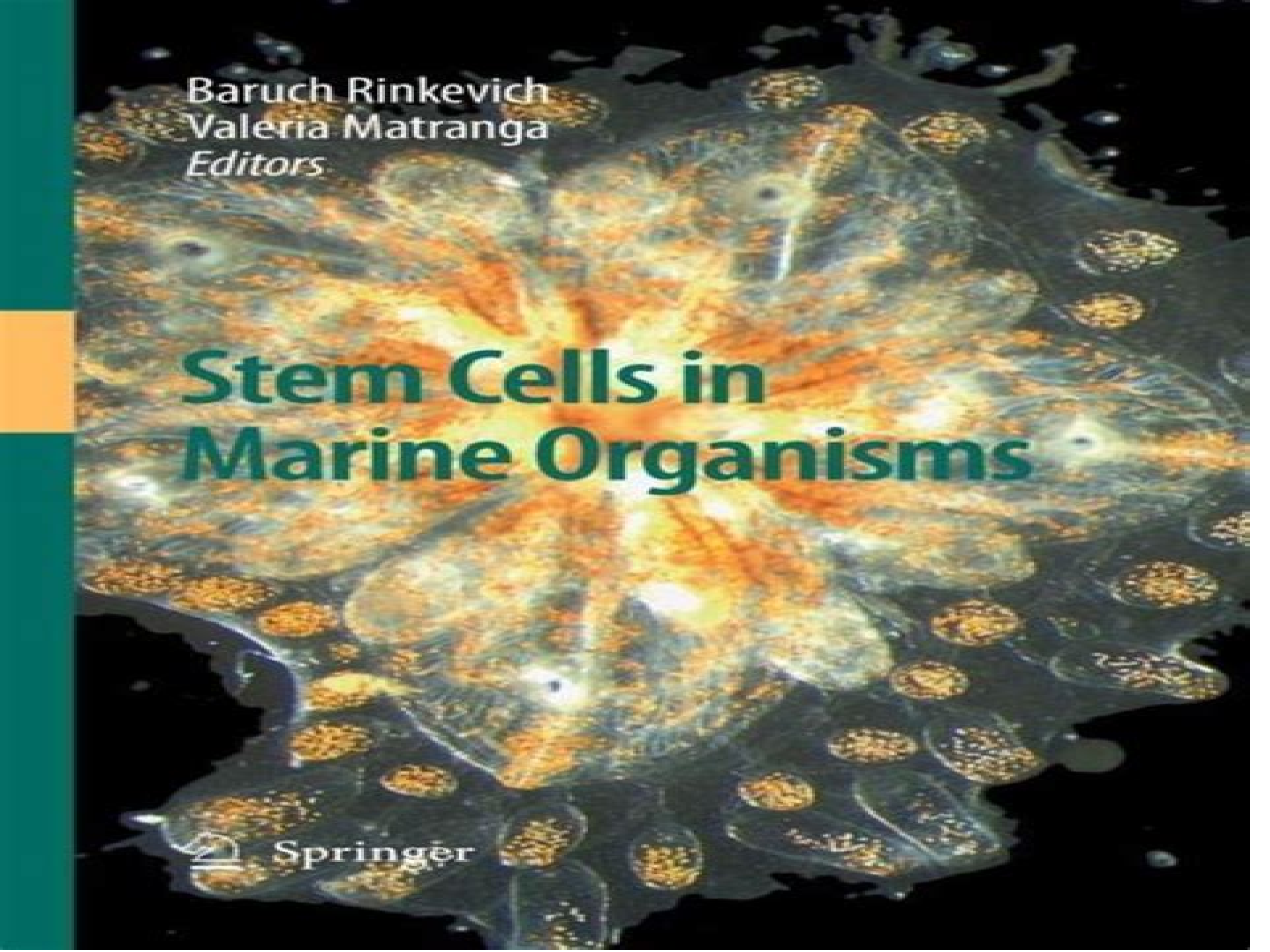




Baruch Rinkevich
Valeria Matranga
Editors

Stem Cells in Marine Organisms



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Stem Cells In Marine Organisms

