

Methods in Molecular Biology

Volume 15

# PCR PROTOCOLS

*Current Methods and Applications*

*Edited by*  
**Bruce A. White**



# Pcr Protocols Methods In Molecular Biology

**Bing-Yuan Chen,Harry W. Janes**

## Pcr Protocols Methods In Molecular Biology:

**PCR Protocols** Bruce A. White,2008-02-02 PCR has been successfully utilized in every facet of basic clinical and applied studies of the life sciences and the impact that PCR has had on life science research is already staggering. Comitant with the essentially universal use of PCR has been the creative and explosive development of a wide range of PCR based techniques and applications. These increasingly numerous protocols have each had the general effect of facilitating and accelerating research. Because PCR technology is relatively easy and inexpensive PCR applications are well within the reach of every research lab. In this sense PCR has become the equalizer between small and big labs since its use makes certain projects especially those related to molecular cloning now far more feasible for the small lab with a modest budget. This new volume on PCR Protocols does not attempt the impossible task of representing all PCR based protocols. Rather it presents a range of protocols both analytical and preparative that provide a solid base of knowledge on the use of PCR in many common research problems. The first six chapters provide some basic information on how to get started. Chapters 7-19 represent primarily analytical uses of PCR both for simple DNA and RNA detection as well as for more complex analyses of nucleic acid e.g. DNA footprinting, RNA splice site localization. The remaining chapters represent synthetic or preparative uses of PCR.

**PCR Protocols** Michael A. Innis, David H. Gelfand, John J. Sninsky, Thomas J. White, 2012-12-02 The correct procedures you need for frustration free PCR methods and applications are contained in this complete step by step clearly written inexpensive manual. Avoid contamination with specific instructions on setting up your lab. Avoid cumbersome molecular biological techniques.

Discover new applications.

**PCR Protocols** John M. S. Bartlett, David Stirling, 2008-02-03 In this new edition the editors have thoroughly updated and dramatically expanded the number of protocols to take advantage of the newest technologies used in all branches of research and clinical medicine today. These proven methods include real time PCR, SNP analysis, nested PCR, direct PCR and long range PCR. Among the highlights are chapters on genome profiling by SAGE, differential display and chip technologies, the amplification of whole genome DNA by random degenerate oligonucleotide PCR and the refinement of PCR methods for the analysis of fragmented DNA from fixed tissues. Each fully tested protocol is described in step by step detail by an established expert in the field and includes a background introduction outlining the principle behind the technique, equipment and reagent lists, tips on trouble shooting and avoiding known pitfalls and where needed a discussion of the interpretation and use of results.

**PCR** Lucília Domingues, 2023-08-22 This second volume focuses on PCR methods and PCR application specificities to the biotechnology and bioengineering field. New and updated chapters detail real time PCR protocols, synthetic biology applications, pathogen detection, microfluidics, digital multiplex detection, recent advances. Written in the highly successful Methods in Molecular Biology series format, chapters include introductions to their respective topics, lists of the necessary materials and reagents, step by step, readily reproducible laboratory protocols, and key tips on troubleshooting and avoiding known pitfalls. Authoritative and cutting edge PCR Methods and Protocols.

Second Edition aims to be a useful and practical guide to new researchers and experts looking to expand their knowledge

**PCR Protocols in Molecular Toxicology** John P. Vanden Heuvel, 2019-05-07 Molecular toxicology is an emerging discipline that utilizes molecular and cell biology to understand how drugs and chemicals result in their unwanted effects. PCR Protocols in Molecular Toxicology is a practical guide to the use of polymerase chain reaction PCR to help examine on a molecular and cellular level how toxic responses are manifested. It offers a basic understanding of PCR and its optimization as well as describing specific high impact areas of molecular toxicology and recent advances. The following techniques are described in detail: Quantitative reverse transcriptase PCR and methods to examine gene expression; Differential display; cloning; Cloning and library screening by PCR; Genotype and polymorphism analysis of drug and toxicant metabolizing enzymes; Basic non PCR based molecular biology methods. PCR Protocols in Molecular Toxicology will aid both novices and experienced PCR practitioners in using PCR to its fullest potential.

