

Fish Physiology

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Fish Physiology: Zebrafish 2010-05-28 This cutting-edge resource includes up-to-date information on zebrafish physiology and the tools used to study it, not only as a model species for studies of other vertebrates but with application for studies of human disease and aquatic toxicology. The utility of zebrafish for physiological research is based on several key features including i) a "fully" sequenced genome, ii) rapid (~3 month) generation times), iii) their capacity to produce large numbers of externally fertilized eggs, iv) optical transparency of embryos and larvae, and v) the applicability of reverse and forward genetics to assess gene function. Gene knockdown in embryos and the production of transgenic strains are now standard techniques being used to assess physiology. This book will be of keen interest not only to the typical readers of Fish Physiology but also to biomedical researchers, toxicologists and developmental biologists. Integrates and synthesizes the biology of the zebrafish under one cover Features contributions from the leading researchers in their fields Reaches a wider audience of researchers and biologists with its broad inclusion of subjects relating to zebrafish physiology

Water Pollution and Fish Physiology Alan G. Heath 1995-09-14 This book provides a concise synthesis of how toxic chemical pollutants affect physiological processes in teleost fish. This Second Edition of the well-received Water Pollution and Fish Physiology has been completely updated, and chapters have been added on immunology and acid toxicity. The emphasis, as in the first edition, is on understanding mechanisms of sublethal effects on fish and their responses to these environmental stressors. The first chapter covers the basic principles involved in understanding how fish respond, in general, to environmental alterations. Each subsequent chapter is devoted to a particular organ system or physiological function and begins with a short overview of normal physiology of that system/function. This is followed by a review of how various toxic chemicals may alter normal conditions in fish. Chapters covering environmental hypoxia, behavior, cellular enzymes, and acid toxicity are also included. The book closes with a discussion on the practical application of physiological and biochemical measurements of fish in water pollution control in research and regulatory settings.

Fish Physiology: Organic Chemical Toxicology of Fishes Keith B. Tierney 2013-12-04 Fish Physiology: Organic Chemical Toxicology of Fishes discusses the different types of organic chemical contaminants and their respective toxic effects in fish. The book also covers the detection of dissolved organic compounds and methods to assess organic toxicity. Substances addressed in this book include organometallics, hydrocarbons, endocrine disrupting compounds (EDCs), insecticides, herbicides, and pharmaceuticals. Fish are exposed to an ever-increasing array of organic chemicals that find their way into rivers and oceans. Some of these compounds are no longer being produced but nonetheless persist within the environment (persistent organic pollutants, or POPs). The exposure of fish to toxic organic compounds has potential impact on human, fish, and ecosystem health. Yet the regulations that govern environmental water quality vary worldwide, and compliance is never complete. This book provides a crucial resource on these issues for researchers in zoology, fish physiology, and related fields; applied researchers in environmental monitoring, conservation biology, and toxicology; and university-level students and instructors in these areas. Organized by type of toxic organic chemicals Includes metals, POPs, EDCs, herbicides, insecticides, and pharmaceuticals Measures toxicity in a variety of ways aside from lethality Probes the toxic effects of compound mixtures as well as single pollutants

Fish Physiology: Primitive Fishes 2011-09-21 Primitive fishes are a relatively untapped resource in the scientific search for insights into the evolution of physiological systems in fishes and higher vertebrates. Volume 26 in the Fish Physiology series presents what is known about the physiology of these fish in comparison with the two fish groups that dominate today, the modern elasmobranchs and the teleosts. Chapters include reviews on what is known about cardiovascular, nervous and ventilatory systems, gas exchange, ion and nitrogenous waste regulation, muscles and locomotion, endocrine systems, and reproduction. Editors provide a thorough understanding of how these systems have evolved through piscine and vertebrate evolutionary history. Primitive Fishes includes ground-breaking information in the field, including highlights of the most unusual characteristics

amongst the various species, which might have allowed these fishes to persist virtually unchanged through evolutionary time. This volume is essential for all comparative physiologists, fish biologists, and paleontologists. Provides an analysis of the evolutionary significance of physiological adaptations in "ancient fishes" Offers insights on the evolution of higher vertebrates The only single source that presents an in-depth discussion of topics related to the physiology of ancient fishes

Swimming Physiology of Fish Arjan P. Palstra 2012-08-30 In light of mounting fishing pressures, increased aquaculture production and a growing concern for fish well-being, improved knowledge on the swimming physiology of fish and its application to fisheries science and aquaculture is needed. This book presents recent investigations into some of the most extreme examples of swimming migrations in salmon, eels and tunas, integrating knowledge on their performance in the laboratory with that in their natural environment. For the first time, the application of swimming in aquaculture is explored by assessing the potential impacts and beneficial effects. The modified nutritional requirements of "athletic" fish are reviewed as well as the effects of exercise on muscle composition and meat quality using state-of-the-art techniques in genomics and proteomics. The last chapters introduce zebrafish as a novel exercise model and present the latest technologies for studying fish swimming and aquaculture applications.

