A Volume in the Conceptual Breakthroughs Series



# The Evolutionary Biology of Aging

Kenneth R. Arnold Michael R. Rose

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# **Evolutionary Biology Of Aging**

**Michael R. Rose** 

## **Evolutionary Biology Of Aging:**

**Evolutionary Biology of Aging** Michael R. Rose,1991 In this provocative book on the process of growing old Michael Rose goes right to the heart of the fundamental unsolved problem of biology Why do we grow old The proposed theory is that to understand aging we must understand its evolution only then do its taxonomic distribution and its genetic and physiological mechanisms become intelligible Evidence is produced from the fields of cell biology physiology and gerontology

**Evolutionary Biology of Aging Michael Robertson Rose**, 2023 This study examines a fundamental unsolved problem of biology why do we grow old The author proposes an evolutionary theory of senescence which he elaborates with evidence Conceptual Breakthroughs in The Evolutionary Biology of Aging from cell biology physiology and gerontology Kenneth R. Arnold, Michael R. Rose, 2023-07-10 Conceptual Breakthroughs in the Evolutionary Biology of Aging continues the innovative Conceptual Breakthroughs series by providing a comprehensive outline of the major breakthroughs that built the evolutionary biology of aging as a leading scientific field Following the evolutionary study of aging from its humble origins to the present the book's chapters treat the field's breakthroughs one at a time Users will find a concise and accessible analysis of the science of aging viewed through an evolutionary lens Building upon widely cited studies conducted by author Michael Rose this book covers 30 subsequent years of growth and development within the field The book highlights key publications for those who are not experts in the field providing an important resource for researchers Given the prevailing interest in changing the aging process dramatically it is a powerful tool for readers who have a vested interest in understanding its causes and future control measures Reviews cell molecular theories of aging in the light of evolutionary biology Offers an evolutionary analysis of prospects for mitigating aging not commonly discussed within private and public sectors Provides readers with a radically different perspective on contemporary biological gerontology specifically through the lens of evolutionary biology **Evolutionary Biology of Aging** Michael R. Rose, 1994-10-27 This unique book looks at the biology of aging from a fundamentally new perspective one based on evolutionary theory rather than traditional concepts which emphasize molecular and cellular processes. The basis for this approach lies in the fact that natural selection as a powerful determining force tends to decline in importance with age Many of the characteristics we associate with aging the author argues are more the result of this decline than any mechanical imperative contained within organic structures This theory in turn yields the most fruitful avenues for seeking answers to the problem of aging and should be recognized as the intellectual core of gerontology and the foundation for future research The author ably surveys the vast literature on aging presenting mathematical experimental and comparative findings to illustrate and support the central thesis The result is the first complete synthesis of this vital field Evolutionary biologists gerontologists and all those concerned with the science of aging will find it a stimulating strongly argued account **The Long Tomorrow** Michael R. Rose, 2005-09-15 Equally important Rose surveys the entire field offering colorful portraits of many leading scientists and shedding light on research findings

from around the world We learn that rodents given fifteen to forty percent fewer calories live about that much longer and that volunteers in Biosphere II who lived on reduced caloric intake for two years all had improved vital signs Perhaps most interesting we discover that aging hits a plateau and stops at least it does so in fruit flies Jacket **Genetics and Evolution** of Aging Michael R. Rose, Caleb E. Finch, 2013-03-09 Aging is one of those subjects that many biologists feel is largely unknown Therefore they often feel comfortable offering extremely facile generalizations that are either unsupported or directly refuted in the experimental literature Despite this unfortunate precedent aging is a very broad phenomenon that calls out for integration beyond the mere collecting together of results from disparate laboratory organisms With this in mind Part One offers several different synthetic perspectives The editors Rose and Finch provide a verbal synthesis of the field that deliberately attempts to look at aging from both sides the evolutionary and the molecular The articles by Charlesworth and Clark both provide population genetic perspectives on aging the former more mathematical the latter more experimental Bell takes a completely different approach arguing that aging may not be the result of evolutionary forces Bell s model instead proposes that aging could arise from the progressive deterioration of chronic host pathogen interactions. This is the first detailed publication of this model It marks something of a return to the type of aging theories that predominated in the 1950 s and 1960 s theories like the somatic mutation and error catastrophe theories. We hope that the reader will be interested by the contrast in views between the articles based on evolutionary theory and that of Bell MR Rose and C E Finch eds Genetics and Evolution of Aging 5 12 1994 1994 Kluwer Academic Publishers The J aniform genetics of aging 2 Michael R Rosel Caleb Molecular Biology of Aging Avril D. Woodhead, Anthony D. Blackett, Alexander Hollaender, 2013-11-22 It is delightful but humbling to find my face at the start of these Proceedings there are innumerable other faces which could equally well stand there from among the band who have fore gathered at every gerontology conference since the subject was launched in its present form but I deeply appreciate being there Gerontology d id not grow by accident Its present standing is the fruit of careful planning undertaken by European and American scientists back in the 1950 s In those days it was still a fringe science and the conspirators had much the standing of the 1920 s Interplanetary Society The United States itself is the offspring of conspiracy for when the results of conspiracy are beneficent the conspirators become Founding Fathers This has been the case with gerontology The present meeting is especially gratifying because the papers have been recitals of normal hard science investigation We had to get through the rigors of a long period of semantic argument and a long period of one shot general theories before this kind of meeting normal in all other research fields could take place It was also necessary to breed in the menagerie a generation of excellent investigators aware of the theoretical background but unintimidated by it who share our conviction that human aging is comprehensible and probably controllable and who go into the laboratory to attack specifics The Biology of Aging John A. Behnke, 2012-12-06 Egocentricity is characteristically human It is natural for our prime in terest to be ourselves and for one of our major concerns to be what affects us personally Aging and death

