and qualitative changes taking place during the various phases of the cell cycle. The use of mammalian cell fusion to study cell cycle regulation and the protein synthesis regulation during the cell cycle in Chlamydomonas reinhardi are then discussed. The final chapters focus on the regulation of expression of an inducible structural gene during the cell cycle of the green alga Chlorella. The chapters provide evidence for a model of positive and negative oscillatory control of inducible gene expression. An analysis of the expression of cytoplasmic genes as a function of the cell cycle using pedigrees of a large number of individual yeast cells is also included. This book will appeal to a wide variety of life scientists and to molecular, cellular, and developmental biologists.

Regulation of the Eukaryotic Cell Cycle Dec 15 2019 Comprised of the latest developments in cell cycle research, it analyzes the principles underlying the control of cell division. Offers a framework for future investigation, especially that aimed toward understanding and treatment of cancer.

Quantitative Biology: Dynamics of Living Systems Nov 13 2019 With the emergence of Systems Biology, there is a greater realization that the whole behavior of a living system may not be simply described as the sum of its elements. To represent a living system using mathematical principles, practical quantities with units are required. Quantities are not only the bridge between mathematical description and biological observations; they often stand as essential elements similar to genome information in genetics. This important realization has greatly rejuvenated research in the area of Quantitative Biology. Because of the increased need for precise quantification, a new era of technological development has opened. For example, spatio-temporal high-resolution imaging enables us to track single molecule behavior in vivo. Clever artificial control of experimental conditions and molecular structures has expanded the variety of quantities that can be directly measured. In addition, improved computational power and novel algorithms for analyzing theoretical models have made it possible to investigate complex biological phenomena. This research topic is organized on two aspects of technological advances which are the backbone of Quantitative Biology: (i) visualization of biomolecules, their dynamics and function, and (ii) generic

technologies of model optimization and numeric integration. We have also included articles highlighting the need for new quantitative approaches to solve some of the long-standing cell biology questions. In the first section on visualizing biomolecules, four cutting-edge techniques are presented. Ichimura et al. provide a review of quantum dots including their basic characteristics and their applications (for example, single particle tracking). Horisawa discusses a quick and stable labeling technique using click chemistry with distinct advantages compared to fluorescent protein tags. The relatively small physical size, stability of covalent bond and simple metabolic labeling procedures in living cells provides this type of technology a potential to allow long-term imaging with least interference to protein function. Obien et al. review strategies to control microelectrodes for detecting neuronal activity and discuss techniques for higher resolution and quality of recordings using monolithic integration with on-chip circuitry. Finally, the original research article by Amariei et al. describes the oscillatory behavior of metabolites in bacteria. They describe a new method to visualize the periodic dynamics of metabolites in large scale cultures populations. These four articles contribute to the development of quantitative methods visualizing diverse targets: proteins, electrical signals and metabolites. In the second section of the topic, we have included articles on the development of computational tools to fully harness the potential of quantitative measurements through either calculation based on specific model or validation of the model itself. Kimura et al. introduce optimization procedures to search for parameters in a quantitative model that can reproduce experimental data. They present four examples: transcriptional regulation, bacterial chemotaxis, morphogenesis of tissues and organs, and cell cycle regulation. The original research article by Sumiyoshi et al. presents a general methodology to accelerate stochastic simulation efforts. They introduce a method to achieve 130 times faster computation of stochastic models by applying GPGPU. The strength of such accelerated numerical calculation are sometimes underestimated in biology; faster simulation enables multiple runs and in turn improved accuracy of numerical calculation which may change the final conclusion of modeling study. This also highlights the need to carefully assess simulation results and estimations using computational tools.