Homeostasis and Toxicology of Essential Metals Chris M. Wood 2012 Homeostasis and Toxicology of Essential Metals synthesizes the explosion of new information on the molecular, cellular, and organismal handling of metals in fish in the past 15 years. These elements are no longer viewed by fish physiologists as "heavy metals" that kill fish by suffocation, but rather as interesting moieties that enter and leave fish by specific pathways, which are subject to physiological regulation. The metals featured in this volume are those about which there has been most public and scientific concern, and therefore are those most widely studied by fish researchers. Metals such as Cu, Zn, Fe, Ni, Co, Se, Mo and Cr are either proven to be or are strongly suspected to be essential in trace amounts, yet are toxic in higher doses. The companion volume, Homeostasis and Toxicology of Non-Essential Metals, Volume 31B, covers metals that have no known nutritive function in fish at present, but which are toxic at fairly low levels, such as Ag, Al, Cd, Pb, Hg, As, Sr, and U. In addition, three chapters in Volumes 31A and 31B on Basic Principles (Chapter 1, 31A), Field Studies and Ecological Integration (Chapter 9, 31A) and Modeling the Physiology and Toxicology of Metals (Chapter 9, 31B) act as integrative summaries and make these two volumes a vital set for readers. All major essential metals of interest are covered in metal-specific chapters Each metal-specific chapter is written by fish physiologists/toxicologists who are recognized authorities for that metal A common format is featured throughout this two volume edition

Fish Physiology, Fish Toxicology, and Fisheries Management Robert C. Ryans 1990

Fish Physiology 1983-12-01 Fish Physiology

Fish Physiology: The Multifunctional Gut of Fish 2010-10-21 The Multifunctional Gut of Fish provides a comprehensive synthesis and an integrative overview of the range of gut functions and their implications for organismal physiology. The highly diversified anatomy and functions of the gut, including nutrient uptake, immune barrier function, salt and water homeostasis and respiration, as well as neuroendocrine actions and control are covered in detail by leading authors. In addition, this volume explores the pronounced implications of gut function for whole animal integrative physiology and compensatory demands for non-gastrointestinal organs. As the first comprehensive reference to discuss the diverse morphological and functional adaptations of the gut, this volume provides an excellent resource for comparative physiologists, aquaculturists and biomedical researchers employing fish as model organisms for mammalian physiology. Includes chapters dedicated to anatomical and functional features of the gastro-intestinal tract of fish as well as integrative aspects of gut organ function Includes in depth coverage of recently recognized implications of feeding on salt homeostasis and acid-base balance Provides syntheses of implications of gut function for homeostasis Essential text for those interested in the wide diversity of functions performed by the gut

Fish Physiology 1972-04-28 Fish Physiology

Encyclopedia of fish physiology Anthony P. Farrell

Fish Physiology: Fish Biomechanics Robert E. Shadwick 2006-02-02 The first in two decades to exclusively integrate physiological and biomechanical studies of fish locomotion, feeding and breathing, making this book both comprehensive and unique. Fish Physiology: Fish Biomechanics reviews and integrates recent developments in research on fish biomechanics, with particular emphasis on experimental results derived from the application of innovative new technologies to this area of research, such as high-speed video, sonomicrometry and digital imaging of flow fields. The collective chapters, written by leaders in the field, provide a multidisciplinary view and synthesis of the latest information on feeding mechanics, breathing mechanics, sensory systems, stability and maneuverability, skeletal systems, muscle structure and performance, and hydrodynamics of steady and burst swimming, including riverine passage of migratory species. Book presents concepts in biomechanics, a rapidly expanding area of research First volume in over twenty years on this subject Multi-author volume with contributions by leaders in the field Clear explanations of basic biomechanical

principles used in fish research Well illustrated with summary figures and explanatory color diagrams
The Physiology of Polar Fishes Anthony Peter Farrell 2005 Devoted to fishes of high latitudes (Arctic and Antarctic). This book includes themes such as: the uniqueness of the physiology of fishes that live in cold polar environments, an analysis of physiological patterns exemplified by fishes that live poles apart, and how fishes differ from fishes living in more temperate and tropical habitats.