universal and inevitable have always been of compelling concern Mystical explanations were invented when scientific answers were lacking and gross physiologi As scientific knowledge developed anatomy cal processes were explained and the roles of the endocrine glands were revealed Since the sex hormones obviously lose some of their potency with age it was logical to assume that they played the major role in declining general well being The puzzle of aging would now be solved The Ponce de Leon quest would soon be fulfilled Pseudoscientists and quacks rushed in where most scientists feared to tread By the time the glowing promises of perpetual youth through gland transplants and injections had proved illusory serious study of the aging process had been set back for years The field had lost respect ability and most capable scientists shunned it Those who did con tinue to seek answers to its tough questions deserve special recognition **Evolutionary Biology** Pierre Pontarotti, 2009-08-25 Since 1997 scientists of different disciplines sharing a deep interest in concepts and knowledge related to evolutionary biology have held the annual Evolutionary Biology Meetings in Marseille in order to discuss their research and promote collaboration Lately scientists especially focusing on applications have also joined the group This book starts with the report of the 12th Evolutionary Biology Meeting which gives a general idea of the meeting s epistemological stance This is followed by 22 chapters a selection of the most representative contributions which are grouped under the following four themes Part I Concepts and Knowledge Part II Modelization Part III Applied Evolutionary Biology Part IV Applications in Other Fields Part IV transcends the field of biology presenting applications of evolutionary biology in economics and astronomy Human Evolutionary Biology Michael P. Muehlenbein, 2010-07-29 Wide ranging and inclusive this text provides an invaluable review of an expansive selection of topics in human evolution variation and adaptability for professionals and students in biological anthropology evolutionary biology medical sciences and psychology The chapters are organized around four broad themes with sections devoted to phenotypic and genetic variation within and between human populations reproductive physiology and behavior growth and development and human health from evolutionary and ecological perspectives An introductory section provides readers with the historical theoretical and methodological foundations needed to understand the more complex ideas presented later Two hundred discussion questions provide starting points for class debate and assignments to test student understanding The Evolutionary Roots of Reproductive Ageing and Reproductive Health Across the Tree of Life Jean-Francois Lemaitre, Jean-Michel Gaillard, 2024-01-02 Evolutionary Interpretations of Aging, Disease Phenomenon, and Sex Giacinto Libertini, 2011

Encyclopedia of Biomedical Gerontology ,2019-11-20 Encyclopedia of Biomedical Gerontology Three Volume Set presents a wide range of topics ranging from what happens in the body during aging the reasons and mechanisms relating to those age related changes and their clinical psychological and social modulators and determinants The book covers the biological and medical aspects of gerontology within the general framework of the biological basis of assessing age biological mechanisms of aging age related changes in biological systems human age related diseases the biomedical practicality and

