

Animal Physiology Hill Wyse Anderson Gilbertscarfoot

Animal Physiology Sinauer Associates

How do vertebrates get the oxygen they need, or even manage without it for shorter or longer periods of time? How do they sense oxygen, how do they take it up from water or air, and how do they transport it to their tissues? Respiratory system adaptations allow numerous vertebrates to thrive in extreme environments where oxygen availability is limited or where there is no oxygen at all. Written for students and researchers in comparative physiology, this authoritative summary of vertebrate respiratory physiology begins by exploring the fundamentals of oxygen sensing, uptake and transport in a textbook style. Subsequently, the reader is shown important examples of extreme respiratory performance, like diving and high altitude survival in mammals and birds, air breathing in fish, and those few vertebrates that can survive without any oxygen at all for several months, showing how evolution has solved the problem of life without oxygen.

The fifth edition includes • for the first time, stunning color photographs throughout • chapters rearranged and grouped to best reflect phylogenetic relationships, with updated numbers of genera and species for each family • updated mammalian structural and functional adaptations, as well as ordinal fossil histories • recent advances in mammalian phylogeny, biogeography, social behavior, and ecology, with 12 new or revised cladograms reflecting current research findings • new breakout boxes on novel or unique aspects of mammals; new work on female post-copulatory mate choice, cooperative behaviors, group defense, and the role of the vomeronasal system • discussions of the current implications of climate change and other anthropogenic factors for mammals Maintaining the accessible, readable style for which Feldhamer and his coauthors are well known, this new edition of Mammalogy is the authoritative textbook on this amazingly diverse class of vertebrates.

The authors also provide a comparative survey of the properties of genomes (genome size, gene families, synteny, and polymorphism) for prokaryotes as well as the main eukaryotic models.

Key features: Serves as the detailed, authoritative source of the clinical chemistry of the most commonly used laboratory animals Includes detailed chapters dedicated to descriptions of clinical chemistry-related topics specific to each laboratory species as well as organ/class-specific chapters Presents information regarding evaluation and interpretation of a variety of individual clinical chemistry end points Concludes with detailed chapters dedicated to descriptions of statistical analyses and biomarker development of clinical chemistry-related topics Provides extensive reference lists at the end of each chapter to facilitate further study Extensively updated and expanded since the publication of Walter F. Loeb and Fred W. Quimby's second edition in 1999, the new *The Clinical Chemistry of Laboratory Animals, Third Edition* continues as the most comprehensive reference on in vivo animal studies. By organizing the book into species- and organ/class-specific chapters, this book provides information to enable a conceptual understanding of clinical chemistry across laboratory species as well as information on evaluation and interpretation of clinical chemistry data relevant to specific organ systems. Now sponsored by the American College of Laboratory Animal Medicine (ACLAM), this well-respected resource includes chapters on multiple laboratory species and provides pertinent information on their unique physiological characteristics, methods for sample collection, and preanalytical sources of variation for the particular species. Basic methodology for common procedures for each species is also discussed. New Chapters in the Third Edition Include: The Laboratory Zebrafish and Other Fishes Evaluation of Cardiovascular and Pulmonary Function and Injury Evaluation of Skeletal

Muscle Function and Injury Evaluation of Bone Function and Injury Vitamins Development of Biomarkers Statistical Methods The Clinical Chemistry of Laboratory Animals, Third Edition is intended as a reference for use by veterinary students, clinical veterinarians, veterinary toxicologists, veterinary clinical pathologists, and laboratory animal veterinarians to aid in study design, collection of samples, and interpretation of clinical chemistry data for laboratory species.

Promoting a conceptual understanding and taking an integrative systems approach, ANIMAL PHYSIOLOGY 2E illustrates the individual organization as well as the collective interdependence of each complete physiological system. The text begins with chapters on integrative principles and on the genomic, molecular, and cellular basis of physiology, then proceeds to chapters on individual organ systems. For each organ system, evolutionary forces as well as current cellular and molecular research are discussed. To clearly illustrate system interdependence, each systems chapter contains a summary, titled Making Connections. To make the text even more accessible to students, the authors also incorporate a comparative approach to animal physiology, examining the basic physiology of many vertebrate and nonvertebrate animals as well as their primary diseases and ability to respond to environmental changes. Important Notice: Media content referenced within the product description or the product text may not be available in the ebook version.

Retitled to reflect expansion of coverage from the first edition, Handbook of Meat and Meat Processing, Second Edition, contains a complete update of materials and nearly twice the number of chapters. Divided into seven parts, the book covers the entire range of issues related to meat and meat processing, from nutrients to techniques for preservati

This book offers a toolbox to ease the physiology exam-making process. It provides lists of physiological concepts for each topic, according to basic, advanced or specialized areas of knowledge. Depending on their requirements, the reader is able to use this book in two ways: either by grabbing questions “on demand”, or by making lists of concepts interspersed in the questions. In addition, the book provides a suggested bibliography depending on the level of experience of the reader. Each chapter details a number of teaching schedules, and will help the reader to enjoy the joys of physiology and, of course, teaching.