Fish Physiology: The Physiology of Tropical Fishes Adalberto Luis Val 2005-10-13 The Physiology of Tropical Fishes is the 21st volume of the well-known Fish Physiology series and consists of 12 chapters. The purpose of the book is to consolidate and integrate what is known about tropical fishes (marine and freshwater species). The twelve chapters focus on the physiological adaptations acquired during the evolutionary process to cope with warm and shallow hypoxic waters from tropical and neotropical hydrographic basins as well as with the intertidal and coral reef habitats which occur in abundance in tropical seas. The special characteristics of tropical fish fauna will be issued in order to explain the tropical fish radiation, which gave rise to such extreme fish diversity. This present volume, is a voyage through the tropical region reviewing the fish diversity of the main tropical freshwater sheds, including the major tropical rivers and lakes, the major dams, and marine environments. State-of-the-art information on tropical fish physiology Written by specialists working in the Tropics Offers a diverse depiction of the various tropical fishes and the environment where they inhabit 12 innovative chapters covering a concise view of growth rate, biological rhythms, feeding plasticity, cardio-respiratory design and function, diversity of structure, and much more

Physiology and Ecology of Fish Migration Hiroshi Ueda 2013-08-07 Among the roughly 30,000 species of fish, migratory species account for only 165 species, but most of them are very important fisheries resources. This book presents up-to-date innovative research results on the physiology and ecology of fish migration. It focuses on salmon, eels, lampreys, and bluefin tuna. The book examines migratory behavior, spawning, and behavioral ecology.

Physiology of Elasmobranch Fishes: Internal Processes Robert E. Shadwick 2015-11-16 Fish Physiology: Physiology of Elasmobranch Fishes, Volume 34B is a useful reference for fish physiologists, biologists, ecologists, and conservation biologists. Following an increase in research on elasmobranchs due to the plight of sharks in today's oceans, this volume compares elasmobranchs to other groups of fish, highlights areas of interest for future research, and offers perspective on future problems. Covering measurements and lab-and-field based studies of large pelagic sharks, this volume is a natural addition to the renowned Fish Physiology series. Provides needed comprehensive content on the physiology of elasmobranchs Offers a systems approach between structure and interaction with the environment and internal physiology Contains contributions by leading experts in their respective fields, under the guidance of internationally recognized and highly respected editors Highlights areas of interest for future research, including perspective on future problems

Carbon Dioxide 2019-11-26 Carbon Dioxide, Volume 37 in the Fish Physiology series highlights new advances in the field, with this new volume presenting interesting chapters on a variety of topics, including Historic, current-day and future CO₂ environments and their dynamics in marine and freshwater ecosystems, CO₂ sensing, Acid-base physiology and CO₂ homeostasis: regulation and compensation, CO₂ and calcification processes in fish, The physiology of behavioral impacts of high CO₂, Effects of high CO₂ on metabolic rates, aerobic scope and swimming performance, Internal spatial and temporal CO₂ effects: feeding and alkaline tide, O₂ in aquaculture: CO₂ dynamics and fish health, and much more. Provides the authority and expertise of leading contributors from an international board of authors Presents the latest release in the Fish Physiology series Updated release includes the latest information on Carbon Dioxide

Tuna Barbara Ann Block 2001 This book is a multidisciplinary volume that overviews the most recent literature covering the physiology, biomechanics, evolution, and ecology of tunas. It examines critical areas of molecular and organismal physiology, phylogeny, ecology, and evolutionary biology. Recently developed techniques for electronic tagging of fish are presented. The book covers all aspects of tuna biology, from metabolism and cardiovascular research to reproductive biology. * Contains a comprehensive review of tuna biology * Provides a synthesis of archival and pop-up satellite tag technology in tunas * Covers the phylogenetics of modern tunas * Includes color plates on morphology, physiology, ecology, and oceanography

