

# Contents

Preface .....	v
Contributors .....	ix

## PART I GENERAL CONCEPTS

1 Discovery of Mitochondrial Ribosomes .....	3
<i>Thomas W. O'Brien</i>	
2 Evolution: Mitochondrial Ribosomes Across Species .....	7
<i>Rajendra K. Agrawal and Soneya Majumdar</i>	
3 Mitoribosome Biogenesis .....	23
<i>J. Conor Moran, Samuel Del'Olio, Austin Choi,     Hui Zhong, and Antoni Barrientos</i>	
4 Translation in Mitochondrial Ribosomes .....	53
<i>Zofia M. Chrzanowska-Lightowlers and Robert N. Lightowlers</i>	

## PART II METHODS TO STUDY MITORIBOSOME STRUCTURE, FUNCTION, AND BIOGENESIS

5 Sample Preparation of Isolated Mitochondria for Cryoelectron Tomography and In Situ Studies of Translation .....	75
<i>Lena Thärichen, Robert Englmeier, and Friedrich Förster</i>	
6 Cryo-EM for Structure Determination of Mitochondrial Ribosome Samples .....	89
<i>Hauke S. Hillen</i>	
7 Sucrose Gradient Analysis of Human Mitochondrial Ribosomes and RNA .....	101
<i>Kah Ying Ng and Brendan J. Battersby</i>	
8 Yeast Mitoribosome Purification and Analyses by Sucrose Density Centrifugation and Immunoprecipitation .....	119
<i>Andreas Aufschnaiter, Andreas Carlström, and Martin Ott</i>	
9 Rapid Cryopurification of the Yeast Mitochondrial Ribosome .....	133
<i>Hong Weng Pang and Antoni Barrientos</i>	
10 Methods to Study the Biogenesis of Mitoribosomal Proteins in Yeast .....	143
<i>Lea Bertgen, Tamara Flohr, and Johannes M. Herrmann</i>	
11 Systematic Analysis of Assembly Intermediates in Yeast to Decipher the Mitoribosome Assembly Pathway .....	163
<i>Samuel Del'Olio and Antoni Barrientos</i>	
12 Metabolic Labeling of Mitochondrial Translation Products in Whole Cells and Isolated Organelles .....	193
<i>Priyanka Maiti and Flavia Fontanesi</i>	

## Contents

13	Assembly of the Mitochondrial Translation Initiation Complex.....	217
	<i>Cristina Remes, Minh Duc Nguyen, Henrik Spahr, Martin Ng, Clark Fritsch, Arpan Bhattacharya, Hong Li, Barry Cooperman, and Joanna Rorbach</i>	
14	Reconstitution of Mammalian Mitochondrial Translation System Capable of Long Polypeptide Synthesis.....	233
	<i>Muhoon Lee and Nono Takeuchi-Tomita</i>	
15	Human Mitoribosome Profiling: A Re-engineered Approach Tailored to Study Mitochondrial Translation .....	257
	<i>Iliana Soto, Mary Couvillion, and L. Stirling Churchman</i>	
16	The <i>ARG8<sup>m</sup></i> Reporter for the Study of Yeast Mitochondrial Translation.....	281
	<i>Daniel Flores-Mireles, Yolanda Camacho-Villasana, and Xochitl Pérez-Martínez</i>	
17	Four-Color STED Super-Resolution RNA Fluorescent In Situ Hybridization and Immunocytochemistry to Visualize Mitochondrial mRNAs in Context with Mitochondrial Ribosomes .....	303
	<i>Christin A. Albus, Rolando Berlinguer-Palmini, Zofia M. Chrzanowska-Lightowers, and Robert N. Lightowers</i>	
18	Digital RNase Footprinting of RNA-Protein Complexes and Ribosomes in Mitochondria .....	317
	<i>Danielle L. Rudler, Stefan J. Siira, Oliver Rackham, and Aleksandra Filipovska</i>	
19	<i>Dead-Seq</i> : Discovering Synthetic Lethal Interactions from Dead Cells Genomics .....	329
	<i>Joan Blanco-Fernandez and Alexis A. Jourdain</i>	
	<i>Index</i> .....	343