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This book focuses on respiratory proteins, the broad hemoglobin family, as well as the molluscan and arachnid hemocyanins (and their multifunctional roles). Featuring 20 chapters addressing invertebrate and vertebrate respiratory proteins, lipoproteins and other body fluid proteins, and drawing on the editors’ extensive research in the field, it is a valuable addition to the Subcellular Biochemistry book series. The book covers a wide range of topics, including lipoprotein structure and lipid transport; diverse annelid, crustacean and insect defense proteins; and insect and vertebrate immune complexes. It also discusses a number of other proteins, such as the hemerythrins; serum albumin; serum amyloid A; von Willebrand factor and its interaction with factor VIII; and C-reactive protein. Given its scope, the book appeals to biologists, biomedical scientists and clinicians, as well as advanced undergraduates and postgraduates in these disciplines. Available as a printed book and also as an e-book and e-chapters, the fascinating material included is easily accessible.

Integrative Organismal Biology synthesizes current understanding of the causes and consequences of individual variation at the physiological, behavioral and organismal

levels. Emphasizing key topics such as phenotypic plasticity and flexibility, and summarizing emerging areas such as ecological immunology, oxidative stress biology and others, Integrative Organismal Biology pulls together information across a multitude of disciplines to provide a synthetic understanding of the role of the individual in evolution. Beginning with grounding theory highlighting the role of the individual in evolutionary and ecological processes, the book covers theory and mechanism from both classic and modern perspectives. Chapters explore concepts such as how genetic and epigenetic variation becomes physiological and phenotypic variation, homeostasis, gene regulatory networks, physiological regulatory networks, and integrators. A concluding section illustrates these concepts through a series of case studies of life processes such as aging, reproduction, and immune defense. Written and edited by leaders in the field who are actively engaged in teaching and research, Integrative Organismal Biology will be an important advanced textbook for students and researchers across the numerous subdisciplines of integrative biology.

This volume describes features of autonomy and integrates them into the recent discussion of factors in evolution. In recent years ideas about major transitions in evolution are undergoing a revolutionary change. They include questions about the origin of evolutionary innovation, their genetic and epigenetic background, the role of the phenotype and of changes in ontogenetic pathways. In the present book, it is argued that it is likewise necessary to question the properties of these innovations and what was qualitatively generated during the macroevolutionary transitions. The author states that a recurring central aspect of macroevolutionary innovations is an increase in individual organismal autonomy whereby it is emancipated from the environment with changes in its capacity for flexibility, self-regulation and self-control of behavior. The first chapters define the concept of autonomy and examine its history and its epistemological context. Later chapters demonstrate how changes in autonomy took place during the major evolutionary transitions and investigate the generation of organs and physiological systems. They synthesize material from various disciplines including zoology, comparative physiology, morphology, molecular biology, neurobiology and ethology. It is argued that the concept is also relevant for understanding the relation of the biological evolution of man to his cultural abilities. Finally the relation of autonomy to adaptation, niche construction, phenotypic plasticity and other factors and patterns in evolution is discussed. The text has a clear perspective from the context of systems biology, arguing that the generation of biological autonomy must be interpreted within an integrative systems approach.

This comprehensive introduction to the field of human biology covers all the major areas of the field: genetic variation, variation related to climate, infectious and non-infectious diseases, aging, growth, nutrition, and demography. Written by four expert authors working in close collaboration, this second edition has been thoroughly updated to provide undergraduate and graduate students with two new chapters: one on race and culture and their ties to human biology, and the other a concluding summary chapter highlighting the integration and intersection of the topics covered in the book. The current volume entitled, "Free Radicals and Diseases" integrates knowledge in free radical-associated diseases from the basic level to the advanced level, and from the bench side to bed side. The chapters in this book provide an extensive overview of the topic, including free radical formations and clinical interventions.