The Physiology of Fishes, Third Edition David H. Evans 2005-12-15 New scientific approaches have dramatically evolved in the decade since The Physiology of Fishes was first published. With the genomic revolution and a heightened understanding of molecular biology, we now have the tools and the knowledge to apply a fresh approach to the study of fishes. Consequently, The Physiology of Fishes, Third Edition is not merely another updating, but rather an entire reworking of the original. To satisfy that need for a fresh approach, the editors have employed a new set of expert contributors steeped in the very latest research; their contemporary perspective pervades the entire text. In addition to new chapters on gas transport, temperature physiology, and stress, as well as one dedicated to functional genomics, readers will discover that many of these new contributors approach their material with a contemporary molecular perspective. While much of the material is new, the editors have completely adhered to the original's style in creating a text that continues to be highly readable and

perpetually insightful in bridging the gap between pure and applied science. The Physiology of Fishes, Third Edition, completely updated with a molecular perspective, continues to be regarded as the best single-volume general reference on all major areas of research in fish physiology. The Physiology of Fishes, Third Edition provides background information for advanced students as well as material of interest to marine and fisheries biologists, ichthyologists, and comparative physiologists looking to differentiate between the physiological strategies unique to fishes, and those shared with other organisms.

Fish Physiology: Zebrafish 2010-06-23 This cutting-edge resource includes up-to-date information on zebrafish physiology and the tools used to study it, not only as a model species for studies of other vertebrates but with application for studies of human disease and aquatic toxicology. The utility of zebrafish for physiological research is based on several key features including i) a "fully" sequenced genome, ii) rapid (~3 month) generation times, iii) their capacity to produce large numbers of externally fertilized eggs, iv) optical transparency of embryos and larvae, and v) the applicability of reverse and forward genetics to assess gene function. Gene knockdown in embryos and the production of transgenic strains are now standard techniques being used to assess physiology. This book will be of keen interest not only to the typical readers of Fish Physiology but also to biomedical researchers, toxicologists and developmental biologists. Integrates and synthesizes the biology of the zebrafish under one cover Features contributions from the leading researchers in their fields Reaches a wider audience of researchers and biologists with its broad inclusion of subjects relating to zebrafish physiology

Fish Physiology: Homeostasis and Toxicology of Non-Essential Metals 2011-07-01 Homeostasis and Toxicology of Non-Essential Metals synthesizes the explosion of new information on the molecular, cellular, and organismal handling of metals in fish in the past 15 years. These elements are no longer viewed by fish physiologists as "heavy metals" that kill fish by suffocation, but rather as interesting moieties that enter and leave fish by specific pathways, which are subject to physiological regulation. The metals featured in this volume are those about which there has been most public and scientific concern, and therefore are those most widely studied by fish researchers. Metals such as Ag, Al, Cd, Pb, Hg, As, Sr, and U have no known nutritive function in fish at present, but are toxic at fairly low levels. The companion volume, Homeostasis and Toxicology of Essential Metals, Volume 31A, covers metals that are either proven to be or are strongly suspected to be essential in trace amounts, yet are toxic in higher doses. Metals such as Cu, Zn, Fe, Ni, Co, Se, Mo and Cr. In addition, three chapters in Volumes 31A and 31B on Basic Principles (Chapter 1, 31A), Field Studies and Ecological Integration (Chapter 9, 31A) and Modeling the Physiology and Toxicology of Metals (Chapter 9, 31B) act as integrative summaries and make these two volumes a vital set for readers. All major essential metals of interest are covered in metal-specific chapters Each metal-specific chapter is written by fish physiologists/toxicologists who are recognized authorities for that metal A common format is featured throughout this two volume edition

Fish Physiology: The Multifunctional Gut of Fish 2010-10-05 The Multifunctional Gut of Fish provides a comprehensive synthesis and an integrative overview of the range of gut functions and their implications for organismal physiology. The highly diversified anatomy and functions of the gut, including nutrient uptake, immune barrier function, salt and water homeostasis and respiration, as well as neuroendocrine actions and control are covered in detail by leading authors. In addition, this volume explores the pronounced implications of gut function for whole animal integrative physiology and compensatory demands for non-gastrointestinal organs. As the first comprehensive reference to discuss the diverse morphological and functional adaptations of the gut, this volume provides an excellent resource for comparative physiologists, aquaculturists and biomedical researchers employing fish as model organisms for mammalian physiology. Includes chapters dedicated to anatomical and functional features of the gastro-intestinal tract of fish as well as integrative aspects of gut organ function Includes in depth coverage of recently recognized implications of feeding on salt homeostasis and acid-base balance Provides syntheses of implications of gut function for homeostasis Essential text for those interested in the wide diversity of functions performed by the gut

