
Preface

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*.

All these methods have been shown to be reliable procedures in the authors' laboratories, and the chapters display helpful notes for optimizing the procedure and avoiding pitfalls. Part II, Research and Clinical Applications, addresses particular applications of both PRINS and *in situ* PCR in research and diagnosis. The use of PRINS is described in various applications in humans (detection of gene deletions in cancer, detection of fetal cells in maternal blood, assessment of aneuploidy in brain tissues, in embryos), as well as in plant cells. A selection of *in situ* PCR techniques is also presented step by step (detection of cytomegalovirus, use of RT *in situ* PCR on plants or in cancer investigation, combination with microdissection), based on the experience of well-versed researchers and clinical investigators. All these chapters are focused on the practical aspects, introducing the reader to the background and operating procedures, and with a Notes section highlighting potential problems and providing hints and tips for success. Finally, the book closes with two

overviews on PRINS and *in situ* PCR technologies that discuss the latest developments in the field, as well as challenges for the foreseeable future.

Intended for molecular biologists, cytogeneticists, and cytologists, my wish would be that this book could be helpful to experts as a source of information, as well as to non-experts as a means of orientation in the rapidly developing field of *in situ* labeling technology.

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