Cell Cycle Regulation of HMG-CoA Reductase Apr 30 2021

Progress in Cell Cycle Research Feb 21 2023 The "Progress in Cell Cycle Research" series is dedicated to serve as a collection of reviews on various aspects of the cell division cycle, with special emphasis on less studied aspects. We hope this series will continue to be helpful to students, graduates and researchers interested in the cell cycle area and related fields. We hope that reading of these chapters will constitute a "point of entry" into specific aspects of this vast and fast moving field of research. As PCCR4 is being printed several other books on the cell cycle have appeared (ref. 1-3) which should complement our series. This fourth volume of PCCR starts with a review on RAS pathways and how they impinge on the cell cycle (chapter 1). In chapter 2, an overview is presented on the links between cell anchorage - cytoskeleton and cell cycle progression. A model of the Gl control in mammalian cells is provided in chapter 3. The role of histone acetylation and cell cycle contriol is described in chapter 4. Then follow a few reviews dedicated to specific cell cycle regulators: the 14-3-3 protein (chapter 5), the cdc7/Dbf4 protein kinase (chapter 6), the two products of the pI6/CDKN2A locus and their link with Rb and p53 (chapter 7), the Ph085 cyclin-dependent kinases in yeast (chapter 9), the cdc25 phophatase (chapter 10), RCCI and ran (chapter 13). The intriguing phosphorylation dependent prolyl-isomerization process and its function in cell cycle regulation are reviewed in chapter 8.

Generation of Model Systems for the Study of Novel Cell Cycle Regulation in Development Jan 20 2023

Cell Cycle Control Jan 16 2020 What makes a cell begin the complicated process of cell division? How does it stop? What happens when things go wrong? The use of developing technologies has revealed the extraordinary degree to which cell cycle control mechanisms have been conserved through eukaryotic evolution. This is thefirst book to cover the cell cycle field in the wake of groundbreaking research from the past five years. A historical look at cell cycle findings places this new knowledge into perspective and demonstrates the universality of cell cycle control, from the evolutionary process to cancer research andmitotic regulation. Cell cycle research is the most exciting area in contemporary biology, and anyone either interested or involved in the cell cycle field will find this an invaluable study.

Checkpoint Responses in Cancer Therapy May 12 2022 Extensive research has uncovered a set of molecular surveillance mechanisms – commonly called “checkpoints” – which tightly monitor cell-cycle processes. Today’s anticancer drug development has identified many of these cell-cycle checkpoint molecules as effective targets. Research now promises to uncover a new generation of anticancer drugs with improved therapeutic indices based on their ability to target emerging checkpoint components. Checkpoint Responses in Cancer Therapy summarizes the advances made over the past 20 years, identifying components of cell-cycle checkpoints and their molecular regulation during checkpoint activation and validating the use of checkpoint proteins as targets for the development of anticancer drugs. This book’s distinguished panel of authors takes a close look at topics ranging from the major molecular players affecting DNA synthesis and the response to DNA damage to advances made in the identification of chemical compounds capable of inhibiting individual mitotic kinases. Illuminating and authoritative, Checkpoint Responses in Cancer Therapy offers a critical summary of findings for researchers in the pharmaceutical and biotechnology industries and a valuable resource for academic scientists in cancer research and the study of cell-cycle regulation, signal transduction and apoptosis.

Understanding Cancer Oct 13 2019 Understanding Cancer: From Basics to Therapeutics presents both basic concepts and research prospects in the field of cancer biology. This book summarizes the fundamental aspects of cancer and presents a detailed description of molecular aspects as well as treatment and therapeutics for patients. The book is divided into three parts: the first part deals with the basics of cancer, including etiology and medical diagnosis; the second part explores the molecular mechanisms associated with cancer, focusing on cell cycle and apoptosis, cell metabolism, gene regulation, epigenetics, and stem cells; and the third part is dedicated to therapeutics, discussing chemo and radiotherapies, gene, hormone, herbal, and immunotherapies. It is a valuable resource for cancer researchers, oncologists, graduate students, and biomedical researchers who need to understand the fundamental topics related to cancer to apply to their research work or clinical setting. Presents fundamental aspects of cancer in a didactic way to make the content easily applicable by readers Illustrates the content through detailed images developed by the authors exclusively for the book to facilitate comprehension Summarizes the content of each chapter with several tables and schematic diagrams for quick consult

Stem Cells: From Basic Research to Therapy Aug 03 2021 The first volume of Stem Cells deals with the fundamental principles that govern embryonic and somatic stem cell biology. Historically, the identification and characterization of such pathways and general rules of stemness occurred during embryonic development and Volume I reflects this with topics spanning cell cycle regulation, epigenetics, and asymmetric cell division in a number of organ systems from planarian to human. Three specific sections discuss i) Basic Stem Cell Biology, ii) Tissue Formation During Development, and iii) Model Organisms with particular emphasis on those more relevant for biomedical

research and, thus, leading to the topics addressed in Volume II.