Encyclopedia of Fish Physiology 2011-06-01 Fish form an extremely diverse group of vertebrates. At a conservative estimate at least 40% of the world's vertebrates are fish. On the one hand they are united by their adaptations to an aquatic environment and on the other they show a variety of adaptations to differing environmental conditions - often to extremes of temperature, salinity, oxygen level and water chemistry. They exhibit an array of behavioural and reproductive systems. Interesting in their own right, this suite of adaptive physiologies provides many model systems for both comparative vertebrate and human physiologists. This four volume encyclopedia covers the diversity of fish physiology in over 300 articles and provides entry level information for students and summary overviews for researchers alike. Broadly organised into four themes, articles cover Functional, Thematic, and Phylogenetic Physiology, and Fish Genomics Functional articles address the traditional aspects of fish physiology that are common to all areas of vertebrate physiology including: Reproduction, Respiration, Neural (Sensory, Central, Effector), Endocrinology, Renal, Cardiovascular, Acid-base Balance, Osmoregulation, Ionoregulation, Digestion, Metabolism, Locomotion, and so on. Thematic Physiology articles are carefully selected and fewer in number. They provide a level of integration that goes beyond the coverage in the Functional Physiology topics and include discussions of Toxicology, Air-breathing, Migrations,

Temperature, Endothermy, etc. Phylogenetic Physiology articles bring together information that bridges the physiology of certain groupings of fishes where the knowledge base has a sufficient depth and breadth and include articles on Ancient Fishes, Tunas, Sharks, etc. Genomics articles describe the underlying genetic component of fish physiology and high light their suitability and use as model organisms for the study of disease, stress and physiological adaptations and reactions to external conditions. Winner of a 2011 PROSE Award Honorable Mention for Multivolume Science Reference from the Association of American Publishers The definitive encyclopedia for the field of fish physiology Three volumes which comprehensively cover the entire field in over 300 entries written by experts Detailed coverage of basic functional physiology of fishes, physiological themes in fish biology and comparative physiology amongst taxonomic Groups Describes the genomic bases of fish physiology and biology and the use of fish as model organisms in human physiological research Includes a glossary of terms

Fish Larval Physiology Roderick Nigel Finn 2020-04-30 This book is intended as a resource for students and researchers interested in developmental biology and physiology and specifically addresses the larval stages of fish. Fish larvae (and fish embryos) are not small juveniles or adults. Rather they are transitional organisms that bridge the critical gap between the singlecelled egg and sexually immature juvenile. Fish larvae represent the stage of the life cycle that is used for differentiation, feeding and distribution. The book aims at providing a single-volume treatise that explains how fish larvae develop and differentiate, how they regulate salt, water and acid-base balance, how they transport and exchange gases, acquire and utilise energy, how they sense their environment, and move in their aquatic medium, how they control and defend themselves, and finally how they grow up.

Fish Physiology: Euryhaline Fishes Stephen D. McCormick 2013-01-11 The need for ion and water homeostasis is common to all life. For fish, ion and water homeostasis is an especially important challenge because they live in direct contact with water and because of the large variation in the salt content of natural waters (varying by over 5 orders of magnitude). Most fish are stenohaline and are unable to move between freshwater and seawater. Remarkably, some fishes are capable of life in both freshwater and seawater. These euryhaline fishes constitute an estimated 3 to 5% of all fish species. Euryhaline fishes represent some of the most iconic and interesting of all fish species, from salmon and sturgeon that make epic migrations to intertidal mudskippers that contend with daily salinity changes. With the advent of global climate change and increasing sea levels, understanding the environmental physiology of euryhaline species is critical for environmental management and any mitigative measures. This volume will provide the first integrative review of euryhalinity in fish. There is no other book that focuses on fish that have the capacity to move between freshwater and seawater. The different challenges of salt and water balance in different habitats have led to different physiological controls and regulation, which heretofore has not been reviewed in a single volume. Collects and synthesizes the literature covering the state of knowledge of the physiology of euryhaline fish Provides the foundational information needed for researchers from a variety of fields, including fish physiology, conservation and evolutionary biology, genomics, ecology, ecotoxicology, and comparative physiology All authors are the leading researchers and emerging leaders in their fields

Fish Physiology, Toxicology, and Water Quality Management Rosemarie C. Russo 1993