**Michael Schubert, Gabriella Lania, Alice
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Stem Cells In Marine Organisms:

Stem Cells in Marine Organisms Baruch Rinkevich,Valeria Matranga,2009-10-03 Do real stem cells and stem cell lineages exist in lower organisms Can stem cells from one organism parasitize the soma and or the germ line of conspecifics Can differentiated cells in marine organisms be re programmed to regenerate tissues organs and appendages through novel de differentiation transdifferentiation or re differentiation processes leading to virtually all three germ layers including the germline The positive answers to above questions open a new avenue in stem cell research the biology of stem cells in marine organisms It is therefore unfortunate that while the literature on stem cell from terrestrial organisms is rich and expanding at an exponential rate investigations on marine organisms stem cells are very limited and scarce By presenting theoretical chapters overview essays and specific research results this book summarises the knowledge and the hypotheses on stem cells in marine organisms through major phyla and specific model organisms The study on stem cells from marine invertebrates may shed lights on mechanisms promoting immunity developmental biology regeneration and budding processes in marine invertebrates body maintenance aging and senescence It aims in encouraging a larger scientific community to follow and study the novel phenomena of stem cells behaviours as depicted from the few currently studied marine invertebrates

Stem Cells in Marine Organisms Baruch Rinkevich,Valeria Matranga,2009-10-13 Do real stem cells and stem cell lineages exist in lower organisms Can stem cells from one organism parasitize the soma and or the germ line of conspecifics Can differentiated cells in marine organisms be re programmed to regenerate tissues organs and appendages through novel de differentiation transdifferentiation or re differentiation processes leading to virtually all three germ layers including the germline The positive answers to above questions open a new avenue in stem cell research the biology of stem cells in marine organisms It is therefore unfortunate that while the literature on stem cell from terrestrial organisms is rich and expanding at an exponential rate investigations on marine organisms stem cells are very limited and scarce By presenting theoretical chapters overview essays and specific research results this book summarises the knowledge and the hypotheses on stem cells in marine organisms through major phyla and specific model organisms The study on stem cells from marine invertebrates may shed lights on mechanisms promoting immunity developmental biology regeneration and budding processes in marine invertebrates body maintenance aging and senescence It aims in encouraging a larger scientific community to follow and study the novel phenomena of stem cells behaviours as depicted from the few currently studied marine invertebrates

Advances in Aquatic Invertebrate Stem Cell Research Lorian Ballarin,Baruch Rinkevich,Bert Hobmayer,2022-01-28 This publication is based upon work from COST Action 16203 MARISTEM Stem cells of marine aquatic invertebrates from basic research to innovative applications supported by COST European Cooperation in Science and Technology COST European Cooperation in Science and Technology is a funding agency for research and innovation networks Our Actions help connect research initiatives across Europe and enable scientists to grow their ideas by sharing

them with their peers This boosts their research career and innovation [www cost eu](http://www.cost.eu) Aquatic invertebrates represent the largest biodiversity and the widest phylogenetic radiation on Earth with more than 2 million known species Up until a few years ago their use as model organisms in biological research was limited by the paucity of omics data Recently the situation has rapidly changed and is still changing Today the genomes and various transcriptomes of many aquatic invertebrate species as well as many recombinant proteins of invertebrate origin are available New technologies have revolutionized the available toolbox of research methodologies This explains the rising interest of researchers in the use of aquatic invertebrates as reliable model organisms In contrast to the prevalence of diverse oligopotent and unipotent stem cells in vertebrates aquatic invertebrates especially non ecdysozoan invertebrates exhibit multiple adult cell types with stem cell attributes characterized by multipotency and pluripotency furthermore these give rise to cell lineages characteristic of more than a single germ layer sometimes with somatic and germ line potentials In addition unlike vertebrates aquatic invertebrate adult stem cells are disseminated and widespread inside the animal body are not associated with a regulatory microenvironment niche and do participate in aging and regeneration phenomena These properties can help us to better understand the processes and phenomena in mammalian stem cell biology such as natural chimerism and cancer aging and senescence immunity and autoimmune responses which are all difficult to explain or understand in the human context The COST Action 16203 MARISTEM Stem cells of marine aquatic invertebrates from basic research to innovative applications started in 2017 with the aim to foster the knowledge of the biology of aquatic invertebrates stem cells and strengthen the European community of researchers on aquatic invertebrate stem cells in order to build innovative ideas relevant to various biomedical disciplines This book represents one of the deliverables of the Action and collects part of the materials produced during the past 3 years within the network as a tool to disseminate and render available what has been achieved up to now We hope that this book will be useful to scientists interested in stem cells of non model organisms with particular reference to aquatic invertebrates