Unlocking the puzzle of how animals behave and how they interact with their environments is impossible without understanding the physiological processes that determine their use of food resources. But long overdue is a user-friendly introduction to the subject that systematically bridges the gap between physiology and ecology. Ecologists--for whom such knowledge can help clarify the consequences of global climate change, the biodiversity crisis, and pollution--often find themselves wading through an unwieldy, technically top-heavy literature. Here, William Karasov and Carlos Martínez del Río present the first accessible and authoritative one-volume overview of the physiological and biochemical principles that shape how animals procure energy and nutrients and free themselves of toxins--and how this relates to broader ecological phenomena. After introducing primary concepts, the authors review the chemical ecology of food, and then discuss how animals digest and process food. Their broad view includes symbioses and extends even to ecosystem phenomena such as ecological stoichiometry and toxicant biomagnification. They introduce key methods and illustrate principles with wide-ranging vertebrate and invertebrate examples. Uniquely, they also link the physiological mechanisms of resource use with ecological phenomena such as how and why animals choose what they eat and how they participate in the exchange of energy and materials in their biological communities. Thoroughly up-to-date and pointing the way to future research, *Physiological Ecology* is an essential new source for upper-level undergraduate and graduate students--and an ideal synthesis for professionals. The most accessible introduction to the physiological and biochemical principles that shape how animals use resources Unique in linking the physiological mechanisms of resource use with ecological phenomena An essential resource for upper-level undergraduate and graduate students An ideal overview for researchers

'The book is important for those involved in aquaculture and those wishing to learn more about the effects of non-infectious disorders and the mechanisms of response within fish and is thoroughly recommended.' *Journal of Fish Diseases* --
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Animal Physiology, Fourth Edition presents all the branches of modern animal physiology with a strong emphasis on integration of physiological knowledge, ecology, and evolutionary biology.

This book discusses oxidative stress and hormesis from the perspective of an evolutionary ecologist or physiologist. In the first of ten chapters, general historical information, definitions, and background of research on oxidative stress physiology, hormesis, and life history are provided. Chapters 2-10 highlight the different solutions that organisms have evolved to cope with the oxidative threats posed by their environments and lifestyles. The author illustrates how oxidative stress and hormesis have shaped diversity in organism life-histories, behavioral profiles, morphological phenotypes, and aging mechanisms. The book offers fascinating insights into how organisms work and how they evolve to sustain their physiological functions under a vast array of environmental conditions.

Published to mark the opening of Wellcome Collection, this book examines the history of man's understanding of the human heart from the ancient world to the present. The book provides a richly-illustrated account of changes in our perception of what the heart does and what it means.

Temperature affects everything. It influences all aspects of the physical environment and governs any process that involves a flow of energy, setting boundaries on what an organism can or cannot do. This novel textbook reveals the key principles behind the complex relationship between organisms and temperature, namely the science of thermal ecology. It starts by providing a rigorous framework for understanding the flow of energy in and out of the organism, before describing the influence of temperature on what an organism can do. With these fundamental principles covered, the book's final section explores thermal ecology itself, incorporating the important extra dimension of interactions with other organisms. An entire chapter is devoted to the crucially important subject of how organisms are responding to climate change. Indeed, the threat of rapid climatic change on a global scale is a stark reminder of the challenges that remain for evolutionary thermal biologists, and adds a sense of urgency to this book's mission.

In the application of statistics to ecological inference problems, hierarchical models combine explicit models of ecological system structure or dynamics with models of how ecological systems are observed. The principles of hierarchical modeling are applied in this book to a wide range of problems ranging from the molecular level, through populations, ecosystems, landscapes, networks, through to the global ecosphere. Provides an excellent introduction to modelling Collects together in one source a wide range of modelling techniques Covers a wide range of topics, from the molecular level to the global ecosphere

This new volume provides a concise overview of the most basic and exciting chapters of comparative medicine with regards to physiology and function in healthy individuals. The book includes core concepts in anatomy and physiology in human and animal models, which are key to understanding comparative medicine and to making contributions to research in this area. While writing this book, the authors were in constant interdisciplinary dialogue. They aim to contribute to improvements in quality of life for human and animal patients.

Considered high-priced delicacies or waste material to be tossed away, the use and value of offal-edible and inedible animal by-products-depend entirely on the culture and country in question. The skin, blood, bones, meat trimmings, fatty tissues, horns, hoofs, feet, skull, and entrails of butchered animals comprise a wide variety of products inclu

Animal Osmoregulation collates a widely dispersed literature to produce a comprehensive and authoritative synthesis of the field, providing detailed examples of osmoregulatory processes at the organismal, organ and cellular level. It incorporates clear background information on ion regulation and transport (specifically in the light of recent molecular studies) and illustrates the physical principles to which each organism must adhere, as well as the phylogenetic constraints within which it must operate.

The Hidden Mechanics of Exercise reveals the microworld of the body in motion, from motor proteins that produce force to enzymes that extract energy from food,

and tackles questions athletes ask: What should we ingest before and during a race? How does a hard workout trigger changes in our muscles? Why does exercise make us feel good?

125 million years ago on the floodplains of North America, a burrowing lizard started down the long evolutionary path of shedding its limbs. The 60-plus species of snakes found in Sean P. Graham's *American Snakes* have this ancestral journey to thank for their ubiquity, diversity, and beauty. Although many people fear them, snakes are as much a part of America's rich natural heritage as redwoods, bald eagles, and grizzly bears. Neither a typical field guide nor an exhaustive reference, *American Snakes* is instead a fascinating study of the suborder Serpentes. Brimming with intriguing and unusual stories- of hognose snakes that roll over and play dead, blindsnakes with tiny vestigial lungs, rainbow-hued dipsadines, and wave-surfing sea-snakes- the text is interspersed with scores of gorgeous full-color images of snakes, from the scary to the sublime.