Fish Physiology: The Multifunctional Gut of Fish 2010-10-05 The Multifunctional Gut of Fish provides a comprehensive synthesis and an integrative overview of the range of gut functions and their implications for organismal physiology. The highly diversified anatomy and functions of the gut, including nutrient uptake, immune barrier function, salt and water homeostasis and respiration, as well as neuroendocrine actions and control are covered in detail by leading authors. In addition, this volume explores the pronounced implications of gut function for whole animal integrative physiology and compensatory demands for non-gastrointestinal organs. As the first comprehensive reference to discuss the diverse morphological and functional adaptations of the gut, this volume provides an excellent resource for comparative physiologists, aquaculturists and biomedical researchers employing fish as model organisms for mammalian physiology. Includes chapters dedicated to anatomical and functional features of the gastro-intestinal tract of fish as well as integrative aspects of gut organ function Includes in depth coverage of recently recognized implications of feeding on salt homeostasis and acid-base balance Provides syntheses of implications of gut function for homeostasis Essential text for those interested in the wide diversity of functions performed by the gut

Fish Physiology: Hypoxia Jeffrey G. Richards 2009-03-10 Periods of environmental hypoxia (Low Oxygen Availability) are extremely common in aquatic systems due to both natural causes such as diurnal oscillations in algal respiration, seasonal flooding, stratification, under ice cover in lakes, and isolation of densely vegetated water bodies, as well as more recent anthropogenic causes (e.g. eutrophication). In view of this, it is perhaps not surprising that among all vertebrates, fish boast the largest number of hypoxia tolerant species; hypoxia has clearly played an important role in shaping the evolution of many unique adaptive strategies. These unique adaptive strategies either allow fish to maintain function at low oxygen levels, thus extending hypoxia tolerance limits, or permit them to defend against the metabolic consequences of oxygen levels that fall below a threshold

where metabolic functions cannot be maintained. The aim of this volume is two-fold. First, this book will review and synthesize the adaptive behavioural, morphological, physiological, biochemical, and molecular strategies used by fish to survive hypoxia exposure and place them within an environmental and ecological context. Second, through the development of a synthesis chapter this book will serve as the cornerstone for directing future research into the effects of hypoxia exposures on fish physiology and biochemistry. The only single volume available to provide an in-depth discussion of the adaptations and responses of fish to environmental hypoxia Reviews and synthesizes the adaptive behavioural, morphological, physiological, biochemical, and molecular strategies used by fish to survive hypoxia exposure Includes discussion of the evolutionary and ecological consequences of hypoxia exposure in fish

The Physiology of Fishes Taylor & Francis Group 2020-09-30 The fifth edition of *The Physiology of Fishes* represents a compendium of knowledge across fish physiology, collecting up-to-date research into an easy-to-access single textbook. Written by the leaders in the field, it provides a comprehensive, accessible review of the core topics, integrating physiology with environmental science, ecology, evolution, and molecular cell biology. New chapters address Epigenetics, Biomechanics and Locomotion, and Behaviour and Learning. Each chapter contains an extensive bibliography, providing readers with the best sources from the primary literature. Almost three decades after the publication of the first edition, this book remains the only published single-volume work on fish physiology. The fifth edition provides an important reference for new students of fish biology, marine and freshwater biologists, ichthyologists, fisheries scientists, and comparative physiologists.

Fish Physiology: Recent Advances Stefan Nilsson 2012-02-13 Fishes are very successful vertebrates and have adapted to a wide range of environmental conditions, from the deep ocean to the smallest brook or pond. The physiological background to these environmental adaptations is, obviously, far from clear, and provides fish physiologists with many challenges. The number of extant fish species has been estimated to be in excess of 20000, and only relatively few of these have been subject to physiological studies. Yet among these animals can be found many physiological systems different from those of the land-dwelling vertebrates, and also systems similar to those of the 'higher' vertebrates but at a different level of phylogenetic development. Apart from the rapidly increasing interest in basic fish physiology, the last few years have seen a dramatic increase in applied research, aimed primarily in two directions: fish culture and environmental toxicology. Physiological research is of vital importance in both these fields, and basic fish physiology is a necessary base for the applied research. This book is intended for a wide readership among senior undergraduate, postgraduate and research students, as well as university teachers and researchers in zoology, physiology, aquaculture and biology generally. The book focuses on five major areas of basic and applied research: haemopoiesis, acid-base regulation, circulation, gastro-intestinal functions and physiological toxicology. The chapters will serve as introductions to these fields, as well as up-to-date reviews of the most recent advances in the research areas.

