

AGING



Atherosclerosis



Coronary artery disease



Hypertension



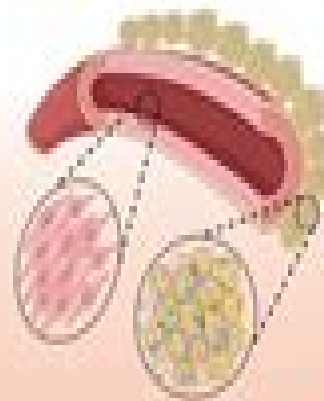
Heart Failure



Myocardial infarction



Cardiovascular death



Cellular Senescence

MECHANISTIC APPROACHES

1 Genetically-based therapies



2 Senotherapies



REJUVENATING STRATEGIES

Mechanisms Of Cardiovascular Aging

**Michel E. Safar, Michael F.
O'Rourke, Edward D. Frohlich**



Mechanisms Of Cardiovascular Aging:

Mechanisms of Cardiovascular Aging T. Hagen, 2002-11-19 This volume of *Advances in Cell Aging and Gerontology* provides a timely review on the molecular and cellular basis of cardiovascular diseases CVD Age itself is the leading risk factor for cardiovascular diseases which include loss of vasomotor function athero and arterio sclerosis hypertension congestive heart failure and stroke Together these pathologies comprise the leading causes of permanent disability hospitalization and death for individuals over the age of 65 Thus there is a critical need to assess both the age associated causes leading to CVD as well as the current state of knowledge on preventive regimens designed to slow or modulate disease progression This book concisely summarizes the current knowledge related to the major aspects contributing to cardiovascular disfunction in the elderly as well as potential ways of maintaining or improving human cardiovascular healthspan

Cardiovascular Aging Iokim Spyridopoulos, 2018-11-01 *Cardiovascular Aging Linking Cellular and Molecular Mechanisms* is a first of its kind resource linking age related cardiovascular disease to its molecular pathomechanism With full coverage of the essential cellular and molecular mechanisms of ageing this valuable resource will provide the important connection between research and clinical application highlighting paths in translational science and pointing to future interventions Presents a complete picture of cardiovascular aging which allows bench to bedside application and leads to future interventions Provides you with coverage of essential cellular and molecular mechanisms of ageing Highlights the link between age related cardiovascular disease and molecular mechanisms

Advances in Metabolic Mechanisms of Aging and Its Related Diseases Katia Aquilano, Daniele Lettieri Barbato, Raffaella Faraonio, Natascia Ventura, 2020-12-18 This eBook is a collection of articles from a *Frontiers Research Topic* *Frontiers Research Topics* are very popular trademarks of the *Frontiers Journals Series* they are collections of at least ten articles all centered on a particular subject With their unique mix of varied contributions from Original Research to Review Articles *Frontiers Research Topics* unify the most influential researchers the latest key findings and historical advances in a hot research area Find out more on how to host your own *Frontiers Research Topic* or contribute to one as an author by contacting the *Frontiers Editorial Office* frontiersin.org about contact

Handbook of the Biology of Aging Nicolas Musi, Peter Hornsby, 2021-01-19 *Handbook of the Biology of Aging Ninth Edition* provides a comprehensive synthesis and review of the latest and most important advances and themes in modern biogerontology The book focuses on the trend of big data approaches in the biological sciences presenting new strategies to analyze interpret and understand the enormous amounts of information being generated through DNA sequencing transcriptomic proteomic and metabolomics methodologies applied to aging related problems Sections cover longevity pathways and interventions that modulate aging innovative tools that facilitate systems level approaches to aging research the mTOR pathway and its importance in age related phenotypes and much more Assists researchers in keeping abreast of research and clinical findings outside their subdiscipline Helps medical behavioral and social gerontologists

understand what basic scientists and clinicians are discovering Includes new chapters on genetics evolutionary biology bone aging and epigenetic control Examines the diverse research being conducted in the study of the biology of aging

Mechanisms Linking Aging, Diseases and Biological Age Estimation Sara C. Zapico,2017-03-27 This book focuses on four of the hallmarks of aging aspartic acid racemization advanced glycation end products telomere shortening and mitochondrial mutations describing their role in aging and diseases and their application to age at death estimation in forensic sciences in greater depth displaying the interconnecting pathways among these processes An additional chapter related to Epigenetics and its role in aging diseases and forensic age estimation is also included This book is aimed at a broad audience from students being introduced to aging diseases and forensic science research to scientists in biomedicine and forensics complementing their knowledge in their respective fields while also increasing their knowledge in other disciplines

