BIOLOGY OF AGING AND ITS MODULATION

Aging of Organisms

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Aging Of Organisms Biology Of Aging And Its Modulation Volume 4

S.I. Rattan

Aging Of Organisms Biology Of Aging And Its Modulation Volume 4:

Handbook of the Biology of Aging Edward J. Masoro,Steven N. Austad,2011-04-28 The Handbook of the Biology of Aging Sixth Edition provides a comprehensive overview of the latest research findings in the biology of aging Intended as a summary for researchers it is also adopted as a high level textbook for graduate and upper level undergraduate courses The Sixth Edition is 20% larger than the Fifth Edition with 21 chapters summarizing the latest findings in research on the biology of aging The content of the work is virtually 100% new Though a selected few topics are similar to the Fifth Edition these chapters are authored by new contributors with new information The majority of the chapters are completely new in both content and authorship The Sixth Edition places greater emphasis and coverage on competing and complementary theories of aging broadening the discussion of conceptual issues Greater coverage of techniques used to study biological issues of aging include computer modeling gene profiling and demographic analyses Coverage of research on Drosophilia is expanded from one chapter to four New chapters on mammalian models discuss aging in relation to skeletal muscles body fat and carbohydrate metabolism growth hormone and the human female reproductive system Additional new chapters summarize exciting research on stem cells and cancer dietary restriction and whether age related diseases are an integral part of aging The Handbook of the Biology of Aging Sixth Edition is part of the Handbooks on Aging series including Handbook of the Psychology of Aging and Handbook of Aging and the Social Sciences also in their 6th editions **Biology of Aging and Development** Gertruida Thorbecke,2013-03-09 e of the reasons for all the F ASEB Societies to meet yearly is the possibility O to interrelate recent progress in diverse areas of research The F ASEB Conferences have been organized to promote such interdisciplinary approaches They center around a basic theme with the aim of discussing active research in cluding widely divergent approaches towards a better understanding of a general biological phenomenon Because of the mounting interest in the subject of aging and development this has been chosen as the theme for this year s symposia We have necessarily been limited in the number of topics that could be covered In our choice we have attempted to select those facets of the main subject which at this time are gen erating active research interest among our membership We have included invited speakers from abroad such as Drs Goldstein Liew and Miller from Canada and Drs Wolpert Holliday and Williamson from England I am sorry to say that the two speakers that we had invited from Russia Dr Frolkis and from Czechoslovakia Dr Sterzl were unable to attend **Endogenous Toxins, 2 Volume Set** Peter J. O'Brien,William Robert Bruce,2009-12-02 Designed as a first stop reference for researchers and professionals in toxicology pharmacology and medicine this handbook is the very first to tie together the knowledge from many disciplines that has so far been available only from widely dispersed sources in the primary literature As such it presents the complete picture on what is currently known about endogenous toxins including their generation mode of action resulting disease condition and available countermeasures Clearly divided into four parts the first systematically covers important toxic molecule species including metabolic intermediates and reactive oxygen species