Physiology of Fish in Intensive Culture Systems Gary A. Wedemeyer 2012-12-06 Fish culture in hatcheries and other aquacultural facilities is becoming much more intensive all over the world. The success of all kinds of fish rearing depends on the quality of management and this depends, in turn, on understanding the biology of fishes and the aquatic environment in which they live. This book directly addresses the relationship between the aquatic environment and the fishes. An understanding of this by the reader will result in a reduction of disease outbreaks through improved management.

Aquaculture 2020-12-01 *Fish Physiology*, Volume 38 in this ongoing series, examines how the inherent potential of fish to express traits of economic value can be realized through aquaculture. Topics covered include the regulation of the reproductive cycle of captive fish, shifting carnivorous fish towards plant-based diets, defining the challenges, opportunities and optimal conditions for growth under intensive culture (including in Recirculating Aquaculture Systems), enhancing immune function and fish health during culture, identifying and managing maladaptive physiological responses to aquaculture stressors, establishing welfare guidelines for farmed fish, phenotypic and physiological responses to genetic modification, Zebrafish as a research tool, and the aquaculture of air-breathing fish. Contains contributions from an international board of authors, each with decades of aquaculture expertise Provides the most up-to-date information on the fundamental role that physiology plays in optimizing fish performance in aquaculture Provides the latest release in the *Fish Physiology* series that tackles how the manipulation of biological processes can be used to maximize the expression of beneficial production traits in fish aquaculture

Fish Physiology: Homeostasis and Toxicology of Essential Metals 2011-06-28 *Homeostasis and Toxicology of Essential Metals* synthesizes the explosion of new information on the molecular, cellular, and organismal handling of metals in fish in the past 15 years. These elements are no longer viewed by fish physiologists as "heavy metals" that kill fish by suffocation, but rather as interesting moieties that enter and leave fish by specific pathways, which are subject to physiological regulation. The metals featured in this volume are those about which there has been most public and scientific concern, and therefore are those most widely studied by fish researchers. Metals such as Cu, Zn, Fe, Ni, Co, Se, Mo and Cr are either proven to be or are strongly suspected to be essential in trace amounts, yet are toxic in higher doses. The companion volume, *Homeostasis and*

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Biology and Physiology of Freshwater Neotropical Fish Bernardo Baldisserotto 2019-11-09 Biology and Physiology of Freshwater Neotropical Fish is the all-inclusive guide to fish species prevalent in the neotropical realm. It provides the most updated systematics, classification, anatomical, behavioral, genetic, and functioning systems information on freshwater neotropical fish species. This book begins by analyzing the differences in phylogeny, anatomy, and behaviour of neotropical fish. Systems such as cardiovascular, respiratory, renal, digestive, reproductive, muscular, and endocrine are described in detail. This book also looks at the effects of stress on fish immune systems, and how color and pigmentation play into physiology and species differentiation. Biology and Physiology of Freshwater Neotropical Fish is a must-have for fish biologists and zoologists. Students in zoology, ichthyology, and fish farming will also find this book useful for its coverage of some of the world's rarest and least-known fish species. Features chapters written by top neotropical fish researchers and specialists Discusses environmental effects on neotropical fishes, including climate change and pollution Details the phylogenetic occurrence of electroreceptors and electric organs in fish

Biology of Stress in Fish Carl B. Schreck 2016-11-01 Biology of Stress in Fish: Fish Physiology provides a general understanding on the topic of stress biology, including most of the recent advances in the field. The book starts with a general discussion of stress, providing answers to issues such as its definition, the nature of the physiological stress response, and the factors that affect the stress response. It also considers the biotic and abiotic factors that cause variation in the stress response, how the stress response is generated and controlled, its effect on physiological and organismic function and performance, and applied assessment of stress, animal welfare, and stress as related to model species. Provides the definitive reference on stress in fish as written by world-renowned experts in the field Includes the most recent advances and up-to-date thinking about the causes of stress in fish, their implications, and how to minimize the negative effects Considers the biotic and abiotic factors that cause variation in the stress response

Fish Physiology William S. Hoar 2007

Fish Physiology: Muscle Development and Growth 2000-10-31 With the advent of zebrafish as a model system, the development and growth of muscle in fish has become an ever more important process. This volume, in the continuing Fish Physiology series, focuses attention on muscle from the genetics of muscle development to application of muscle growth patterns to aquacultural production.