#### **Methods in Molecular Biology: PCR protocols**

John M. Walker, 1984 **RT-PCR Protocols** Nicola King, Joe O'Connell, 2008-02-04 Until the mid 1980s the detection and quantification of a specific mRNA was a difficult task usually only undertaken by a skilled molecular biologist. With the advent of PCR it became possible to amplify specific mRNA after first converting the mRNA to cDNA via reverse transcriptase. The arrival of this technique, termed reverse transcription PCR (RT PCR), meant that mRNA suddenly became amenable to rapid and sensitive analysis without the need for advanced training in molecular biology. This new accessibility of mRNA, which has been facilitated by the rapid accumulation of sequence data for human mRNAs, means that every biomedical researcher can now include measurement of specific mRNA expression as a routine component of his/her research plans. In view of the ubiquity of the use of standard RT PCR, the main objective of RT PCR Protocols is essentially to provide novel useful applications of RT PCR. These include some useful adaptations and applications that could be relevant to the wider research community who are already familiar with the basic RT PCR protocol. For example, a variety of different adaptations are described that have been employed to obtain quantitative data from RT PCR. Quantitative RT PCR provides the ability to accurately measure changes in mRNA expression between normal and diseased tissues.

#### **Methods in Molecular Biology: PCR protocols. 2nd edition** John M. Walker, 1984

**PRINS and In Situ PCR Protocols** Franck Pellestor, 2008-02-03 The in situ hybridization and PCR technologies are now well established molecular techniques for studying chromosomal aneuploidy and rearrangements, gene localization and expression, and genomic organization. Over the last decade we have seen increasing applications in these fields. By combining the high sensitivity of the PCR reaction and the cytological localization of target sequences both PRINS and in situ PCR techniques have provided highly powerful complements to FISH for in situ cellular and molecular investigations. Both these approaches have several advantages in terms of sensitivity and specificity owing to the use of primers and to the fast kinetics of annealing and elongation reactions in situ. In the first edition of PRINS and In Situ PCR Protocols edited by John R. Gosden, experts in the field presented in detail

a variety of applications of PRINS and in situ PCR techniques in a wide range of clinical conditions Since the publication of this successful reference book there have been significant improvements in in situ detection techniques This completely revised and updated second edition presents a comprehensive selection of new procedures developed in the field of PRINS and in situ PCR technologies The book has two sections Part I Basic Methodology contains chapters that provide useful protocols for many variations of PRINS and in situ PCR including a new fast multicolor PRINS method and protocols for PRINS detection of unique sequences in situ     **Methods in Molecular Biology: RT-PCR protocols** John M. Walker, 1984

**Quantitative Real-Time PCR** Roberto Biassoni, Alessandro Raso, 2019-10-03 This book expands upon the useful first edition by exploring classic Quantitative Polymerase Chain Reaction qPCR techniques as well as a number of recently developed applications With the changes in instrumentation due to technological advances and the development of new reagents to fulfill ethical and legal issues the qPCR field is now an up to date technology that indeed is widely used in research and clinical diagnostics Written for the highly successful Methods in Molecular Biology series chapters include introductions to their respective topics lists of the necessary reagents step by step readily reproducible laboratory protocols and tips on troubleshooting and avoiding known pitfalls Revised and authoritative Quantitative Real Time PCR Methods and Protocols Second Edition is an ideal guide to this expanding and vital field of study     *RT-PCR Protocols* Nicola King, 2016-08-23 Once a tedious highly skilled operation reverse transcription polymerase chain reaction RT PCR has become a routine and invaluable technique used in most laboratories In RT PCR Protocols Second Edition expert researchers fully update the technologies presented in the popular previous edition such as competitive RT PCR nested RT PCR RT PCR from single cells and RT PCR for cloning In addition newer technologies are also explored including multiplex RT PCR RT LATE PCR and the greatly advanced field of real time quantitative RT PCR while recent advances in creating the optimum RT PCR reaction e.g. RNA extraction primer design and reverse transcription end the book with their indispensable input Written in the highly successful Methods in Molecular BiologyTM series format chapters include brief introductions to their respective topics lists of the necessary materials and reagents step by step readily reproducible protocols and notes sections highlighting tips on troubleshooting and avoiding known pitfalls User friendly and up to date RT PCR Protocols Second Edition acts as a handy companion to scientists from numerous diverse backgrounds who wish to explore further the marvels of gene expression     **Methods in Molecular Biology: PRINS and in situ PCR protocols** John M. Walker, 1984