The second discusses the role of genetically determined metabolic malfunctions such as galactosemia hyperlipidemia porphyria hemochromatosis and related conditions while part three looks at acquired and chronic diseases caused or exacerbated by endogenous toxins such as hepatic injury asthma rheumatism colorectal cancer reperfusion diseases neurodegeneration and aging The final part reviews currents strategies to control and minimize the effect of endogenous toxins either by nutritional or pharmacological interventions With its complete coverage integrating molecular and systemic aspects from the biochemical basis to human disease conditions this comprehensive reference will appeal to a broad target group of toxicologists biochemists nutrition specialists and physicians **The Membrane Hypothesis of Aging** Imre Zs.-Nagy,1994-07-12 The Membrane Hypothesis of Aging offers the most comprehensive multidisciplinary description of the cell maturation and aging process The membrane hypothesis of aging MHA described in this book is based on the actual multidisciplinary knowledge of cell morphology physiology and biochemistry The solid basis of known facts explains the destructive progressive intrinsic and universal character of the aging process The book interprets other aging theories including free radical theory of aging dysdifferentiation hypothesis of aging and cancer and the accumulation theories It presents important issues for future research The book also outlines the possibilities of an efficient preventive anti aging drug design and presents the first promising results of such research activity **Papers of the Conference on Genetics of Aging and Longevity 2012** Alexey Moskalev,Elena G. Pasyukova,2014-11-12 **Introduction à la biogérontologie** Éric LE BOURG,2012-03-16 La biologie du vieillissement ou biog rontologie se d veloppe rapidement depuis une quinzaine d ann es dans nos soci t s souvent inqui tes devant le vieillissement d mographique Contrairement ce qui se passe pour les autres disciplines enseign es l universit la biog rontologie est peu abord e dans les ouvrages universitaires laissant souvent l tudiant ou le chercheur devant la n cessit de trouver par lui m me dans des sources vari es l information dont il a besoin Du fait de l inqui tude de nos contemporains devant le vieillissement individuel ou d mographique les biog rontologues sont souvent confront s la n cessit de s int resser des sujets a priori loign s de leur sujet de recherche comme la d mographie ou le commerce de pr tendus rem des anti vieillissement Une telle situation impose au biog rontologue peut tre plus que dans d autres domaines scientifiques d avoir une r flexion critique sur les enjeux de sa discipline Ce livre court n est pas un manuel de biog rontologie mais plut t une introduction critique la biog rontologie faisant appel la r flexion du lecteur sur les m thodes utilis es pour tudier le vieillissement mais aussi sur le contexte dans lequel se d roule cette recherche Introduction la biog rontologie approche critique sera utile aux tudiants s orientant vers la recherche exp rimentale ou clinique sur le vieillissement aux chercheurs et enseignants chercheurs des m mes domaines mais aussi ceux qui travaillant dans d autres domaines souhaitent acqu rir des notions de base en biog rontologie pour parfaire leurs connaissances de ce domaine en essor rapide The spatiotemporal dynamics of longevity-defining cellular processes and its modulation by genetic, dietary and pharmacological anti-aging interventions Vladimir I. Titorenko,Troy A. A. Harkness, Aging of multicellular and unicellular

eukaryotic organisms is a highly complex biological phenomenon that affects a plethora of processes within cells This wide array of longevity defining cellular processes which are governed by an evolutionarily conserved signaling network includes oxidative metabolism and protein synthesis in mitochondria lipid and carbohydrate metabolism NAD homeostasis amino acid biosynthesis and degradation ammonium and amino acid uptake ribosome biogenesis and translation proteasomal protein degradation nuclear DNA replication chromatin assembly and maintenance actin organization apoptosis necrosis autophagy protein folding stress response signal transduction cell cycle and cell growth The focus of this Frontiers Special Topic Issue is on an important conceptual advance in our understanding of how cells integrate and control these numerous processes and how genetic dietary and pharmacological anti aging interventions extend longevity by altering their functional states and spatiotemporal dynamics The Issue will highlight the various strategies used by evolutionarily diverse organisms for coordinating these longevity defining cellular processes in space and time critically evaluate the molecular and cellular mechanisms underlying such coordination and outline the most important unanswered questions and directions for future research in this vibrant and rapidly evolving field **Modulating Aging and Longevity** S.I. Rattan,2003-09-30 After decades of systematic collection of data describing age related changes in organisms organs tissues cells and macromolecules biogerontologists are now in a position to construct general principles of ageing and explore various possibilities of intervention using rational approaches While not giving serious consideration to the claims made by charlatans it cannot be ignored that several researchers are making genuine attempts to test and develop various means of intervention for the prevention and treatment of age related diseases for regaining the functional abilities and for prolonging the lifespan of experimental organisms This book provides the most up to date information and a critical evaluation of a variety of approaches being tried for modulating aging and longevity including dietary supplementation with antioxidants vitamins and hormones genetic engineering life style alterations and hormesis through mild stress The goal of research on ageing is not to increase human longevity regardless of the consequences but to increase active longevity free from disability and functional dependence **Prevention and Treatment of Age-related Diseases** Suresh I.S. Rattan,Moustapha Kassem,2007-05-09 This book offers a broad ranging assessment of current efforts of the molecular cellular hormonal nutritional and lifestyle strategies being tested and applied by biogerontologists in the search for effective means of intervention prevention and treatment of age related diseases and for achieving healthy old age Employing a semi academic style the book presents data from experimental systems while focusing primarily on their applications to humans in the prevention and treatment of age related impairments **The Aging Immune System and Health** Valquiria Bueno,Rafael Solana,Annemieke Boots,2020-01-15 The world population presents an increased percentage of individuals over 65 years old and the fastest growing subgroup is over 85 years old The increase in life expectancy observed in the last century has not been synonymous with extra years lived in good health disability free years Population studies have shown that as individuals

