
Preface

Mitosis is a dynamic and stochastic process that has evolved to accurately segregate the genetic material into two daughter cells, thereby preventing genomic instability and the development of disease. Mitosis is a phenomenally complicated process that involves hundreds, if not thousands, of protein components and regulatory steps that operate in both space and time to drive cell division. Modern methods make it possible to ask for mechanistic principles underlying this bewildering complexity. The main purpose of this volume is to provide an up-to-date collection of methods and approaches that are used to investigate the mechanism of mitosis at the molecular level. While many of these methods are focused on mammalian cells, we have, where appropriate, included chapters using model organisms. We hope to capture both current approaches and the future direction of method development, with contributions from both established researchers and emerging young scientists.

This book is designed with two general groups of readers in mind: First, graduate students and postdoctoral researchers who are beginning work for the first time in a mitosis laboratory. Second, researchers who are already working in the mitosis field who require a resource for both established and newly developed methodologies. To achieve this, the organization of this book developed into three general areas: First, we cover methods that can be used to inactivate your gene of interest, or deplete proteins of interest (chapters 1–3). Second, we learn about specific biochemical and microscope-based methods (chapters 4–9). Third, we discover approaches to monitor and measure key mitotic processes (chapters 9–20). Given the complexities of mitosis, it seems highly probable that such a combination of imaging, biochemical and genetic methodologies will be crucial to our future understanding of mitotic regulation.

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