**The Nucleic Acid Protocols Handbook** Ralph Rapley, 2008-06-29 A comprehensive treasury of all the key molecular biology methods ranging from DNA extraction to gene localization in situ needed to function effectively in the modern laboratory Each of the 120 highly successful techniques follows the format of the much acclaimed Methods in Molecular BiologyOao series providing an introduction to the scientific basis of each technique a complete listing of all the necessary materials and reagents and clear step by step instruction to permit error free execution Included for each technique are notes about pitfalls

to avoid troubleshooting tips alternate methods and explanations of the reasons for certain steps all key elements contributing significantly to success or failure in the lab The Nucleic Acid Protocols Handbook constitutes today s most comprehensive collection of all the key classic and cutting edge techniques for the successful isolation analysis and manipulation of nucleic acids by both experienced researchers and those new to the field **PCR Applications** Michael A. Innis,David H. Gelfand,John J. Sninsky,1999-05-11 PCR is the most powerful technique currently used in molecular biology It enables the scientist to quickly replicate DNA and RNA on the benchtop From its discovery in the early 80 s PCR has blossomed into a method that enables everything from ready mutation of DNA RNA to speedy analysis of tens of thousands of nucleotide sequences daily PCR Applications examines the latest developments in this field It is the third book in the series building on the previous publications PCR Protocols and PCR Strategies The manual discusses techniques that focus on gene discovery genomics and DNA array technology which are contributing factors to the now occurring bioinformatics boom Key Features Focuses on gene discovery genomics and DNA array technology Covers quantitative PCR techniques including the use of standards and kinetic analysis includes statistical refinement of primer design parameters Illustrates techniques used in microscopic tissue samples such as single cell PCR whole cell PCR laser capture microdissection and in situ PCREntries provide information on Nomenclature Expression Sequence analysis Structure and function Electrophysiology Pharmacology Information retrieval **Digital PCR** George Karlin-Neumann,Francisco Bizouarn,2019-05-15 This volume explores and explains how digital PCRs dPCRs help in the study of numerous topics such as infectious diseases evolution of cancer and treatment responses somatic mosaicism genome editing and cell therapy and food testing for GMOs and pathogens Written in the highly successful Methods in Molecular Biology series format chapters include introductions to their respective topics lists of the necessary materials and reagents step by step readily reproducible laboratory protocols and tips on troubleshooting and avoiding known pitfalls Authoritative and thorough Digital PCR Methods and Protocols is a valuable resource for specialists in various fields including geneticists neurologists immunologists oncologists and researchers who are interested in environmental sciences **PCR Protocols** Michael A. Innis,David H. Gelfand,John J. Sninsky,Thomas J. White,1990-01-11 The correct procedures you need for frustration free PCR methods and applications are contained in this complete step by step clearly written inexpensive manual Avoid contamination with specific instructions on setting up your lab Avoid cumbersome molecular biological techniques Discover new applications **PCR Cloning Protocols** Bing-Yuan Chen,Harry W. Janes,2008-02-05 PCR Cloning Protocols Second Edition updates and expands Bruce White s best selling PCR Cloning Protocols 1997 with the newest procedures for DNA cloning and mutagenesis Here the researcher will find readily reproducible methods for all the major aspects of PCR use including PCR optimization computer programs for PCR primer design and analysis and novel variations for cloning genes of special characteristics or origin with emphasis on long distance PCR and GC rich template amplification Also included are both conventional and novel enzyme free and restriction site free

procedures to clone PCR products into a range of vectors as well as state of the art protocols to facilitate DNA mutagenesis and recombination and to clone the challenging uncharacterized DNA flanking a known DNA fragment [PCR Methods and Applications](#) ,1995

**PCR Mutation Detection Protocols** Bimal D. M. Theophilus, Ralph Rapley, 2008-02-02 1Bimal D Theophilus and Ralph Rapley provide biological and clinical investigators with a comprehensive collection of new recent and updated PCR based screening methods suitable for detecting the presence of both known and novel mutations. The methods cover point mutations e.g. ASO PCR SSCP DGGE chemical cleavage deletions multiplex PCR FISH blotting non sense mutations PTT and more. The new and exciting techniques of DNA array analysis along with such recently developed experimental methods as conformation sensitive gel electrophoresis are also included. Each chapter explains the basic theory behind the technique and provides valuable notes essential for its successful execution.

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