age they can present a great heterogeneity of ability and health Therefore aging has been associated for some individuals with disabilities and hospitalizations Deaths related to infectious pathogens are increased in the aging population mainly due to pneumonia and influenza whereas Cytomegalovirus Epstein Barr virus among other viruses seem to contribute to the low grade inflammatory process observed inflammaging Aging is a complex and multifactorial process in which functions of the organism are adjusted remodelled in order to deal with damaging events during life One of the most important changes in aging individuals occurs in the immune system innate and adaptive responses with consequences such as poor response to new infections and vaccinations increased susceptibility to cancer development and autoimmune diseases frailty and organ dysfunction In addition it has been proposed that immunosenescence not only reflects the aging of the organism but also contributes to this process Bone marrow presents decreased hematopoiesis the thymus undergoes involution and lymphoid organs lymph nodes spleen also present reduced functionality Therefore cells derived matured or residing in these tissues decline in number and function These changes have been identified in experimental models in vitro conditions peripheral blood and biopsies via biomarkers such as cell phenotype stimulus induced proliferation cytokines and antibodies levels Telomere length and telomerase activity also decline in bone marrow derived and peripheral blood cells and have been shown to play a role in immunosenescence More recently the investigation of short non coding RNA molecules microRNAs miRNAs pointed to this system as a possible control of aging related mechanisms Data obtained on these markers for aging individuals could lead to the generation of a marker panel for pathology prediction to indicate interventions and to evaluate the efficacy of interventions Interventions such as nutrition supplements exercise vaccination different dose concentration of antigen adjuvants have been proposed to circumvent age related diseases Considering the heterogeneity in the aging process further investigation is vital before the indication of interventions for aging individuals As the extension of life expectancy is a reality it is a challenge to understand how the aging population copes with the remodelling of the organism and how interventions could provide longevity in good health **Sirtuins in Biology and Disease** Tiago F. Outeiro,Aleksey G. Kazantsev, Sirtuins comprise a family of NAD dependent enzymes that have been shown to impact longevity in a number of eukaryotic organisms Sir2 Silent Information Regulator 2 was the first sirtuin protein discovered The discovery that Sir2 requires NAD for its activity suggested a link between Sir2 activity and the phenomenon of caloric restriction in prolonging longevity This link was strengthened by the observation that lifespan extension by caloric restriction requires Sir2 protein Under conditions of caloric restriction NAD levels are high Sir2 is activated and the rate of aging is decreased These effects have been replicated in invertebrate organisms where a close structural and functional homologue of Sir2 was found in C elegans and Drosophila The sirtuin dependent effects on metabolism and ageing observed in lower organisms have ignited intensive investigation of their biological and therapeutic roles in mammals There are seven known mammalian sirtuins SIRTs 1 7 the most studied of which is SIRT1 a close structural and functional homologue of yeast Sir2 Enhancement of