Development and Reproduction in Humans and Animal Model Species Werner A.

Mueller, Monika Hassel, Maura Grealy, 2015-01-03 This book describes human development including sexual reproduction and stem cell research with the development of model organisms that are accessible to genetic and experimental analysis in readily understandable texts and 315 multi colored graphics The introductory account of model organisms selected from the entire animal kingdom presents general principles which are then outlined in subsequent chapters devoted to for example sexual development genes controlling development and their contemporary molecular analysis methods production of clones and transgenic animals development of the nervous and circulatory systems regenerative medicine and ageing Finally the evolution of developmental toolkits and novelties is discussed including the genetic basis of the enlargement of the human forebrain Separate boxes are devoted to controversial questions such as the benefits and problems of prenatal diagnostics or the construction of ancient body plans

Handbook of Marine Model Organisms in Experimental Biology Agnes

Boutet, Bernd Schierwater, 2021-12-13 The importance of molecular approaches for comparative biology and the rapid development of new molecular tools is unprecedented The extraordinary molecular progress belies the need for understanding the development and basic biology of whole organisms Vigorous international efforts to train the next generation of experimental biologists must combine both levels next generation molecular approaches and traditional organismal biology This book provides cutting edge chapters regarding the growing list of marine model organisms Access to and practical advice on these model organisms have become a conditio sine qua non for a modern education of advanced undergraduate students graduate students and postdocs working on marine model systems Model organisms are not only tools they are also bridges between fields from behavior development and physiology to functional genomics Key Features Offers deep insights into cutting edge model system science Provides in depth overviews of all prominent marine model organisms Illustrates challenging experimental approaches to model system research Serves as a reference book also for next generation functional genomics applications Fills an urgent need for students Related Titles Jarret R L K McCluskey eds The Biological Resources of Model Organisms ISBN 978 1 1382 9461 5 Kim S K Healthcare Using Marine Organisms ISBN 978 1 1382 9538 4 Mudher A T Newman eds Drosophila A Toolbox for the Study of Neurodegenerative Disease ISBN 978 0 4154 1185 1 Green S L The Laboratory Xenopus sp ISBN 978 1 4200 9109 0 Current Frontiers and Perspectives in Cell Biology Stevo Najman, 2012-04-25 A numerous internationally renowned authors in the pages of this book present the views of the fields of cell biology and their own research results or review of current knowledge Chapters are divided into five sections that are dedicated to cell structures and functions genetic material regulatory mechanisms cellular biomedicine and new methods in cell biology Multidisciplinary and often quite versatile approach by many authors have imposed restrictions of this classification so it is certain that many chapters could belong to the other sections of this book The current frontiers on the manner in which they described in the book can be a good inspiration to many readers for further improving and perspectives which are highlighted can be seen in many areas of fundamental biology biomedicine biotechnology and other applications of knowledge of cell biology The book will be very useful for beginners to gain insight into new area as well as experts to find new facts and expanding horizons **Mechanisms of Cellular Differentiation, Organ Development, and Novel Model Systems** Benedetta Artegiani, Delilah Hendriks, Kai Kretzschmar, 2022-09-29 **Deep-sea chemosynthetic ecosystems: Living in extreme environments** Chaolun Li, Hao Chen, Raul Bettencourt, Dong Feng, Hongmei Jing, Jian-Wen Qiu, Jin Sun, Yong Wang, 2023-04-20 Evolution and Speciation in Animals T. J. Pandian, 2021-09-22 This book represents the first attempt to quantify environmental factors and life history traits that accelerate or decelerate species diversity in animals About 15% 8% and 77% of species are distributed in marine 70% of earth's surface freshwater terra firma fosters more diversity The harsh hadal desert and elevated montane habitats restrict diversity to 0.5-4.2% Costing more time and energy osmotrophic and suspension modes of food acquisition limit diversity to Selfing hermaphrodites 0-9% parthenogens