Advances in Geroscience Felipe Sierra,Ronald Kohanski,2015-11-10 This book provides the first comprehensive overview of a new scientific discipline termed Geroscience Geroscience examines the molecular and cellular mechanisms that might explain why aging is the main risk factor for most chronic diseases affecting the elderly population Over the past few decades researchers have made impressive progress in understanding the genetics biology and physiology of aging This book presents vital research that can help readers to better understand how aging is a critical malleable risk factor in most chronic diseases which in turn could lead to interventions that can help increase a healthy lifespan or healthspan The book begins with an analysis of the Geroscience hypothesis as well as the epidemiological underpinnings that define aging as a candidate main risk factor for most chronic diseases Next each chapter focuses on one particular disease or group of diseases with an emphasis on how basic molecular and cellular biology might explain why aging is a major risk factor for it Coverage in the book includes cancer cardiovascular disease dementias stroke Parkinson s and Alzheimer s diseases osteoporosis arthritis diabetes asthma emphysema kidney disease vision impairment and AIDS HIV It finishes with a chapter on pain in the elderly and an overview of future steps needed to bring the newly acquired knowledge into the clinic and the public at large

Cardiac Management in the Frail Elderly Patient and the Oldest Old Andrea Ungar,Niccolò Marchionni,2017-03-14 This book focuses specifically on the management of cardiovascular disease in elderly patients with particular frailties and in the oldest old It is clearly explained how treatment in these patients differs from that in patients in their seventies who respond well to therapies and do not present frailties or organ failures Although not young the latter patients can be treated almost like any other patient according to established guidelines In contrast the frail compromised elderly and the oldest old require specific measures that target their needs including with respect to underlying renal conditions The book considers all those pathologies that have a high prevalence in the general population explaining advanced treatment concepts and all aspects of assessment Key clinical points are highlighted and the text is supplemented with numerous informative figures and tables The authors are respected experts for the most part geriatric physicians and

the book is especially addressed to cardiologists who may lack the described targeted information and treatment tools

Beauty, Aging and AntiAging Ibrahim Vargel, Fatma Figen Ozgur, 2022-08-31 *Beauty Aging and AntiAging* covers novel and updated research and treatment options regarding the effects of aging on human physiology. Beauty perception and related molecular pathways are reviewed along with current medical and surgical approaches to aging. The first part of the book focuses on beauty youth aging and its effects on the human body. In the second part, various restorative treatment approaches are reviewed in detail. Particularly, invasive treatment options and molecular pathophysiology of aging are covered in this book. Presents current trends and developments in regenerative and restorative medicine in aging and antiaging. Includes recent reconstructive and restorative algorithms of various fields related to aging. Covers new treatment perspectives in degenerative diseases.

Aging and Heart Failure Bodh I. Jugdutt, 2014-02-19 This book synthesizes the major research advances in molecular biochemical and translational aspects of aging and heart failure over the last four decades and addresses future directions in management and drug discovery. It presents clinical issues and molecular mechanisms related to heart failure, including the changing demographics in the aging population with heart failure, hypertension, and prevention of diastolic heart failure in the aging population, polypharmacy and adverse drug reactions in the aging population with heart failure, changes in the heart that accompany advancing age from humans to molecules, aging associated alterations in myocardial inflammation and fibrosis, and aging related changes in mitochondrial function and implications for heart failure therapy. The book succinctly summarizes the large volume of data on these key topics and highlights novel pathways that need to be explored. Featuring contributions from leading clinician scientists, *Aging and Heart Failure: Mechanisms and Management* is an authoritative resource on the major clinical issues in heart failure therapy in the elderly for cardiologists, gerontologists, and internists.

Aging and the Heart José Marín-García, 2007-12-07 In this book, the genetic and molecular basis of cardiovascular aging is examined in detail, and a comprehensive assessment is given of the bioenergetics changes occurring in human and animal models of cardiac aging. Both current diagnostic and future therapeutic modalities are presented, giving this book a dual pronged approach. Cardiac aging, like aging in general, is a complex process involving numerous cellular and molecular changes. This book sheds new light on the phenomenon. The relationship between cardiovascular disease and other chronic conditions