Progress in Cell Growth Process Research Jan 28 2021 When used in the context of reproduction of living cells the phrase "cell growth" is shorthand for the idea of "growth in cell populations by means of cell reproduction." During cell reproduction one cell (the "mother" cell) divides to produce two daughter cells. Cell proliferation, which depends on the intimately linked processes of growth and division, is a fundamental systems-level attribute of all life forms. The precise regulation of proliferation in response to internal and external cues is critical for development, tissue renewal and evolutionary fitness, while the disregulation of cell proliferation underlies a variety of human diseases, most notably cancer and ageing. Historically, breakthroughs in our understanding of cell growth and division have derived from cross-fertilisation of results and ideas from researchers studying a wide range of model organisms, from yeast to humans. The basis for cell proliferation entails the control of key signalling and cell cycle regulators through transcriptional, translational, post-translational, genetic and epigenetic mechanisms. Indeed, many conceptual breakthroughs in cell regulation have derived from analyses of basic cell cycle mechanisms. This book is dedicated to new research from around the globe in this field.

Cell Cycle Checkpoint Control Protocols Aug 15 2022 The field of cell cycle regulation is based on the observation that the life cycle of a cell progresses through several distinct phases, G1, M, S, and G2, occurring in a well-defined temporal order. Details of the mechanisms involved are rapidly emerging and appear extraordinarily complex. Furthermore, not only is the order of the phases important, but in normal eukaryotic cells one phase will not begin unless the prior phase is completed successfully. Che- point control mechanisms are essentially surveillance systems that monitor the events in each phase, and assure that the cell does not progress prematurely to the next phase. If conditions are such that the cell is not ready to progress—for example, because of incomplete DNA replication in S or DNA damage that may interfere with chromosome segregation in M—a transient delay in cell cycle progression will occur. Once the inducing event is properly handled— for example, DNA replication is no longer blocked or damaged DNA is repaired—cell cycle progression continues. Checkpoint controls have recently been the focus of intense study by investigators interested in mechanisms that regulate the cell cycle. Furthermore, the relationship between checkpoint c- trol and carcinogenesis has additionally enhanced interest in these cell cycle regulatory pathways. It is clear that cancer cells often lack these checkpoints and exhibit genomic instability as a result. Moreover, several tumor suppressor genes participate in checkpoint control, and alterations in these genes are as- ciated with genomic instability as well as the development of cancer.

Molecular Biology of the Cell Dec 07 2021

Molecular Biology Oct 05 2021 Molecular Biology: Principles of Genome Function offers a fresh, distinctive approach to the teaching of molecular biology. With its focus on key principles, its emphasis on the commonalities that exist between the three kingdoms of life, and its integrated approach throughout, it is the perfect companion to any molecular biology course.

Cell Cycle Checkpoints Sep 04 2021 Cell cycle checkpoints control the fidelity and orderly progression of eukaryotic cell division. By controlling the orderly progression of critical cell cycle events such as DNA replication and chromosome segregation and ensuring proper repair of damaged DNA, cell cycle checkpoints function to ensure genome integrity. Mechanisms of checkpoint controls are not only the research focus of investigators interested in mechanisms that regulate the cell cycle, but are also the interests of researchers studying cancer development as it is increasingly clear that loss of cell cycle checkpoints, which leads to genomic instability as a result, is a hallmark of tumorigenesis. Cell Cycle Checkpoints: Methods and Protocols provides detailed descriptions of methodologies

currently employed by researchers in the field, including those commonly used in the mammalian, yeast, C. elegans, Drosophila, and Xenopus model systems. Each chapter describes a specific technique or protocol, such as a method to induce cell cycle checkpoints in a particular model system, to synchronize a population of cells to allow observations of cell cycle progression, to identify genes involved in checkpoint regulation, and to study particular protein components of cell cycle checkpoint pathways. Written in the highly successful Methods in Molecular BiologyTM series format, chapters contain introductions to their respective topics, lists of the necessary materials and reagents, step-by-step, readily reproducible laboratory protocols, and notes on troubleshooting and avoiding known pitfalls. Authoritative and easily accessible, Cell Cycle Checkpoints: Methods and Protocols seeks to serve both professionals and novices with its well-honed methodologies in an effort to further our knowledge of this essential field.

