
Preface

Among life scientists, the mitochondrial community originally formed a rather separate and isolated subgroup studying a peculiar organelle. The relevance of mitochondrial research was thought to be limited to the field of bioenergetics. This view changed considerably during the last 10 to 15 years when it became more and more evident that mitochondrial processes are closely intertwined with many other cellular processes. Prominent examples are apoptosis or cellular aging and the observation that several human diseases are related to mitochondrial dysfunction, including Parkinson's and Alzheimer's diseases. As a result, mitochondrial processes are studied by an increasing number of scientists, ranging from molecular biologists, biochemists, structural biologists, and cell biologists to pharmacists and medical researchers.

Our intention in compiling this book is to offer readers a wide range of protocols and reproducible step-by-step procedures for the study of mitochondrial functions. The wide spectrum of methods in a single book will be a valuable resource both for beginners and for experienced scientists. All chapters are written by specialists who have solid experience in the procedures described and who provide the readers with valuable tips and tricks in a special "Notes" section integrated into each chapter.

In Part I of *Mitochondria: Practical Protocols*, a series of chapters introduces the major experimental model systems and discusses their specific advantages and limitations for the analysis of mitochondrial functions. In addition to a short overview on the general properties of these systems, detailed protocols are provided for cultivation of these organisms and on basic experiments in "mitochondriology."

Parts II through VI of *Mitochondria: Practical Protocols* comprise an ample collection of detailed protocols for studying different molecular aspects of mitochondrial functions: genetics and molecular biology (Part II), biochemistry (Part III), physiology (Part IV), dynamics and morphology (Part V), and functional genomics (Part VI). The chapters not only cover the classical methodology of mitochondrial research but also focus on more recent aspects, such as the examination of apoptotic effects, fusion and fission of mitochondria, and proteome and transcriptome analyses.

We are grateful to all contributing authors for the time they devoted to sharing their knowledge and experience.

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