organismal longevity and other health promoting effects of mammalian SIRT1 have frequently been attributed to the regulation of metabolism A recognized molecular link between metabolism and aging stimulated a firestorm of investigations aiming to combat metabolic and age dependent human diseases It has become clear however that the sirtuin family of proteins regulates a diverse repertoire of cellular functions in mammals Mounting evidence implicating SIRT1 in important clinical indications such as diabetes cancer cardiovascular dysfunction and neurodegenerative disease suggest that modality as attractive therapeutic target Subsequently drug discovery and development targeting sirtuin activation has been intensified in the recent years Despite rapid progress and accumulation of new data the biological roles of other mammalian sirtuins have been less studied and remain poorly understood There are several important questions that remain to be addressed What are the functions of sirtuins in different cell types and tissues Are all sirtuins involved in the regulation of metabolism and aging What is the functional relationship between different sirtuins What are the mechanisms of regulation of sirtuin activities What is the role of sirtuins in disease and therapy This issue aims to address these and other critical questions relevant to Research Topic on sirtuin biology and therapeutics To that end the issue solicits expert opinions of sirtuin research on structural biology biochemistry cell biology animal genetics pharmacology medicinal chemistry and drug discovery and on areas of investigation studying human conditions like diabetes cancer cardio vascular and neutodegeneration Of particular interest are the new methods and assays to study sirtuins in various organisms and developing sirtuin based therapeutics Furthermore we propose to encourage contributors to discuss new concepts and paradigms and to express their perspectives on the future development of the sirtuin research field Altogether we believe this issue provides a unique opportunity for comprehensive and diverse coverage of the topic and will be of broad interest for the journal s readership **Neuronal Inputs and Outputs of Aging and Longevity** Joy Alcedo,Thomas Flatt,Elena G. Pasyukova,2013-08-23 An animal s survival strongly depends on its ability to maintain homeostasis in response to the changing quality of its external and internal environments This is achieved through intercellular communication not only within a single tissue but also among different tissues and organ systems Thus alterations in tissue to tissue or organ to organ communications which are under genetic regulation can affect organismal homeostasis and consequently impact the aging process One of the organ systems that play a major role in maintaining homeostasis is the nervous system Considering that the nervous system includes the sensory system which perceives the complexity of an animal s environment it should be no surprise that there would be a sensory influence on homeostasis and aging To promote homeostasis any given sensory information is transmitted through short range signals via neural circuits and or through long range endocrine signals to target tissues which may in turn be neuronal or non neuronal in nature At the same time since homeostasis involves a number of feedback mechanisms non neuronal tissues can also modulate sensory and other neuronal functions Several genes that regulate signaling pathways known to affect homeostasis and aging have been shown to act in neurons in tissues that

are likely downstream targets of the nervous system or through feedback regulation of neuronal activities These genes can have different temporal requirements some might function early e g by affecting neural development while others may only be required later in adulthood Some well known examples of genes involved in the neuronal regulation of homeostasis and longevity encode components of the evolutionarily conserved nutrient sensing insulin insulin like signaling pathway the stress sensing internal repair system and the mitochondrial electron transport chain Indeed the genetic perturbation of these pathways has been found to lead to numerous diseases many of which are age related and involve the nervous system such as neurodegeneration and the metabolic syndrome Despite much progress however many aspects of the neuronal inputs and outputs that affect aging and longevity are poorly understood to date For example the precise neuronal and non neuronal circuitries and the details of the molecular mechanisms through which genes signaling pathways maintain homeostasis and affect aging in response to the environment remain to be elucidated Similarly it is presently unclear whether genes that regulate the early development of the nervous system and its consequent circuitry influence homeostasis and longevity during adulthood At the same time although many genes affecting aging are conserved both the nervous system and the aging process are highly variable within populations and among taxa Accordingly the role of natural genetic variation in shaping the neurobiology of aging is also presently unknown The aim of this Research Topic is therefore to highlight the genetic developmental and physiological aspects of the signaling networks that mediate the neuronal inputs and outputs that are required to maintain organismal homeostasis The elucidation of the effects of these neuronal activities on homeostasis may thus provide much needed insight into mechanisms that affect aging and longevity The Proteasomal System in Aging and Disease Tilman Grune,2012-07-05 This volume of Progress in Molecular Biology and Translational Science discusses cutting edge research of proteasomes and proteasome associated proteins and cellular systems The volume is split into two sections The first part discusses the current knowledge of the structure function and regulation of the proteasomal system The second part describes the role of the proteasome in aging and disease Contributions from leading authorities Informs and updates on all the latest developments in the field **Advances in Swine in Biomedical Research** Mike E. Tumbleson,Lawrence B. Schook,1996 Contains papers from the October 1995 symposium in sections on methods and techniques and nutrition Subjects include the Yucatan miniature pig model of ventricular septal defect the minipig as a model for the study of aging in humans an external thoracic duct venous shunt to allow for long term **Frontiers in Medicinal Chemistry: Volume 4** Atta-ur Rahman,M. Iqbal Choudhary,Allen B. Reitz,2009-01-15 Frontiers in Medicinal Chemistry is an Ebook series devoted to the review of areas of important topical interest to medicinal chemists and others in allied disciplines Frontiers in Medicinal Chemistry covers all the areas of medicinal chemistry incl Sleep and Clocks in Aging and Longevity Anita Jagota,2023-03-06 This edited volume focuses on the interplay between sleep and circadian rhythms with health aging and longevity Sleep is absolutely important for human health and survival as insufficient sleep is associated with