Genetic Expression in the Cell Cycle Feb 09 2022 Genetic Expression in the Cell Cycle provides an understanding of the molecular mechanisms that govern the expression of genetic information during the cell cycle. The initial five chapters describe the intimate relationships between the supramolecular complexes that form the basic structure of chromatin. Emphasis is placed on the dynamics of cycle-dependent changes in the structural organization of some of these components. Subsequent chapters demonstrate that small nuclear RNAs (SnRNA) are actively involved in gene regulation in eukaryotic cells; discuss the relationship between cell cycle regulation in the yeast Saccharomyces cerevisiae and transcription of ribosomal RNA genes; and describe the use of conditional lethal mutants to study the regulation of the cell cycle of eukaryotic cells. The remaining chapters discuss the concepts and methodologies employed to isolate and study specific cell cycle mutants of S. cerevisiae; the antiproliferative effect of interferon on cultured human fibroblasts; and the role of cell membrane and related subcellular elements in the control of proliferation, differentiation, and cell cycle kinetics.

DNA Damage Tolerance and Mutagenesis Feb 15 2020 (Cont.) Due to the mutagenic nature of Rev1, the cell must regulate the employment of TLS to optimize the benefits of tolerance. One manner this is accomplished in S. cerevisiae is through the cell cycle regulation of Rev1's protein levels. I begin with the study of proteasome-dependent degradation as a means to govern the cell cycle regulation of Rev1 and the non-cell cycle regulated levels of the Rev3 subunit of Pol[zeta]. Next, I describe another layer of regulation involving Rev 's lesion-specific catalytic activity that is otherwise largely ignored in vivo and how the error-free tolerance pathway masks the loss of this function.

Cell Cycle Control Jun 01 2021 This book provides leading edge research on a cell cycle, which is an ordered and highly controlled set of events that leads to cell growth and proliferation. Cell cycle progression is driven by changes in the substrate specificity and subcellular localisation of cyclin-dependent kinases (Cdks), which in turn are modulated by a collection of cyclins, Cdk-activating and Cdk-inhibiting kinases, and Cdk inhibitors (CDKIs). Regulation of the cell cycle is critical for the normal development of multicellular organisms and dysregulation of cell cycle could lead to cancer, a disease where normal cell growth and behaviour are lost. Cell cycle regulation is tightly controlled by both synthesis and degradation of short-lived proteins, such as cyclins and CDKIs, and degradation of these proteins is mainly mediated by the ubiquitin-dependent proteasome pathway.

Advances in Cancer Research Sep 23 2020 The Advances in Cancer Research series provides invaluable information on the exciting and fast-moving field of cancer research. This volume presents outstanding and original reviews on a variety of topics, including HAMLET and tumor cells; survivin and apoptosis control; retroviral insertional mutagenesis; aberrant ubiquitin-mediated proteolysis of cell cycle regulatory proteins and oncogenesis; and

epigenetic variability and the evolution of human cancer. Provides invaluable information on the exciting and fast-moving field of cancer research Presents outstanding and original reviews on a variety of topics, including HAMLET and tumor cells; survivin and apoptosis control; retroviral insertional mutagenesis; aberrant ubiquitin-mediated proteolysis of cell cycle regulatory proteins and oncogenesis; and epigenetic variability and the evolution of human cancer

Study of Glyoxylate Cycle Regulation by Sucrose During Protocorm Growth in Phalaenopsis Aphrodite Aug 23 2020