Laura Sabatino, Cristina Vassalle, Junjie Xiao, 2023-03-16 Vascular Aging: Facts and Factors Elisabet Vila, Francesc Jiménez-Altayó, Paula Dantas, The increasing mean age of the population in developed countries has turned out to be an economic and social problem. Cardiovascular disease has long been considered to be age related in terms of their onset and progression. As such, we can say that the increase in life expectancy goes in parallel with increased incidence of cardiovascular disease. With age, a number of changes occur in the vasculature, altering the homeostasis of the irrigated organs, promoting target organ damage. While different adaptive mechanisms to protect vessels against mild stress have been described, the aging process induces a progressive

failure of protective mechanisms leading to vascular changes and higher susceptibility to cardiovascular diseases. Indeed, vascular aging is exacerbated by coexisting cardiovascular risk factors such as hypertension, metabolic syndrome, and diabetes. Compelling evidence indicates that diminished endothelial relaxation and increased decrease or no change in contractile responses to several agonists is associated with aging. There is an increase of vasoconstrictor factors expression and a decrease of vasodilators. Morphologic changes include lumen diameter enlargement, wall thickening, and alterations of matrix substances as increased collagen or decreased elastin deposition, ultimately leading to greater arterial stiffening, reduced compliance. Importantly, arterial stiffness is an independent predictor of cardiovascular morbidity and mortality. Cellular and molecular mechanisms have also been documented. Senescence at the cellular level involves alterations in Ca^{2+} signaling and down regulation of anti-aging proteins. Both endothelial and smooth muscle cells change their number, morphology, function, and their regenerative ability. Aging is also associated with a gradual loss of antioxidant defense mechanisms, a proinflammatory shift in the cytokine expression profile, and a production of reactive oxygen species such as superoxide ($O_2^{\cdot-}$) that promotes the breakdown of nitric oxide. Nitric oxide and $O_2^{\cdot-}$ interact to form peroxynitrite, known to nitrosylate proteins, affecting their physiological function. However, vascular wall proteins may also suffer from other potentially deleterious modifications as glycation (Maillard reaction) and glyco-oxidative reactions with increasing age, which could be linked to the age-associated changes in vascular function. Various strategies have shown benefit in preventing, delaying, or attenuating vascular aging. For instance, a healthy lifestyle including low-fat diet and/or exercise have a favorable effect. Nevertheless, it yet remains to be fully demonstrated whether vascular aging can be pharmacologically prevented. This Research Topic is intended to bring together research efforts to understand the causes and consequences of vascular aging and propose new therapeutic strategies for the management of vascular senescence.

Autophagy and Cardiometabolic Diseases Jun Ren, James R. Sowers, Yingmei Zhang, 2018-04-12. Autophagy and Cardiometabolic Diseases: From Molecular Mechanisms to Translational Medicine covers the science of autophagy in relation to cardiometabolic diseases and the future therapeutic potentials of autophagy regulation in these processes. Processes are not described in isolation but in concert with other cellular and/or metabolic processes such as lipogenesis, glucose energy metabolism, and apoptosis. This approach recognizes the multifactorial nature of cardiometabolic diseases including obesity, diabetes, insulin resistance, hypertension, and dyslipidemia. The book provides explanations while also distinguishing the delicate role for autophagy in pathogenesis and exploring complications for cardiometabolic diseases. By targeting autophagy, it offers new avenues for drug discovery and treatment for cardiometabolic anomalies. It is a perfect resource for cardiology researchers, scientists, and medical practitioners. Explains the processes inherent in the protein quality control for pathogenesis and complications of cardiometabolic diseases. Provides knowledge from internationally recognized contributors in the field. Incorporates a translational approach covering the basic cellular biology of autophagy and presenting the role of autophagy regulation for

