

1. Record Nr.	UNINA9910743231703321
Titolo	Aging mechanisms II : longevity, metabolism, and brain aging // Nozomu Mori, editor
Pubbl/distr/stampa	Singapore : , : Springer, , [2022] ©2022
ISBN	981-16-7976-2 981-16-7977-0
Descrizione fisica	1 online resource (429 pages)
Disciplina	612.67
Soggetti	Aging - Physiological aspects Longevity Longevitat Vellesa Fisiologia humana Llibres electrònics
Lingua di pubblicazione	Inglese
Formato	Materiale a stampa
Livello bibliografico	Monografia
Nota di contenuto	<p>Intro -- Preface -- Contents -- Contributors -- Part I: From Hypothesis to Mechanisms -- Chapter 1: An Unsolved Problem in Gerontology Yet: Molecular Mechanisms of Biological Aging-A Historical and Critical Overview -- 1.1 Introduction -- 1.2 The Definition of Aging -- 1.3 Aging Theories -- 1.4 Mutation Theory of Aging/Genome Instability Theory of Aging -- 1.5 Free Radical Theory of Aging/Oxidative Stress Theory of Aging -- 1.6 The Mitochondrial Theory of Aging -- 1.7 The Error Catastrophe Theory of Aging -- 1.8 The Altered Protein Theory of Aging/Protein Homeostasis or Proteostasis Theory of Aging -- 1.9 Dysdifferentiation Theory of Aging/Epigenetic Theory of Aging -- 1.10 The Hyperfunction Theory of Aging -- 1.11 Summary and Perspectives -- References -- Part II: Human Longevity: Accelerated Aging and Centenarians -- Chapter 2: Clinical and Basic Biology of Werner Syndrome, the Model Disease of Human Aging -- 2.1 Clinical Features and Pathogenesis of Werner Syndrome -- 2.1.1 Introduction -- 2.1.2 Diagnostic Criteria -- 2.1.3 Werner Syndrome Registry -- 2.1.3.1</p>

