

---

## Preface

Since the invention of the polymerase chain reaction (PCR) in the early 1980s, this technique has rapidly become an indispensable part of modern molecular diagnostics. Without this powerful technology, many of the important developments in modern sciences, including the Human Genome Project, would probably have progressed much more slowly. In the area of molecular diagnostics, PCR has allowed target detection to be performed with unprecedented sensitivity and ease.

It has been several years since the first edition of *Clinical Applications of PCR* was published. During these few years, it is amazing how rapidly technological advances in PCR-based technologies have developed. Important technological advances, notably real-time PCR and mass spectrometry, have revolutionized the field. In particular, real-time PCR has allowed the technique to be performed with improved sensitivity, robustness, and resilience to carryover contamination, as well as in a quantitative manner. These technological developments, together with the indispensable nature of PCR in molecular laboratories everywhere, have led to a vast expansion in the number of clinical applications of PCR.

In the second edition of *Clinical Applications of PCR*, we hope to share with readers the exciting applications of some of these innovations, including PCR for gene expression, methylation, trace molecule, gene dosage, and single cell analysis. It is hoped that the step-by-step protocols and the explanatory notes will help readers to harness the power of these techniques in their laboratories.

**Y. M. Dennis Lo**  
**Rossa W. K. Chiu**  
**K. C. Allen Chan**