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Viral Applications of Green Fluorescent Protein

Methods and Protocols

Edited by

Barry W. Hicks

 Humana Press



Green Fluorescent Protein Methods In Molecular Biology

Ammasi Periasamy, Robert M. Clegg



Green Fluorescent Protein Methods In Molecular Biology:

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Green Fluorescent Protein P. Michael Conn, 1999-04-02 One of the most important recent discoveries in science is the green fluorescent protein isolated from a bioluminescent jellyfish The gene that codes for this protein is active in any type of cell from microbes to humans producing a day glo dye visible as a bright green light in the microscope The power of the gene is that by using recombinant DNA technology GFP can be spliced to any protein essentially painting that protein green When such a spliced protein is inside a cell Further time lapse microscopy can be used to examine how that protein and the cellular components that it is part of move within the cell during the cell's life cycle This *Methods in Enzymology* volume deals with the utility of green fluorescent protein GFP The OVID database including MEDLINE Current Contents and other sources lists nine references to GFP for the ten year period 1985-1994 In contrast in less than four years thereafter over 500 references are listed a testament to the rapid growth of interest in this probe This volume documents many diverse uses for this interesting molecule in disciplines that broadly span biology The methods presented include shortcuts and conveniences not included in previously published sources The techniques are described in a context that allows comparisons to other related methodologies such comparisons are valuable to readers who must adapt existing procedures to new systems Also so far as possible methodologies have been presented in a manner that stresses their general applicability and potential limitations The volume provides a substantial and current overview of the extant methodology in the field and a view of its rapid development The critically acclaimed laboratory standard for more than 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 Now with more than 300 volumes all of them still in print the series contains much material still relevant today truly an essential publication for researchers in all fields of life sciences

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Green Fluorescent Protein Martin Chalfie, Steven R. Kain, 2005-12-13

Since the discovery of the gene for green fluorescent protein GFP derived from jellyfish this protein that emits a green glow has initiated a revolution in molecular biosciences With this tool it is now possible to visualize nearly any protein of interest in any cell or tissue of any species Since the publication of the first edition there have been tremendously significant technological advances including development of new mutant variants Proteins are now available in yellow and blue and Novel Fluorescent Proteins NFPs have expanded their utility in developing biosensors biological markers and other biological applications This updated expanded new edition places emphasis on the rise of NFPs including new chapters on NFP properties with detailed protocols applications of GFPs and NFPs in industry research and biosensors This book provides a solid theoretical framework along with detailed practical guidance on use of GFPs and NFPs with discussion of potential pitfalls The expert contributors provide real examples in showing how to tailor GFP NFP to specific systems maximize expression and enhance detection

Methods in Molecular Biology: Green fluorescent protein: applications and protocols John M. Walker, 1984 **Green Fluorescent Proteins**, 1998-10-07 This volume is an authoritative and comprehensive treatment of the approaches and techniques used for Green Fluorescent Proteins GFP The primary focus of this work is on research using biological systems The volume covers all aspects of GFP from its expression in different organisms to specific microscopic and data analysis methods Key Features Only volume on Green Fluorescent Protein research Covers all aspects of GFP Provides specific microscopic and data analysis methods Discusses the design and construction of GFP fusion proteins Covers GFP expression in animals insects plants and microbes Details procedures for time lapse imaging of living cells Explains how to implement single molecule fluorescence detection with GFP Discusses dual label GFP strategies for multicolor fluorescence Presents fluorescence resonance energy transfer methods with GFPs Details quantitative fluorescence imaging techniques Extensively illustrated with color photographs

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Fluorescent Proteins Kevin F. Sullivan, 2007-12-14 This new edition of Fluorescent Proteins presents current applications of autofluorescent proteins in cell and molecular biology authored by researchers from many of the key laboratories in the

field Starting from a current review of the broad palette of fluorescent proteins available several chapters focus on key autofluorescent protein variants including spectral variants photodynamic variants as well as chimeric FP approaches Molecular applications are addressed in chapters that detail work with single molecules approaches to generating protein fusions and biosensors as well as analysis of protein protein interactions in vivo by FRET fluorescence polarization and fluorescence cross correlation techniques A number of approaches to in vivo dynamics are presented including FRAP photoactivation and 4 dimensional microscopy Behavior of spindle components membrane proteins mRNA trafficking as well as analysis of cell types in tissues and in development are detailed and provide models for a wide variety of experimental approaches In addition several chapters deal directly with the computational issues involved in processing multidimensional image data and using fluorescent imaging to probe cellular behavior with quantitative modeling This volume brings together the latest perspective and techniques on fluorescent proteins and will be an invaluable reference in a wide range of laboratories

Fluorescent Proteins Mayank Sharma, 2022-09-15 This volume brings together cutting edge laboratory protocols to characterize the novel fluorescent proteins FPs and approaches based on fluorescent proteins that aim to answer some of the key cell biological questions The book covers topics ranging from the database of fluorescent proteins to their characterization and adaptation to a wide range of biological systems Written for the highly successful Methods in Molecular Biology series chapters include introductions to their respective topics lists of the necessary materials and reagents step by step and readily reproducible laboratory protocols and tips on troubleshooting and avoiding known pitfalls Authoritative and practical Fluorescent Proteins Methods and Protocols serves as an ideal guide for students and academicians enthusiastic about the recent progress in the practical application of fluorescent protein technology

