

PCR Troubleshooting and Optimization

The Essential Guide



Edited by: Suzanne Kennedy and Nick Oswald

MO BIO Laboratories, Inc., Carlsbad, CA 92010, USA and BitesizeBio, Edinburgh, UK (respectively)

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The polymerase chain reaction (PCR) is a fundamental tool in scientific research and clinical testing. Real-time PCR, combining both amplification and detection in one instrument, is a rapid and accurate method for nucleic acid detection and quantification. Although PCR is a very powerful technique, the results achieved are valid only if the appropriate controls have been employed. In addition, proper optimization of PCR conditions is required for the generation of specific, repeatable, reproducible and sensitive data.

This book discusses the strategies for preparing effective controls and standards for PCR, when they should be employed and how to interpret the information they provide. It highlights the significance of optimization for efficiency, precision and sensitivity of PCR methodology and provides essential guidance on how to troubleshoot inefficient reactions. Experts in PCR describe design and optimization techniques, discuss the use of appropriate controls, explain the significance of standard curves and explore the principles and strategies required for effective troubleshooting. Authors highlight the importance of sample preparation and quality, primer design, controlling inhibitors, avoiding amplicon and environmental contamination, optimizing reagent quality and concentration, and modifying the thermal cycling protocol for optimal sensitivity and specificity. In addition, specific chapters discuss the history of PCR, the choice of instrumentation, the applications of PCR in metagenomics, high resolution melting analysis, the MIQE guidelines, and PCR at the microliter scale.

The strategies, tips and advice contained in this concise volume enable the scientist to optimize and effectively troubleshoot a wide range of techniques including PCR, reverse transcriptase PCR, real-time PCR and quantitative PCR. An essential book for anyone using PCR technology.

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Chapter 2. Difficult Templates and Inhibitors of PCR. *Jack M. Gallup*

Chapter 3. Significance of Controls and Standard Curves in PCR. *Ian Kavanagh, Gwyn Jones and Saima Naveed Nayab*

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PCR Troubleshooting Michael L. Altshuler, 2006 This unique polymerase chain reaction PCR troubleshooting guide is an essential companion for readers with some experience in PCR The book discusses the many and varied problems encountered with PCR together with tips advice and procedures to obviate rather than overcome the PCR problems The advice in PCR Troubleshooting is invaluable

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Real-time PCR Kirstin Edwards, Julie M. J. Logan, Nick A.

Saunders,2004 This essential manual presents a comprehensive guide to the most appropriate and up to date technologies and applications as well as providing an overview of the theory of this important technique Written by recognized experts in the field this timely and authoritative volume is an essential requirement for all laboratories using PCR Topics covered include Real time PCR instruments and probe chemistries set up controls and validation quantitative real time PCR analysis of mRNA expression mutation detection NASBA application in clinical microbiology and diagnosis of infection **Real-time PCR** ,2007 *Understanding PCR* Sarah Maddocks,Rowena Jenkins,2016-10-28 Understanding PCR A Practical Bench Top Guide gives you all of the information you need to plan your first PCR from reagents to conditions to analysis and beyond It is a user friendly book that has step by step basic protocols which can be adapted to your needs Includes helpful information such as where to order your reagents and basic troubleshooting hints and tips **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 Guru** Ayaz Najafov,Gerta Hoxhaj,2016-11-28 PCR Guru An Ultimate Benchtop Reference for Molecular Biologists is provides researchers in molecular biology with a handy reference for approaching and solving challenging problems associated with PCR setup and optimization As a laboratory guide it emphasizes the technical aspects of employing PCR as a tool in molecular biology laboratories The book covers the history of PCR and the basic science underlying it It then discusses PCR at the bench level starting with detailed description and tips on primer design and continuing with the standard protocols used to perform PCR Provides troubleshooting tips for various types of modifications of standard protocols Contains unique Good Practices and Tips that are indispensable for the beginner and expert alike Features Special Cases with applications of PCR optimization and troubleshooting Includes detailed appendices with tables figures and key protocols Organized as a systematic concentrated resource to save time when addressing a PCR problem *PCR* Julian Burke,1996-12-16 This convenient spiral bound laboratory manual saves readers valuable time by providing easily accessible information on key topics and protocols Succinctly describes the most commonly applied techniques and contains useful tips on stopping points troubleshooting and safety **PCR 2** M. J. McPherson,B. D. Hames,Graham R. Taylor,1995 PCR is now an indispensable tool for the molecular biologist heralding an era of unparalleled research productivity The basic PCR technique provides the cornerstone of in vitro DNA amplification upon which further features can be built to expand the range of PCR based applications PCR 2 A Practical Approach is not a revised version of PCR A Practical Approach but sets out to address some of the exciting new applications of PCR and so it is complementary to the original volume The book starts with an essential guide for improving PCRs then deals with the use of modified primers and the direct sequencing of PCR products The focus then switches to mRNA and covers cDNA cloning mRNA quantitation and direct expression of proteins from PCR products

Finally genomic DNA analysis is addressed including genome mapping and fingerprinting the analysis of mutations and the direct sequencing and analysis of methylation patterns The book is essential reading for all researchers in molecular biology and related disciplines BOOK JACKET Title Summary field provided by Blackwell North America Inc All Rights Reserved

Principles and Technical Aspects of PCR Amplification Elizabeth van Pelt-Verkuil,Alex van Belkum,John P.

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Quantitative Real-time PCR Roberto Biassoni,Alessandro Raso,2019 **Molecular Diagnostic PCR Handbook**

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