Incidence of heterogamety is four times more in males than in females Hence evolution is more a male driven process Egg size is determined by environmental factors but lecithality is genetically fixed In poikilotherms sex is also determined by genes but differentiation by environmental factors The extra ovarian vitellogenesis 96% spermatozoan 81% rather than spermatophore mechanism of sperm transfer promiscuity and polygamy over monogamy iteroparity 99.6% over semelparity and internal fertilization 84% are preferred as they accelerate diversity Body size and egg size determine fecundity Indirect life cycle 82% and incorporation of feeding larval stages accelerate diversity Brooding and viviparity 6.4% decelerate it Parasitism extends life span and liberates fecundity from eutelism Evolution is an ongoing process and speciation and extinction are its unavoidable by products The in built conservation mechanism of reviving life after a sleeping duration has been reduced from a few million years in microbial spores to a few thousand years in plant seeds and a few hundred years in dormant eggs in animals Hence animal conservation requires priority The existence of temperature resistant insensitive individuals strains and species shall flourish during the ongoing global warming and earth shall continue with such burgeoning species hopefully inclusive of man

Reproduction and Development in Crustacea T. J. Pandian, 2016-04-05

Dating back to the early Cambrian period crustaceans had ample time to undertake endless experimentation with form and function Today no other group of plants or animals on the planet exhibit the range of morphological diversity seen among extant Crustacea With more than 52 000 species they are placed fourth in terms of overall species diversity

Principles of Developmental Genetics Sally A. Moody, 2014-09-02

Providing expert coverage of all major events in early embryogenesis and the organogenesis of specific systems and supplemented with representative clinical syndromes *Principles of Developmental Genetics* Second Edition discusses the processes of normal development in embryonic and prenatal animals including humans The new edition of this classic work supports clinical researchers developing future therapies with its all new coverage of systems biology stem cell biology new technologies and clinical disorders A crystal clear layout exceptional full color design and bulleted summaries of major takeaways and clinical pathways assist comprehension and readability of the highly complex content All new coverage of systems biology and stem cell biology in context of evolving technologies places the work squarely on the modern sciences Chapters are complemented with a bulleted summary for easy digestion of the major points with a clinical summary for therapeutic application Clinical highlights provides a bridge between basic developmental biology and clinical sciences in embryonic and prenatal syndromes

Advances in Comparative Immunology Edwin L. Cooper, 2018-08-07

Immunologists perhaps understandably most often concentrate on the human immune system an anthropocentric focus that has resulted in a dearth of information about the immune function of all other species within the animal kingdom However knowledge of animal immune function could help not only to better understand human immunology but perhaps more importantly it could help to treat and avoid the blights that affect animals which consequently affect humans Take for example the mass death of honeybees in recent years their demise resulting in much less pollination

poses a serious threat to numerous crops and thus the food supply There is a similar disappearance of frogs internationally signaling ecological problems among them fungal infections This book aims to fill this void by describing and discussing what is known about non human immunology It covers various major animal phyla its chapters organized in a progression from the simplest unicellular organisms to the most complex vertebrates mammals Chapters are written by experts covering the latest findings and new research being conducted about each phylum Edwin L Cooper is a Distinguished Professor in the Laboratory of Comparative Immunology Department of Neurobiology at UCLA s David Geffen School of Medicine