Fish Physiology: Fish Neuroendocrinology Nicholas J. Bernier 2009-06-29 The study of fish neuroendocrinology has had a significant impact on our general understanding of the functional roles and evolution of a variety of neurochemical messengers and systems. Not only do fish possess unique neuroendocrine features, they have also been and remain an important vertebrate models for the discovery of new neuropeptides. In the last fifty years, neuroendocrinologists have documented a complex and seemingly infinite number of interactions between hormones and nerve structures. Gradually emerging from this knowledge is an understanding of the specific neurohormonal pathways and the messengers responsible for maintaining homeostasis in an aquatic environment and for regulating the functional systems that allow for the highly diverse life histories and reproductive tactics of fish Despite its recent growth, breadth and unique attributes, there is no single text covering the discipline of fish neuroendocrinology. In fact, other than a few mammalian neuroendocrinology textbooks, there is a serious lack of texts in comparative neuroendocrinology. Currently, information on the anatomical organization and function of the various neuroendocrine systems in fish is only available in original research papers and reviews. By providing a current and comprehensive volume that highlights the specific properties of fish neuroendocrinology, this book will go beyond being the only reference text for fish neuroendocrinologists and will also serve comparative physiologists, endocrinologists, neuroanatomists and behaviourists interested in understanding the reciprocal actions between the nervous and endocrine systems. * Highlights the specific properties of fish neuroendocrinology * Emphasises the range and variety of interactions between neurobiology and endocrinology * Discusses both anatomical and functional aspects of the Neuroendocrine system * Also serves comparative physiologists, endocrinologists, neuroanatomists and behaviourists interested in understanding the reciprocal actions between the nervous and endocrine systems

Fish Pathology Ronald J. Roberts 2012-03-06 Fish Pathology is the definitive, classic and essential book on the subject, providing in-depth coverage across all major aspects of fish pathology. This new, fully updated and expanded fourth edition builds upon the success of the previous editions which have made Fish Pathology the best known and most respected book in the field, worldwide. Commencing with a chapter covering the aquatic environment, the book provides comprehensive details of the anatomy and physiology of teleosts,

pathophysiology and systematic physiology, immunology, neoplasia, virology, parasitology, bacteriology, mycology, nutritional pathology and other non-infectious diseases. A final chapter provides extremely useful details of the most widely-used and trusted laboratory methods in the area. Much new information is included in this new edition, including enhanced coverage of any diseases which have become commercially significant since publication of the previous edition. Beautifully illustrated in full colour throughout with many exceptional photographs, *Fish Pathology, Fourth Edition*, is an essential purchase for fish pathologists, fish veterinarians, biologists, microbiologists and immunologists, including all those working in diagnostic services worldwide. Personnel working in fish farming and fisheries will also find much of great use and interest within the book's covers. All libraries in universities and research establishments where biological and veterinary sciences are studied and taught should have copies of this landmark publication on their shelves.

Fish Physiology: Fish Neuroendocrinology Nicholas J. Bernier 2009-07-09 The study of fish neuroendocrinology has had a significant impact on our general understanding of the functional roles and evolution of a variety of neurochemical messengers and systems. Not only do fish possess unique neuroendocrine features, they have also been and remain an important vertebrate models for the discovery of new neuropeptides. In the last fifty years, neuroendocrinologists have documented a complex and seemingly infinite number of interactions between hormones and nerve structures. Gradually emerging from this knowledge is an understanding of the specific neurohormonal pathways and the messengers responsible for maintaining homeostasis in an aquatic environment and for regulating the functional systems that allow for the highly diverse life histories and reproductive tactics of fish. Despite its recent growth, breadth and unique attributes, there is no single text covering the discipline of fish neuroendocrinology. In fact, other than a few mammalian neuroendocrinology textbooks, there is a serious lack of texts in comparative neuroendocrinology. Currently, information on the anatomical organization and function of the various neuroendocrine systems in fish is only available in original research papers and reviews. By providing a current and comprehensive volume that highlights the specific properties of fish neuroendocrinology, this book will go beyond being the only reference text for fish neuroendocrinologists and will also serve comparative physiologists, endocrinologists, neuroanatomists and behaviourists interested in understanding the reciprocal actions between the nervous and endocrine systems. * Highlights the specific properties of fish neuroendocrinology * Emphasises the range and variety of interactions between neurobiology and endocrinology * Discusses both anatomical and functional aspects of the Neuroendocrine system * Also serves comparative physiologists, endocrinologists, neuroanatomists and behaviourists interested in understanding the reciprocal actions between the nervous and endocrine systems