a plethora of conditions including the poor quality of life onset of several diseases and premature death The sleep wake cycle is an evolutionary conserved neurobiological phenomenon and is a prominent manifestation of the biological clocks localised in the suprachiasmatic nucleus SCN Understanding bidirectional relationship between sleep and circadian rhythms is of utmost importance and urgency especially in the context of modern lifestyle where sleep is often out of phase with the internal body clocks social jetlag artificial lights and so on The 25 chapters by leading researchers and experts from 11 countries are arranged into seven sections understanding sleep and clock interlink in health and longevity sleep aging and longevity clock aging and longevity melatonin sleep and clock genetic regulation of sleep and clock therapeutic interventions in sleep disorders and clock misalignment and experimental models to study sleep and clocks in aging and longevity This book is useful for advanced undergraduate and graduate students and researchers educators and other biomedical professionals **Journal of the National Cancer Institute** ,1985-04 JNCI, Journal of the National Cancer Institute National Cancer Institute (U.S.),1985 **MicroRNAs in Medicine** Charles H. Lawrie,2013-10-30 MicroRNAs in Medicine provides an access point into the current literature on microRNA for both scientists and clinicians with an up to date look at what is happening in the emerging field of microRNAs and their relevance to medicine Each chapter is a comprehensive review with descriptions of the latest microRNA research written by international leaders in their field Opening with an introduction to what microRNAs are and how they function the book goes on to explore the role of microRNAs in normal physiological functions infectious diseases non infectious diseases cancer circulating microRNAs as non invasive biomarkers and finally their potential as novel therapeutics Including background information on the field as well as reviews of the latest research breakthroughs MicroRNAs in Medicine is a one stop source of information to satisfy the specialists and non specialists alike appealing to students researchers and clinicians interested in understanding the potential of microRNAs in medicine and research The Coming of Age of Insulin-Signalling in Insects Colin G.H. Steel,Xanthe Vafopoulou,2015-01-28 The new millennium has seen a major paradigm shift in insect endocrinology Great advancements are being made which establish that nutrition and growth play a central role in diverse cellular and physiological phenomena during insect development and reproduction Nutrition affects rates of growth and is mainly regulated by the function of the pathway of insulin insulin like growth factor signalling This pathway is highly conserved across species and ultimately regulates rates of cell growth and proliferation in growing organs Insulin and insulin like peptides ILPs are some of the best studied hormones in the animal kingdom and all share a common structural motif and initiate a wide range of closely similar physiological processes in higher organisms In insects nutrition via circulating sugar promotes release of ILPs from brain neurosecretory cells into the haemolymph which act on peripheral tissues and stimulate protein synthesis and cell growth Therefore insect ILPs are common mediators between nutrition and growth in insects and are functionally analogous to mammalian insulin The 1980s and 1990s witnessed great progress in elucidation of the physiological and molecular mechanism of action of

numerous insect hormones involved in regulation of growth development reproduction and metabolism But the signals for the initiation or termination of controlled events remained largely unknown ILPs were first identified from the silkmoth Bombyx mori and were named bombyxins but related peptides were soon found in numerous species and their functions elucidated The insulin signalling pathway is now recognized as a central factor in the timing of cell proliferation growth longevity reproduction and reproductive diapause as well as social behaviour Recent work has revealed that the insulin signalling pathway is closely integrated with that of various other hormones including ecdysteroids the juvenile hormones and neuropeptide s such a prothoracicotropic hormone In addition the pathway is also linked with both circadian daily and photoperiodic seasonal clocks potentially providing a basis for its timing function This Research Topic aims to provide the only current collection of recent advances on insect ILPs We encouraged submissions on all areas related to identification characterization regulation and physiological functions of insect ILPs We welcomed both full and short reviews and original research articles

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