The alarm calls of birds make them difficult for predators to locate, while the howl of wolves and the croak of bullfrogs are designed to carry across long distances. From an engineer's perspective, how do such specialized adaptations among living things really work? And how does physics constrain evolution, channeling it in particular directions? Writing with wit and a richly informed sense of wonder, Denny and McFadzean offer an expert look at animals as works of engineering, each exquisitely adapted to a specific manner of survival, whether that means spinning webs or flying across continents or hunting in the dark-or writing books. This particular book, containing more than a hundred illustrations, conveys clearly, for engineers and nonengineers alike, the physical principles underlying animal structure and behavior. Pigeons, for instance- when understood as marvels of engineering-are flying remote sensors: they have wideband acoustical receivers, hi-res optics, magnetic sensing, and celestial navigation. Albatrosses expend little energy while traveling across vast southern oceans, by exploiting a technique known to glider pilots as dynamic soaring. Among insects, one species of fly can locate the source of a sound precisely, even though the fly itself is much smaller than the wavelength of the sound it hears. And that big-brained, upright Great Ape? Evolution has equipped us to figure out an important fact about the natural world: that there is more to life than engineering, but no life at all without it.

This book provides an in-depth overview on the functional ecology of daily torpor and hibernation in endothermic mammals and birds. The reader is well introduced to the physiology and thermal energetics of endothermy and underlying different types of torpor. Furthermore, evolution of endothermy as well as reproduction and survival strategies of heterothermic animals in a changing environment are discussed. Endothermic mammals and birds can use internal heat production fueled by ingested food to maintain a high body temperature. As food in the wild is not always available, many birds and mammals periodically abandon energetically costly homeothermic thermoregulation and enter an energy-conserving state of torpor, which is the topic of this book. Daily torpor and hibernation (multiday torpor) in these heterothermic endotherms are the most effective means for energy conservation available to endotherms and are characterized by pronounced temporal and controlled reductions in body temperature, energy expenditure, water loss, and other physiological functions.

Hibernators express multiday torpor predominately throughout winter, which substantially enhances winter survival. In contrast, daily heterotherms use daily torpor lasting for several hours usually during the rest phase, some throughout the year. Although torpor is still widely considered to be a specific adaptation of a few cold-climate species, it is used by many animals from all climate zones, including the tropics, and is highly diverse with about 25-50% of all mammals, but fewer birds, estimated to use it. While energy conservation during adverse conditions is an important function of torpor, it is also employed to permit or facilitate energy-demanding processes such as reproduction and growth, especially when food supply is limited. Even migrating birds enter torpor to conserve energy for the next stage of migration, whereas bats may use it to deal with heat. Even though many heterothermic species will be challenged by anthropogenic influences such as habitat destruction, introduced species, novel pathogens and specifically global warming, not all are likely to be affected in the same way. In fact it appears that opportunistic heterotherms because of their highly flexible energy requirements, ability to limit foraging and reduce the risk of predation, and often pronounced longevity, may be better equipped to deal with anthropogenic challenges than homeotherms. In contrast strongly seasonal hibernators, especially those restricted to mountain tops, and those that have to deal with new diseases that are difficult to combat at low body temperatures, are likely to be adversely affected. This book addresses researchers and advanced students in Zoology, Ecology and Veterinary Sciences.

In essence, the authors argue for the existence of direct, measurable, links between phenotype and ecology.

The groundbreaking Encyclopedia of Ecology provides an authoritative and comprehensive coverage of the complete field of ecology, from general to applied. It includes over 500 detailed entries, structured to provide the user with complete coverage of the core knowledge, accessed as intuitively as possible, and heavily cross-referenced. Written by an international team of leading experts, this revolutionary encyclopedia will serve as a one-stop-shop to concise, stand-alone articles to be used as a point of entry for undergraduate students, or as a tool for active researchers looking for the latest information in the field. Entries cover a range of topics, including: Behavioral Ecology Ecological Processes Ecological Modeling Ecological Engineering Ecological Indicators Ecological Informatics Ecosystems Ecotoxicology Evolutionary Ecology General Ecology Global Ecology Human Ecology System Ecology The first reference work to cover all aspects of ecology, from basic to applied Over 500 concise, stand-alone articles are written by prominent leaders in the field Article text is supported by full-color photos, drawings, tables, and other visual material Fully indexed and cross referenced with detailed references for further study Writing level is suited to both the expert and non-expert Available electronically on ScienceDirect shortly upon publication

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