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C. elegans Kevin Strange, 2008-02-05 Molecular biology has driven a powerful reductionist or molecule centric approach to biological research in the last half of the 20th century Reductionism is the attempt to explain complex phenomena by defining the functional properties of the individual components of the system Bloom 1 has referred to the post genome sequencing era as the end of naive reductionism Reductionist methods will continue to be an

essential element of all biological research efforts but naive reductionism the belief that reductionism alone can lead to a complete understanding of living organisms is not tenable Organisms are clearly much more than the sum of their parts and the behavior of complex physiological processes cannot be understood simply by knowing how the parts work in isolation Systems biology has emerged in the wake of genome sequencing as the successor to reductionism 2 5 The systems of systems biology are defined over a wide span of complexity ranging from two macromolecules that interact to carry out a specific task to whole organisms Systems biology is integrative and seeks to understand and predict the behavior or emergent properties of complex multicomponent biological processes A systems level characterization of a biological process addresses the following three main questions 1 What are the parts of the system i e

Flow Cytometry Protocols Teresa S.

Hawley, Robert Hawley, 2008-02-03 Flow cytometry has evolved since the 1940s into a multidisciplinary field incorporating aspects of laser technology fluid dynamics electronics optics computer science physics chemistry biology and mathematics Innovations in instrumentation development of small lasers discovery of new fluorochromes fluorescent proteins and implementation of novel methodologies have all contributed to the recent rapid expansion of flow cytometry applications In this thoroughly revised and updated second edition of Flow Cytometry Protocols time proven as well as cutting edge methods are clearly and comprehensively presented by leading experimentalists In addition to being a valuable reference manual for experienced flow cytometrists the editors expect this authoritative up to date collection to prove useful to investigators in all areas of the biological and biomedical sciences who are new to the subject The introductory chapter provides an eloquent synopsis of the principles and diverse uses of flow cytometry beginning with a historical perspective and ending with a view to the future Chapters 2 22 contain step by step protocols of highly practical and state of the art techniques Detailed instructions and helpful tips on experimental design as well as selection of reagents and data analysis tools will allow researchers to readily carry out flow cytometric investigations ranging from traditional phenotypic characterizations to emerging genomics and proteomics applications Complementing these instructive protocols is a chapter that provides a preview of the next generation of solid state lasers and one that describes a rapid means to validate containment of infectious aerosols generated during high speed sorting Chapters 23 24

Chromic Phenomena 3rd Edition Peter

Bamfield, Michael Hutchings, 2018-08-24 Chromic or colour related phenomena are produced in response to a chemical or physical stimulus This new edition will update the information on all those areas where chemicals or materials interact with light to produce colour a colour change or luminescence especially in the imaging analysis lighting and display areas The book has been restructured to show greater emphasis on applications where coloured compounds are used to transfer energy or manipulate light in some way therefore reducing the details on classical dyes and pigments In the past eight years since the previous edition there has been a remarkable increase in the number of papers and reviews being produced reflecting the growth of interest in this area This ongoing research interest is matched by a large number of new technological

applications gaining commercial value covering e.g. biomedical areas, energy, data storage, physical colour, bio-inspired materials and photonics. This book appeals to industrial chemists, professionals, postgraduates and as high level recommended reading for colour technology courses.

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Proteoglycan Protocols Renato V. Iozzo, 2008-02-02 Proteoglycans are some of the most elaborate macromolecules of mammalian and lower organisms The covalent attachment of at least five types of glycosami glycan side chains to more than forty individual protein cores makes these molecules quite complex and endows them with a multitude of biological functions Proteoglycan Protocols offers a comprehensive and up to date collection of preparative and analytical methods for the in depth analysis of proteoglycans Featuring step by step detailed protocols this book will enable both novice and experienced researchers to isolate intact proteoglycans from tissues and cultured cells to establish the composition of their carbohydrate moieties to generate strategies for prokaryotic and eukaryotic expression to utilize methods for the suppression of specific proteoglycan gene expression and for the detection of mutant cells and degradation products and to study specific interactions between proteoglycans and extracellular matrix proteins as well as growth factors and their receptors The readers will find concise yet comprehensive techniques carefully drafted by leading experts in the field Each chapter commences with a general Introduction followed by a detailed Materials section and an easy to follow Methods section An asset of each chapter is the extensive notation that includes troubleshooting tips and practical considerations that are often lacking in formal methodology papers The reader will find this section most valuable because it is clearly provided by experienced scientists who have first hand knowledge of the techniques they outline In addition most of the chapters are well

illustrated with examples of typical data generated with each method *Biophotonics, Part A* ,2003-02-19 The critically acclaimed laboratory standard for more than 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 Now with more than 300 volumes all of them still in print the series contains much material still relevant today truly an essential publication for researchers in all fields of life sciences Discusses optical instrumentation for imaging screening and diagnosis in molecules tissues and cells Covers the development and application of optical probes and techniques for imaging and drug screening Investigates the structure and dynamics of biomolecular systems screening and drug discovery and the diagnosis and treatment of disease **Ion Channels** James D. Stockand, Mark S. Shapiro, 2008-02-04 Internationally recognized biomedical scientists describe recent technological breakthroughs and demonstrate their use in successful experimental designs The diverse applications range from the study of allosteric regulation of ion channel activity using a classic mutagenesis approach to the study of channel subunit stoichiometry using a novel biophysical approach based on fluorescence resonance energy transfer Highlights include methods for heterologous expression of ion channels in cells for determining channel structure function for studying channel regulation and physiological function and for genetic screening and investigating channelopathies

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