A Study of Mechanisms of Cell Cycle Regulation in the Male Gametophyte of Arabidopsis Thaliana Jul 02 2021 The haploid male gametophyte of angiosperms has an integral role in the production of twin sperm cells necessary for the double fertilization, the essence of flowering plants. However, the mechanisms regulating sperm cell formation and cell fate specification has yet to be identified. In this study, the thesis investigates the function of key cell cycle regulators and presents characterisation of a novel pollen division mutant of Arabidopsis (duo3) that fails to produce twin sperm cells. In addition, the project also examines the activity of small RNA (smRNA) pathways as a potential mechanism that modulates native gene expression. Pollen cell-specific vectors were constructed to drive the expression of hairpin double stranded RNA (hp-dsRNA) as tools for investigating the activity of smRNA pathways, and their efficacy was tested by manipulating expression of key cell cycle regulators in Arabidopsis. Indeed, expression of hp-dsRNA intended to knockdown transcripts of Cyclin B1 members, revealed a putative role Cyclin B1 in microspore and germ cell division. Furthermore, analysis of a Cyclin B1;1 reporter led to the identification of DUO1 (a pollen specific R2R3 MYB protein) but not DUO3 as a germ cell-specific regulator of Cyclin B1;1 expression. This interaction was further verified by rescuing mutant duo1 plants with Cyclin B1;1. Analysis of DUO3 expression revealed restricted patterns confined predominantly in dividing tissues. Moreover, study of Cyclin B1;1 reporter revealed mutant duo3 cells to be impaired in degrading Cyclin B1;1 protein, suggesting a role in modulating Cyclin B1;1 activity. In summary, this work has highlighted a potential role of the Cyclin B1 family in the development of the male gametophyte. Use of Cyclin B1;1 marker has demonstrated a first example of germ cell specific integrator of cell division and cell differentiation and a putative role of DUO3 in germ cell division. A significant progress has been achieved in understanding smRNA pathways and the vectors generated will be exploited to gain more insight into the development of the male gametophyte.

A Study on the Transcription Factor Brn-3b, the Cell Cycle Regulation and the Cause of Elevated Brn-3b Expression in Cancers Oct 17 2022

Cell Cycle Regulation Mar 10 2022 This book is a state-of-the-art summary of the latest achievements in cell cycle control research with an outlook on the effect of these findings on cancer research. The chapters are written by internationally leading experts in the field. They provide an updated view on how the cell cycle is regulated in vivo, and about the involvement of cell cycle regulators in cancer.

Metabolome Profiling to Study Metabolic Turnover, Regulation, and Cell Cycle Dynamics Jun 20 2020

Studies on Cell Cycle Regulation in Arabidopsis and Tobacco Nov 25 2020

Cell Cycle Regulation of DNA Replication in S. Cerevisiae Oct 25 2020

Cell Cycle Regulation Dec 19 2022 Focuses on recent key discoveries made relating to the cell cycle and its regulation - a critical new horizon in therapeutics. Research into all aspects of cell cycle regulation has undergone explosive growth during the past decade due to the powerful techniques of molecular biology. An overall view of the cellular processes, both at the enzymatic and genetic level, has been identified in continually finer detail, as described inside this text. This has enabled significant progress in the identification of drugs capable of acting on specific components of the cell cycle, with the result that we may soon have the ability to

manipulate the cell cycle pharmacologically. The potential impact on clinical conditions such as cancer, hematopoiesis, angiogenesis, inflammation, organ remodelling and apoptosis is vast. Originating from presentations at the Eighth SmithKline Beecham Pharmaceuticals United States Research Symposium, each chapter in this volume is written by an opinion leader in the field.

