

## CONTENTS

Contributors .....	ix
Preface .....	xii

### Mitochondrial Genomes of the Ciliate

Donald J. Cummings

I. Introduction .....	1
II. Mitochondrial Genome Structure and Replication .....	4
III. The DNA Sequence of <i>P. aurelia</i> .....	12
IV. Structure and Organization of Ribosomal RNA Genes .....	45
V. Mitochondrial Genetic Code .....	52
VI. Perspectives .....	58
References .....	60

### Mitochondrial DNA of Kinetoplastids

Kenneth Stuart and Jean E. Feagin

I. Introduction .....	65
II. Maxicircle Genes .....	69
III. Maxicircle Transcripts .....	74
IV. Developmental Control in <i>T. brucei</i> .....	80
V. Minicircles .....	82
VI. Minicircle Transcripts .....	84
VII. Conclusion .....	84
References .....	85

## **Evolution of Mitochondrial Genomes in Fungi**

G. D. Clark-Walker

I. Introduction .....	89
II. Diversity in mtDNA Size and Structure .....	90
III. Generation of Diversity in mtDNA .....	106
IV. Conclusions .....	119
References .....	121

## **Structure and Function of the Higher Plant Mitochondrial Genome**

Maureen R. Hanson and Otto Folkerts

I. Introduction .....	129
II. Abnormal Phenotypes Specified by the Mitochondrial Genome .....	129
III. Structure of the Plant Mitochondrial Genome .....	135
IV. Genes of the Mitochondrial Genome and Their Genomic Locations .....	157
V. Transcription, RNA Processing, and Translation .....	160
VI. Summary and Conclusions .....	164
References .....	165

## **Animal Mitochondrial DNA: Structure and Evolution**

David R. Wolstenholme

I. Introduction .....	173
II. Genome Content and Organization .....	176
III. Protein Genes .....	181
IV. Ribosomal RNA Genes .....	189
V. Transfer RNA Genes .....	191
VI. The Control Region .....	201
VII. Directly Repeated Sequences .....	203
VIII. Nucleotide Bias .....	204
IX. Deletions and Nucleotide Substitutions Associated with Human Diseases .....	207
X. Conclusions and Perspectives .....	207
References .....	210

## Transcription and Replication of Animal Mitochondrial DNAs

David A. Clayton

I. Introduction .....	217
II. Transcription of Mitochondrial DNA .....	217
III. Replication of Mitochondrial DNA .....	222
IV. Potential Points of Regulation .....	225
V. Summary and Conclusions .....	229
References .....	231

## The Endosymbiont Hypothesis Revisited

Michael W. Gray

I. Introduction .....	233
II. The Lineages of Life .....	237
III. Origin of the Nuclear Genome .....	247
IV. Plastids .....	253
V. Mitochondria .....	280
VI. Other Organelles of Endosymbiotic Origin? .....	329
VII. Epilogue and Future Prospects .....	331
References .....	333
Note Added in Proof .....	357
Index .....	359