General Information -- Age at Onset and Diagnosis -- Physique -- Life Expectancy -- Laboratory Test -- 2.1.3.2 Symptoms -- Sarcopenia -- Diabetes -- Dyslipidemia -- Fatty Liver -- Atherosclerosis -- Malignancy -- Osteoporosis -- Skin Ulcers -- Infection -- Calcification in Tendons -- 2.2 Basic Research and Molecular Mechanisms of Werner Syndrome -- 2.2.1 Werner Gene and Protein -- 2.2.2 WRN and DNA Damage Repair -- 2.2.3 WRN and Telomeres -- 2.2.4 WRN and Mitochondria, mTOR, and Autophagy -- 2.2.5 Phenotype of WRN KO Mice -- 2.2.6 WRN and Stem Cell Senescence and Epigenome Regulation -- 2.2.7 WS Patient-Derived iPS Cells -- 2.2.8 Malignancy and WRN -- 2.3 Conclusion -- References -- Chapter 3: Biomarkers of Healthy Longevity: Lessons from Supercentenarians in Japan -- 3.1 Introduction.  
3.2 Demography and Functional Status of Supercentenarians -- 3.3 Cardiovascular Biomarkers and Exceptional Survival -- 3.4 Adiponectin -- 3.5 Immunological Biomarkers of Healthy Longevity -- 3.6 Future Prospects -- References -- Part III: Cellular Aging and Lower Animal Models -- Chapter 4: Cellular Aging and Metabolites in Aging -- 4.1 Introduction -- 4.2 Historical Theory and Replicative Senescence -- 4.3 Telomere-Dependent and Telomere-Independent Senescence -- 4.4 Double-Edged Sword of SIS -- 4.5 Senescence Markers -- 4.6 The Aging Hypothesis Relevant to Metabolic Profiles -- 4.7 Metabolomic Approach for Human Whole Blood -- 4.8 Blood Metabolites for Aging Markers -- 4.9 Blood Metabolites for Fasting Markers -- 4.10 Frailty Markers for Antioxidation, Cognition, and Mobility -- 4.11 Summary -- References -- Chapter 5: To G0 or Not to G0: Cell Cycle Paradox in Senescence and Brain Aging -- 5.1 Alzheimer's Disease -- 5.2 Cellular Senescence -- 5.3 Cellular Senescence in Post-mitotic Cells -- 5.4 Proteostasis Failure as a Driver of Neuronal Senescence -- 5.5 Neuronal Senescence: Pleiotropic Response -- 5.6 Conclusion -- References -- Chapter 6: *C. elegans* Longevity Genes -- 6.1 *Caenorhabditis elegans* -- 6.2 Methodology -- 6.3 Aging Phenotype -- 6.4 Longevity Genes -- References -- Chapter 7: Understanding the Functions of Longevity Genes in Drosophila -- 7.1 Drosophila melanogaster as a Model System to Study Aging -- 7.1.1 Antioxidant -- 7.1.1.1 Cytoplasmic SOD (Sod1) -- 7.1.1.2 Mitochondrial SOD (Sod2) -- 7.1.1.3 Extracellular SOD (Sod3) -- 7.1.1.4 Catalase (Cat) -- 7.1.1.5 Thioredoxin (Trx-2, TrxT, dhd) -- 7.1.2 Insulin/IGF-1/TOR Pathway -- 7.1.3 JNK Signaling Pathway -- 7.1.4 Epigenetic Mechanism -- 7.2 Epigenetic Inheritance of Longevity -- References -- Part IV: Metabolism: Factors Affecting Tissue Aging -- Chapter 8: NAD+ Metabolism in Aging.  
8.1 Introduction -- 8.2 NAD+ Biosynthesis -- 8.3 NAD+ Consumption -- 8.4 NAD+ Levels Decline with Age -- 8.5 Effects of Age-Related NAD+ Decline on Hallmarks of Aging -- 8.6 Role of NAD+ in Age-Associated Functional Decline of Organs -- 8.6.1 Liver -- 8.6.2 Adipose Tissue -- 8.6.3 Skeletal Muscle -- 8.6.4 Kidney -- 8.7 NAD+ Precursors for Restoring NAD+ Levels in Animals and Humans -- 8.8 Conclusions -- References -- Chapter 9: Mitochondrial Dysfunction and Growth Differentiation Factor 15 in Aging -- 9.1 Introduction -- 9.2 GDF15 as a Marker for Mitochondrial Dysfunction and Mitochondrial Diseases -- 9.2.1 Cybrid Cells with Pathogenic mtDNA Mutations -- 9.2.2 Energy Metabolism in Cybrid Cells with Mitochondrial Dysfunction -- 9.2.3 Transcriptional Response to Impaired Energy Metabolism in Cybrid Cells -- 9.2.4 GDF15 as a Marker for Mitochondrial Dysfunction -- 9.2.5 GDF15 as a Biomarker for Mitochondrial Diseases -- 9.3 GDF15 and Aging -- 9.3.1 Characteristics of GDF15 -- 9.3.2 GDF15 Functions Through Its Specific Receptor GFRAL -- 9.3.3 Correlation of Circulating GDF15 Levels with