Global Analysis of the Transcriptional Regulation of Sinorhizobium Meliloti Cell Cycle Progression and Study of Cell Cycle Regulation During Symbiosis with Medicago Sativa Dec 27 2020 The complex [alpha]-proteobacterial cell cycle regulatory network is essential not only for faithful replication and segregation of the genome, but also to coordinate unique cellular differentiation events that have evolved as adaptations to the different lifestyles of this diverse group of bacteria. The soil-dwelling [alpha]-proteobacterium, Sinorhizobium meliloti, not only has to accurately coordinate the replication of its tripartite genome, but also must undergo a dramatic cellular differentiation in order to form an effective symbiosis with the legume Medicago sativa. Preliminary analyses have indicated that plasticity in the S. meliloti cell cycle regulatory network may be essential to symbiosis, but cell cycle research in S. meliloti has been hindered largely by lack of a method to obtain synchronous populations of S. meliloti. In this thesis, I present the first method to generate synchronous cultures of S. meliloti. I performed microarray gene expression analysis on synchronous populations of S. meliloti to gain a global view of transcriptional regulation of cell cycle events. This represents the first work of this kind done in an [alpha]-proteobacterium besides Caulobacter crescentus, which is the current model for [alpha]-proteobacterial cell cycle studies. The importance of transcriptional regulation of cell cycle progression was first discovered in C. crescentus and the work presented in this thesis highlights the conservation of cell cycle regulated gene expression in S. meliloti. I identified 462 cell cycle regulated transcripts in S. meliloti, which included genes involved in vital cell processes such as cell division, flagella biogenesis, replication and segregation of its tripartite genome as well as several putative cell cycle regulators. I compared the set of genes with cell cycle regulated transcripts identified in my analysis with the set identified in C. crescentus to generate a core set of 128 conserved genes demonstrating cell cycle regulated gene expression in both species. To determine which of the S. meliloti genes with cell cycle regulated transcripts might be part of the CtrA and DnaA regulons in S. meiloti, I performed CtrA and DnaA binding motif analysis. To understand the evolutionary significance of these CtrA and DnaA binding motifs, I looked at conservation of these motifs in homologous genes from several related [alpha]-proteobacteria. The results indicated that the putative CtrA regulon might be more evolutionarily constrained than the putative DnaA regulon. Organisms more closely related to S. meliloti or with more similar lifestyles demonstrated a much greater conservation of the CtrA binding motifs identified in S. meliloti. The CtrA binding motifs in S. meliloti identified by my analysis were not at all well conserved in C. crescentus, which was the most distantly related [alpha]-proteobacteria surveyed. These differences in cell cycle regulated transcription and the putative CtrA regulon between S. meliloti and C. crescentus thus appear to represent specific adaptations to the distinctive genome and unique intracellular symbiotic lifestyle of S. meliloti and illustrate the importance of S. meliloti as a model for cell cycle regulation in [alpha]-proteobacteria with similar intracellular lifestyles. The work presented in this thesis also describes the importance of CtrA regulation in S. meliloti during symbiosis with M. sativa. A crucial part of this symbiosis is a striking cellular differentiation (termed bacteroid differentiation), which includes changes in membrane permeability, cell elongation and branching, endoreduplication of the genome and loss of reproductive capacity and therefore a significant deviation from the free-living

cell cycle program. Endoreduplication of the genome requires a decoupling of DNA replication and cell division, which could be achieved by down-regulation of the essential master cell cycle regulator CtrA. I tested the effects of CtrA depletion in S. meliloti and found that CtrA depletion induces a bacteroid-like state characterized by elongated and branched cells and highly elevated DNA content. I also show that S. meliloti CtrA has a comparable half-life to C. crescentus CtrA, but regulated proteolysis of CtrA may be different in the two species since we found CtrA proteolysis to be essential in S. meliloti. In addition, I demonstrate that the promoter and coding regions of C. crescentus ctrA cannot complement an S. meliloti ctrA chromosomal deletion during symbiosis even though they can do so in the free-living state. My attempts to identify the defects in the function C. cresentus ctrA promoter or coding region within M. sativa gave surprising results since S. melioti strains expressing C. crescentus CtrA from the S. meliloti ctrA promoter region and vice versa were able to establish an effective symbiosis with M. sativa. I discuss several possibilities to explain this apparent paradox, but further study is required to fully clarify this observation. Taken as a whole, my thesis work represents a significant advancement to the field of cell cycle research in S. meliloti and [alpha]-proteobacteria as a whole. The cell synchronization method I developed will greatly facilitate more comprehensive analysis of cell cycle regulation in S. meliloti. My microarray gene expression analysis provides a global view of cell cycle regulated transcription in S. meliloti, which can be used in more in-depth explorations of specific mechanisms of transcriptional regulation of cell cycle events in S. meliloti. Lastly, my study of CtrA function in S. meliloti establishes the importance of CtrA regulation during symbiosis with M. sativa.

