
Contents

| | |
|---|-----|
| Preface | v |
| Contributors | vii |
| 1 Understanding Aging Bernard L. Strehler | 1 |
| PART I: THE STUDY OF CELL SENESCENCE AND CELL DEATH | |
| 2 Use of the Fibroblast Model in the Study of Cellular Senescence Vincent J. Cristofalo, Craig Volker, and Robert G. Allen | 23 |
| 3 Human T-Cell Clones Graham Pawelec | 53 |
| 4 Telomeres and Replicative Senescence Hector F. Valenzuela and Rita B. Effros | 63 |
| 5 Detection of Molecular Events During Apoptosis by Flow Cytometry Ruaidhri J. Carmody, Ana P. Costa-Pereira, Sharon L. McKenna, and Tom G. Cotter | 71 |
| 6 Raf-1 Protein Kinase Activity in T Cells from Aged Mice Christopher J. Kirk and Richard A. Miller | 85 |
| 7 Identification of Differentially Expressed Genes in Young and Senescent T Cells Andrea Engel, Mahdi Adibzadeh, and Graham Pawelec | 97 |
| PART II: AGE-RELATED CHANGES TO XENOBIOTIC METABOLIZING ENZYME SYSTEMS | |
| 8 Xenobiotic-Metabolizing Enzyme Systems and Aging Christopher R. Barnett and Costas Ioannides | 119 |
| PART III: AGE-RELATED CHANGES TO DEFENSE SYSTEMS AGAINST BIOMOLECULE DAMAGE | |
| 9 Assessing Age-Related Changes in Antioxidant Status: <i>The FRASC Assay for Total Antioxidant Power and Ascorbic Acid Concentration in Biological Fluids</i> Iris F. F. Benzie and John J. Strain | 133 |

| | | |
|---|--|-----|
| 10 | Measurement of DNA Damage and Repair Capacity as a Function of Age Using the Comet Assay Peter H. Clingen, Jillian E. Lowe, and Michael H. L. Green | 143 |
| 11 | Measurement of DNA Damage and Repair in Human White Blood Cells by an Immunochemical Assay Govert P. van der Schans | 159 |
| PART IV: AGE-RELATED CHANGES TO CELLULAR BIOMOLECULES | | |
| 12 | Measurement of 8-Oxo-deoxyguanosine in Lymphocytes, Cultured Cells, and Tissue Samples by HPLC with Electrochemical Detection Sharon G. Wood, Catherine M. Gedik, Nicholas J. Vaughan, and Andrew R. Collins | 171 |
| 13 | Mutation and the Aging Process: <i>Mutant Frequency at the HPRT Gene Locus as a Function of Age in Humans</i> Yvonne A. Barnett and Christopher R. Barnett | 179 |
| 14 | Somatic Mutations and Aging: <i>Methods for Molecular Analysis of HPRT Mutations</i> Sai-Mei Hou | 189 |
| 15 | Assessment of Susceptibility of Low-Density Lipoprotein to Oxidation Jane McEneny and Ian S. Young | 199 |
| 16 | Measurement of Pentosidine in Biological Samples Jesus R. Requena, David L. Price, Suzanne R. Thorpe, and John W. Baynes | 209 |
| PART V: MITOCHONDRIAL MUTATION AND FUNCTION WITH AGE | | |
| 17 | Causes and Consequences of Damage to Mitochondria: <i>Morphological Aspects</i> Jaime Miquel and Carlo Bertoni-Freddari | 221 |
| 18 | Causes and Consequences of Damage to Mitochondria: <i>Study of Functional Aspects by Flow Cytometry</i> Federico V. Pallardo, Juan Sastre, Jaime Miquel, and José Viña | 237 |
| 19 | Analysis of Mitochondrial DNA Mutations: <i>Deletions</i> Robert W. Taylor, Theresa M. Wardell, Emma L. Blakely, Gillian M. Borthwick, Elizabeth J. Brierley, and Douglass M. Turnbull | 245 |

20 Analysis of Mitochondrial DNA Mutations: *Point Mutations*
**Robert W. Taylor, Richard M. Andrews, Patrick F. Chinnery,
and Douglass M. Turnbull 265**

PART VI: IMMUNE SYSTEM AND AGING

21 Assessment of T-Cell Function in the Aged: *T-Cell Proliferative
and T-Cell Adherence Assays*
Ian Beckman 281

22 Dendritic Cells in Old Age
**Beatrix Grubeck-Loebenstein, Maria Saurwein-Teissl,
and Nikolaus Romani 291**

23 Age-Related Alterations to Natural Killer Cell Function
Erminia Mariani, Corona Alonso, and Rafael Solana 311

24 Immunogenetics and Lifespan: *HLA*
Derek Middleton, Martin D. Curran, and Fionnuala Williams 321

PART VII: CASE STUDIES

25 Dietary Restriction and Life-Span Extension
Byung Pal Yu 353

26 The Use of Genetically Engineered Mice in Aging Research
Julie K. Andersen 361

Index 379