both pathogenesis and complication in cardiometabolic diseases Contains access to a companion website with additional illustrations *New Mechanisms and Drugs for the Treatment of Cardiovascular Disease with Diabetes* Jingwei Li,Yuli Huang,Xiongfei Pan,Jie Yu,2023-04-05 Signaling in the Heart José Marín-García,2011-06-21 Signal transduction pathways are at the core of most biological processes and are critical regulators of heart physiology and pathophysiology The heart is both a transmitter and dynamic receptor of a variety of intracellular and extracellular stimuli playing a critical role of an integrator of diverse signaling mechanisms Alterations in signaling pathways are contributing factors in the development and progression of a broad spectrum of diseases ranging from dysrhythmias and atherosclerosis to hypertension and the metabolic syndrome Targeting specific components of these signaling pathways has been shown to be effective in preclinical studies with significant therapeutic impact This book brings together current knowledge in cardiovascular cell signal transduction mechanisms advances in novel therapeutic approaches to improve cardiac function and discussion of future directions Presented from a post genomic perspective this exciting book introduces important new ideas in cardiovascular systems biology It is an invaluable reference for cardiology researchers and practitioners *Cardiovascular Mechanics* Michel Labrosse,2018-09-13 The objective of this book is to illustrate in specific detail how cardiovascular mechanics stands as a common pillar supporting such different clinical successes as drugs for high blood pressure prosthetic heart valves and coronary artery bypass grafting among others This information is conveyed through a comprehensive treatment of the overarching principles and theories that are behind mechanobiological processes aortic and arterial mechanics atherosclerosis blood and microcirculation hear valve mechanics as well as medical devices and drugs Examines all major theoretical and practical aspects of mechanical forces related to the cardiovascular system Discusses a unique coverage of mechanical changes related to an aging cardiovascular system Provides an overview of experimental methods in cardiovascular mechanics Written by world class researchers from Canada the US and EU Extensive references are provided at the end of each chapter to enhance further study Michel R Labrosse is the founder of the Cardiovascular Mechanics Laboratory at the University of Ottawa where he is a full professor within the Department of Mechanical Engineering He has been an active researcher in academia along with being heavily associated with the University of Ottawa Heart Institute He has authored or co authored over 90 refereed communications and supervised or co supervised over 40 graduate students and post docs **Non-coding RNAs in Cardiovascular Diseases** Junjie Xiao,2020-04-13 This book presents the latest research on non coding RNAs in cardiovascular disease a major cause of death worldwide Non coding RNAs play a significant role in development proliferation differentiation and apoptosis Since altered non coding RNA expression is often associated with various diseases their potential use in diagnostics prognostics and therapeutics is an important current area of study The book consists of six parts 1 An overview of non coding RNAs and cardiovascular system 2 Bioinformatics and interactions 3 Non coding RNA regulation in cardiovascular system 4 Non coding RNAs and cardiovascular diseases 5 Potential

biomarkers and therapeutic implications 6 Future prospects It is particularly useful for researchers and students in the field of non coding RNA and cardiovascular biology as well as for cardiologists pharmacologists and physiologists *Blood Pressure and Arterial Wall Mechanics in Cardiovascular Diseases* Michel E. Safar,Michael F. O'Rourke,Edward D. Frohlich,2014-07-30 In cardiovascular prevention there is classically a small number of cardiovascular risk factors to treat such as hypertension diabetes hyperlipidemia and smoking excess which are widely detected and treated Recently it has been widely recognized that new mechanical factors should be detected and treated and involves specifically pulsatile arterial hemodynamic PAH parameters such as arterial stiffness pulse pressure and to a lesser extent augmentation index and pulse pressure amplification The pedagogic aspect of this new CV specialty involves 3 principal parts a Basic concepts and pathophysiological mechanisms of PAHb Clinical aspects and end organ damage in PAHc Clinical pharmacology and therapeutics of PAH This book represents the first that spans basic science and clinical management of this new CV subspecialty Much has been learned regarding the management of these patients in recent years and this book presents extensive data on the techniques needed to maximize outcomes *Heart Health* Silas Donovan,AI,2025-03-12 Heart Health offers a comprehensive guide to understanding and maintaining cardiovascular health as we age It emphasizes that heart disease is a leading cause of mortality but proactive lifestyle choices can significantly mitigate age related decline The book uniquely blends biology nutrition and exercise physiology to provide a holistic perspective It highlights the importance of understanding how the heart and blood vessels change with age such as the stiffening of arteries and how these changes impact overall cardiovascular function The book explores the impact of modifiable risk factors like diet and exercise For example it details how dietary patterns like the Mediterranean and DASH diets support heart health offering practical ways to incorporate these principles into daily life It also provides tailored exercise recommendations for different age groups and fitness levels Progressing from basic cardiovascular physiology to advanced interventions Heart Health empowers readers to assess individual risk factors and implement actionable strategies for a healthier heart **Pathophysiology and Pharmacotherapy of Cardiovascular Disease** Gowraganahalli Jagadeesh,Pitchai Balakumar,Khin Maung-U,2015-05-06 The present book covers the basic principles of cardiovascular physiology pathophysiology and advanced pharmacology with particular emphasis on cellular mechanisms of drug action It provides an update on the progress made in several aspects of cardiovascular diseases so that it might kindle scientists and clinicians alike in furthering basic and translational research In addition the book is expected to fill imperative gaps in understanding and optimally treating cardiovascular disease

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