Cell Cycle Control Jun 13 2022 The fundamental question of how cells grow and divide has perplexed biologists since the development of the cell theory in the mid-19th century, when it was recognized by Virchow and others that “all cells come from cells.” In recent years, considerable effort has been applied to the identification of the basic molecules and mechanisms that regulate the cell cycle in a number of different organisms. Such studies have led to the elucidation of the central paradigms that underpin eukaryotic cell cycle control, for which Lee Hartwell, Tim Hunt, and Paul Nurse were jointly awarded the Nobel Prize for Medicine and Physiology in 2001 in recognition of their seminal contributions to this field. The importance of understanding the fundamental mechanisms that modulate cell division has been reiterated by relatively recent discoveries of links between cell cycle control and DNA repair, growth, cellular metabolism, development, and cell death. This new phase of integrated cell cycle research provides further challenges and opportunities to the biological and medical worlds in applying these basic concepts to understanding the etiology of cancer and other proliferative diseases.

SCF and APC E3 Ubiquitin Ligases in Tumorigenesis Feb 26 2021 This SpringerBrief explores the physiological roles of Skp1-Cullin1-F-box Complex (SCF) and Anaphase Promoting Complex (APC) in normal cells and in tumor formation. These two related, multi-subunit E3 ubiquitin ligase enzymes, APC and SCF are thought to be the major driving forces governing proper cell cycle progression. Defective cell cycle regulation leads to genomic instability and ultimately, cancer development. Selective degradation of key cell cycle regulators by the ubiquitin-proteasome system has been proven to be a major regulatory mechanism for ensuring ordered and coordinated cell cycle progression. The SCF and APC E3 ligases have been characterized to play pivotal roles in regulating the cell cycle progression by timely degrading various critical cell cycle regulators. This Brief reviews recent studies that have shown that deregulation of signaling pathways in which the two ubiquitin ligases are involved causes aberrant cell cycle regulation, in turn leading to tumorigenesis. The text also discusses how SCF and APC may present promising therapeutic targets to treat various cancers.

Progress in Cell Cycle Research Nov 06 2021 The

latest volume in this highly regarded series covers current advances in the fast-moving field of cell cycle research by gathering reviews otherwise scattered throughout the literature. Contributions encompass fields from cell and molecular biology to biochemistry.

Cell Cycle Regulation and Development in Alphaproteobacteria Jan 08 2022

Progress in Cell Cycle Research Nov 18 2022 This series is dedicated to serve as a collection of reviews on various aspects of the cell division cycle, with special emphasis in less studied aspects. This fourth volume starts with a review of RAS pathways and how they impinge on the cell cycle (chapter 1). In chapter 2, an overview is presented of the links between cell anchorage - cytoskeleton and cell cycle progression. A model of the G1 control in mammalian cells is provided in chapter 3. The role of histone acetylation and cell cycle control is described in chapter 4. Then follow a few reviews dedicated to specific cell cycle regulators: the 14-3-3 protein (chapter 5), the cdc7/Dbf4 protein kinase (chapter 6), the two products of the p16/CDKN2A locus and their link with Rb and p53 (chapter 7), the Pho85 cyclin-dependent kinases in yeast (chapter 9), the cdc25 phosphatase (chapter 10), RCC1 and ran (chapter 13). The intriguing phosphorylation-dependent prolyl-isomerization process and its function in cell cycle regulation are reviewed in chapter 8.

Cell Cycle Control and Dysregulation Protocols Apr 11 2022 Cell Cycle Control and Dysregulation Protocols focuses on emerging methodologies for studying the cell cycle, kinases, and kinase inhibitors. It addresses the issue of gene expression in vivo and in vitro, the analysis of cyclin-dependent kinase inhibitors, protein degradation mediated by the proteosome, the analysis of the transformed cell phenotype, and innovative techniques to detect apoptosis. Because there are already many manuals and protocols available, along with commercial kits and reagents, a variety of the more common techniques have not been included in our book. The protocols described, based on rather sophisticated techniques for in vivo and in vitro studies, consist of molecular biology, biochemistry, and various types of immunoassays. Indeed, the authors have successfully accomplished an arduous task by presenting several topics in the simplest possible manner. We are confident that Cell Cycle Control and Dysregulation Protocols will facilitate and optimize the work of practical scientists involved in researching the cell cycle. We greatly acknowledge the extraordinary contribution of the authors in writing this book.

Case Studies in Systems Biology Apr 18 2020 This book provides case studies that can be used in Systems Biology related classes. Each case study has the same structure which answers the following questions: What is the biological problem and why is it interesting? What are the relevant details with regard to cell physiology and molecular mechanisms? How are the details put together into a mathematical model? How is the model analyzed and simulated? What are the results of the model? How do they compare to the known facts of the cell physiology? Does the model make predictions? What can be done to extend the model? The book presents a summary of results and references to more relevant sources. The volume contains the classic collection of topics and studies that are well established yet novel in the systems biology field.