Age -- 9.3.4 GDF15 and Adverse Outcomes in Older Adults -- 9.3.5  
GDF15 and Age-Related Diseases -- 9.4 Discussion and Perspectives  
-- References -- Chapter 10: Sirtuins and Metabolic Health -- 10.1  
Introduction -- 10.2 Sirtuins in Oxidative Stress and Mitochondrial  
Biogenesis (Fig. 10.1) -- 10.3 Sirtuins in Inflammation (Fig. 10.1) --  
10.4 Sirtuins in Autophagy (Fig. 10.1) -- 10.5 Sirtuins in Apoptosis  
(Fig. 10.1) -- 10.6 Interventions Targeting Sirtuins -- 10.7 Perspectives  
-- References -- Chapter 11: Autophagy in Aging and Longevity --  
11.1 Overview of Autophagy -- 11.2 Activation of Autophagy Is One of  
the Convergent Mechanisms of Animal Longevity -- 11.3 Autophagic  
Activity Declines with Age -- 11.4 Autophagy and Age-Related  
Neurodegenerative Diseases.  
11.5 Molecular Mechanism Regulating Autophagy and Longevity --  
11.6 Intervention of Aging via Modulating Autophagy -- 11.7  
Conclusion -- References -- Chapter 12: Sarcopenia: Current Topics  
and Future Perspective -- 12.1 What Is Sarcopenia? -- 12.2 How to  
Diagnose Sarcopenia -- 12.3 AWGS 2019 -- 12.4 Utilization of Phase  
Angle -- 12.5 Prevalence of Sarcopenia -- 12.6 Etiology of Sarcopenia  
-- 12.7 Genetics of Sarcopenia -- 12.8 Prognosis of Sarcopenia -- 12.9  
Relationship Between Sarcopenia and Disease -- 12.10 Macroscopic  
Features of Age-Related Changes in Skeletal Muscle -- 12.11  
Microscopic Features of Age-Related Changes in Skeletal Muscle --  
12.12 Prevention of Sarcopenia -- 12.13 Interventions for Sarcopenia  
-- 12.14 How to Provide Resistance Training -- 12.15 How to Provide  
Amino Acids and Protein for Persons with Sarcopenia -- 12.16  
Pharmacological Treatment of Sarcopenia -- 12.17 Conclusions --  
References -- Chapter 13: Osteoporosis and Cellular Senescence in  
Bone -- 13.1 Introduction -- 13.2 Role of Bone Cells and Age-Related  
Changes -- 13.3 Cellular Senescence in the Bone Microenvironment --  
13.4 Bone Phenotype in Animal Models of Accelerated Senescence --  
13.4.1 DNA Damage -- 13.4.2 Telomere Shortening -- 13.5 Cellular  
Senescence in Bone -- 13.6 Elimination of Senescent Cells in Bone  
Using Transgenic Mice -- 13.7 Senolytic and Senomorphic Approaches  
to Treating Osteoporosis -- 13.8 Summary -- References -- Chapter  
14: Aging and Chronic Kidney Disease Viewed from the FGF-Klotho  
Endocrine System -- 14.1 Discovery of the Klotho Gene -- 14.2 Klotho  
Protein Function -- 14.3 Discovery of the FGF-Klotho Endocrine Axes  
-- 14.4 Phosphate and CKD -- 14.5 Phosphate Accelerates Aging --  
14.6 Calciprotein Particles (CPPs) -- 14.7 CPPs and Lipoproteins --  
14.8 Secreted Klotho -- 14.9 FGF21-Klotho Endocrine System --  
14.10 FGF21 and CKD.  
14.11 Concluding Remarks -- References -- Chapter 15: Aging  
Biomarker SMP30 into a New Phase of Vitamin C and Aging Research --  
15.1 Introduction -- 15.2 Discovery of Age-Associated Protein SMP30  
-- 15.3 Functional Analysis of SMP30 -- 15.4 SMP30 as an  
Organophosphatase -- 15.5 SMP30 Homolog in Fireflies -- 15.6 SMP30  
Deficiency -- 15.7 SMP30 Is a Gluconolactonase (GNL) -- 15.8 SMP30-  
Knockout Mice Are Unable to Synthesize Vitamin C -- 15.9 Vitamin C  
Deficiency Accelerates Aging -- 15.10 Rough Estimation of Vitamin C  
Level That Accelerates Human Aging -- 15.11 Currently Available  
Findings Using SMP30-Knockout Mice -- 15.12 Perspectives of Vitamin  
C and Aging Research Using SMP30-Knockout Mice -- References --  
Part V: Aging Brain: Cognitive Decline, Synaptic Plasticity -- Chapter 16:  
Age-Related Memory Impairments Are Caused by Alterations in Glial  
Activity at Old Ages -- 16.1 Associative Memory in Drosophila and the  
Effects of Aging on Memory -- 16.2 Age-Related Impairments in MTM  
-- 16.3 Age-Related Impairments in LTM -- 16.4 Defects in Neuron-  
Glia Interactions in Mammalian Models -- References -- Chapter 17:

Critical Roles of Glial Neuroinflammation in Age-Related Memory Decline -- 17.1 Introduction -- 17.2 Age-Related Cognitive Decline in Animal Models -- 17.2.1 Cognitive Declines in Animal Model for Vascular Dementia -- 17.2.2 Memory Declines in Mouse Model for Alzheimer's Disease -- 17.3 Critical Roles of Neuroinflammation in Age-Related Cognitive declines -- 17.3.1 Glial Neuroinflammation -- 17.3.2 Neuroinflammation at the Cerebrovascular Unit -- 17.4 Age-Related Cognitive Decline in Elderly Individuals -- 17.5 Conclusion -- References -- Chapter 18: Central Mechanisms Linking Age-Associated Physiological Changes to Health Span Through the Hypothalamus -- 18.1 Introduction.  
18.2 Molecules and Signaling Pathways in the Hypothalamus that Control Mammalian Longevity.

---