impracticality of interventions and finally the ethics of intervention Provides a one stop resource to information written by world leading scholars in the field of biomedical gerontology Fills a critical gap of information in a field that has seen significant progress in the last 10 years Methuselah Flies: A Case Study In The Evolution Of Aging Michael Robertson Rose, Hardip B Passananti, Margarida Matos, 2004-06-14 Methuselah Flies presents a trailblazing project on the biology of aging It describes research on the first organisms to have their lifespan increased and their aging slowed by hereditary manipulation These organisms are fruit flies from the species Drosophila melanogaster the great workhorse of genetics Michael Rose and his colleagues have been able to double the lifespan of these insects and improved their health in numerous respects as well The study of these flies with postponed aging is one of the best means we have of understanding and ultimately achieving the postponement of aging in humans As such the carefully presented detail of this book will be of value to research devoted to the understanding and control of aging Methuselah Flies is a tightly edited distillation of twenty years of work by many scientists contains the original publications regarding the longer lived fruit flies offers commentaries on each of the topics covered new short essays that put the individual research papers in a wider context gives full access to the original data captures the scientific significance of postponed aging for a wide academic audience **Experimental** Evolution Theodore Garland, Michael R. Rose, 2009-12-03 This volume summarizes studies in experimental evolution outlining current techniques and applications and presenting the field s range of research Systems Evolutionary Biology Bor-Sen Chen, 2018-02-03 Systems Evolutionary Biology Biological Network Evolution Theory Stochastic Evolutionary Game Strategies and Applications to Systems Synthetic Biology discusses the evolutionary game theory and strategies of nonlinear stochastic biological networks under random genetic variations and environmental disturbances and their application to systematic synthetic biology design The book provides more realistic stochastic biological system models to mimic the real biological systems in evolutionary process and then introduces network evolvability stochastic evolutionary game theory and strategy based on nonlinear stochastic networks in evolution Readers will find remarkable revolutionary information on genetic evolutionary biology that be applied to economics engineering and bioscience Explains network fitness network evolvability and network robustness of biological networks from the systematic perspective Discusses the evolutionary noncooperative and cooperative game strategies of biological networks Offers detailed diagrams to help readers understand biological networks their systematic behaviors and the simulational results of evolutionary biological networks Includes examples in every chapter with computational simulation to illustrate the solution procedure of evolutionary theory strategy Big Questions in Ecology and Evolution Thomas N. Sherratt, David M. Wilkinson, 2009-02-19 This book and results provides an introduction to a range of fundamental questions that have taxed evolutionary biologists and ecologists for decades All of the questions posed have at least a partial solution all have seen exciting breakthroughs in recent years yet many of the explanations have been hotly debated **Evolution, Development and Ecology of Anemonefishes** Vincent

Laudet, Timothy Ravasi, 2022-11-07 Anemone fishes one of the most popular and recognizable of fishes in the world are much more than film characters they are also emerging model organisms for studying the biology ecology and evolution of coral reef fishes They are a group of 28 species often employed to study patterns and processes of social organization intra and inter specific competition sex change mutualism dispersal and connectivity of fish populations habitat selection pigment pattern formation lifespan and predator prey interactions This multi authored book covers all these areas and provides an update on the research done with this model and the perspective it opens for the future Key Features Contains basic and up to date information on an emerging fish model Allows non specialist readers to grasp the relevance of a wide research area Provides accurate and easy to access information on each of the 28 species Includes guidance for establishing a breeding colony Documents that anemonefishes are useful model organisms for ecological developmental and climate research The Open Access version of this book available at www taylorfrancis com has been made available under a Creative Commons Attribution Non Commercial No Derivatives 4 0 license On Evolution John C. Avise, 2007-09-17 Essays from the award winning geneticist on evolutionary biology from protein electrophoresis to the recent ability to scan entire genomes John Avise is one of the most distinguished evolutionary biologists of our time His groundbreaking work with mitochondrial DNA created the entire discipline of phylogeography and his work on the Pleistocene refugia hypothesis redirected scientific thinking about patterns of distribution Spanning a remarkable thirty five year career the essays gathered here were rewritten from his previously published articles and represent the first single volume collection of Avise s work Moving through various questions in evolutionary biology these eclectic essays reveal Avise s unique perspectives on major topics in the field From how to define a species to the folly of faulty applications of cladistics to connections between conservation and evolutionary biology On Evolution takes the reader on a personal journey into the mind of one of the world's leading evolutionists Basics in Human Evolution Michael P Muehlenbein, 2015-07-24 Basics in Human Evolution offers a broad view of evolutionary biology and medicine The book is written for a non expert audience providing accessible and convenient content that will appeal to numerous readers across the interdisciplinary field From evolutionary theory to cultural evolution this book fills gaps in the readers knowledge from various backgrounds and introduces them to thought leaders in human evolution research Offers comprehensive coverage of the wide ranging field of human evolution Written for a non expert audience providing accessible and convenient content that will appeal to numerous readers across the interdisciplinary field Provides expertise from leading minds in the field Allows the reader the ability to gain exposure to various topics in one publication

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