Study of Neural Tube Closure Using Forward Genetic Screens in Mice Mar 18 2020

In Vivo Study on Cell Cycle and Checkpoint Regulation During Mouse Liver Development Sep 16 2022 This dissertation, "In Vivo Study on Cell Cycle and Checkpoint Regulation During Mouse Liver Development" by Kwok-kin, Chan, □□□, was obtained from The University of Hong Kong (Pokfulam, Hong Kong) and is being sold pursuant to Creative Commons: Attribution 3.0 Hong Kong License. The content of this dissertation has not been altered in any way. We have altered the formatting in order to facilitate the ease of printing and reading of the dissertation. All rights not granted by the above license are retained by the author. DOI: 10.5353/th_b4559000 Subjects: Cell cycle - Regulation Cells -

Growth - Regulation Liver cells Liver - Molecular aspects

The Genetics of Cancer Jul 22 2020 Written by internationally recognized experts, The Genetics of Cancer provides up-to-date information and insight into the genetic basis of cancer and the mechanisms involved in cancer invasion and its secondary spread. This volume presents the deregulation of the cell cycle in tumor development and integrates the function of tumor suppressor genes, oncogenes, and metastasis-associated genes in the pathogenesis and progression of cancer. The Genetics of Cancer will be useful to all graduate students, clinicians, and researchers working in the fields of cancer biology, genetics, and molecular biology. Clonal evolution of the metastasis phenotype Cell Cycle regulation Apoptosis in tumour growth and metastasis Angiogenesis in cancer Cell surface glycoproteins and their receptors Proteinases and their inhibitors in cancer invasion Oncogenes and cancer metastasis Developmental genes Tumour suppressor genes Metastasis suppressor genes Dominant metastasis-associated genes

Progress in Cell Cycle Control Research Mar 30 2021 A cell cycle is an ordered and highly controlled set of events that leads to cell growth and proliferation. Cell cycle progression is driven by changes in the substrate specificity and subcellular localisation of cyclin-dependent kinases (Cdks), which in turn are modulated by a collection of cyclins, Cdk-activating and Cdk-inhibiting kinases, and Cdk inhibitors (CDKIs). Regulation of the cell cycle is critical for the normal development of multicellular organisms and dysregulation of cell cycle could lead to cancer, a disease where normal cell growth and behaviour are lost. Cell cycle regulation is tightly controlled by both synthesis and degradation of short-lived proteins, such as cyclins and CDKIs, and degradation of these proteins is mainly mediated by the ubiquitin-dependent proteasome pathway. This book presents the latest research in the field from around the globe.

Tumor Biology May 20 2020 With the aim of providing an international forum for the communication of both the basic and clinical aspects of molecular and cellular biology of cancer, a NATO ASl was held in Porto Carras, Halkidiki, Greece, September 1-12, 1995. The principles as well as recent developments in tumor biology were discussed in depth, with emphasis on the regulation of the cell cycle, differentiation, programmed cell death (apoptosis) and genetics of cancer. This book constitutes the proceedings of that meeting. Specifically, the following areas were addressed: (a) enzymes and proteins (cyclins) that control the cell cycle, as well as the role of m as gene in meiosis and transformation; (b) the structural basis for specificity in protein-tyrosine kinase reactions; (c) the differentiation of normal as well as neoplastic cells with respect to molecular mechanism(s) by which chemical agents or growth factors trigger maturation; (d) phenotypic and genetic aspects of apoptosis; (e) the role of growth factors, like IGF-l, FGF, TN, IL-6, etc. , in cell cycle regulation, apoptosis (cell death) and senescence; (f) molecular mechanisms of transcriptional activation of globin genes and stability of mRNAs related to growth proteins and iron metabolism; (g) the cellular and molecular biology of bone marrow hemopoiesis; and (h) neurotrophic factors and the generation of cellular diversity in the central nervous system. It was obvious from the studies presented that neoplastic cell growth, differentiation and apoptosis in many cell types are regulated at several levels.