Regeneration from cells to limbs: Past, present, and future Jennifer R Morgan, Frank W Stahnisch, Pamela Imperadore, Fabio De Sio, 2023-07-03 Translational Research in Applied Science Agniswar Sarkar, Mousumi Saha, 2025-09-11 This book presents a groundbreaking collection of cutting edge research that bridges the gap between scientific discovery and real world application With a strong focus on sustainability and market oriented solutions this volume is an indispensable resource for researchers industry professionals entrepreneurs and policymakers working in biotechnology environmental science agriculture aquaculture and healthcare The book features high demand topics such as artificial intelligence and machine learning in bio innovation microbial technologies for sustainable agriculture and food security clean and green energy solutions and bioengineered aquafeeds It also covers advanced health technologies marine biomaterials for tissue engineering computational biology and microbial remediation strategies all offering immense commercial potential and societal relevance By connecting innovation with implementation this volume empowers readers to explore scalable impactful solutions ready for real world deployment Whether you re aiming to deepen academic insight foster industrial innovation or invest in forward looking bioscience technologies this book provides a timely and comprehensive entry point into the transformative world of applied biological sciences Engage with the future of science driven innovation where research meets opportunity and ideas become impactful ventures *Relativity of Evolution* Markus Knoflachner, 2024-08-02 This book focuses primarily on evolutionary processes rather than evolutionary history Topics covered are abiotic framework conditions morphology and physiology of living organisms fossil and molecular evidence of evolutionary developments The basic processes of biological evolution are already established in unicellular organisms Evolutionary options for multicellular organisms arise in a simplified way from the usable energetic transformation potentials and the dynamics of abiotic and biotic interactions Evolutionary processes of multicellular organisms are therefore predominantly determined by the conditions of the surrounding systems This is most clearly shown by comparisons of the evolutionary development of vertebrates under marine and terrestrial conditions For reasons of efficiency alone no single species can have the equipment to capture and sustainably shape the surrounding systems in the long term Depending on the available energetic transformation potentials a single species is very well able to change the surrounding systems but without being able to capture the resulting long term consequences This gives rise to fundamentally new questions for the

design and limits of social action that makes sense in the long term This book is a translation of an updated and revised version of the original German work *Relativität der Evolution* ISBN 978 3 662 63936 8 Translated by Robert D Martin

How We Age Coleen T. Murphy, 2025-05-20 How recent breakthroughs in longevity research offer clues about human aging All of us would like to live longer or to slow the debilitating effects of age In *How We Age* Coleen Murphy shows how recent research on longevity and aging may be bringing us closer to this goal Murphy a leading scholar of aging explains that the study of model systems particularly simple invertebrate animals combined with breakthroughs in genomic methods have allowed scientists to probe the molecular mechanisms of longevity and aging Understanding the fundamental biological rules that govern aging in model systems provides clues about how we might slow human aging which could lead in turn to new therapeutics and treatments for age related disease Among other vivid examples Murphy describes research that shows how changing a single gene in the nematode worm *C. elegans* doubles its lifespan extending not only the end of life but also the youthful healthy part of life Drawing on work in her own lab as well as other recent research Murphy chronicles the history and current state of the field explaining longevity's links to reproduction and mating sensory and cognitive function inheritances from our ancestors and the gut microbiome Written with clarity and wit *How We Age* provides a guide to the science what we know about aging how we know what we know and what we can do with this new knowledge

Laboratory and Field Investigations in Marine Life James L. Sumich, Gordon Dudley, 2005 The laboratory companion to *Introduction to the Biology of Marine Life* by James L. Sumich and John F. Morrissey this laboratory manual further engages students in the excitement and challenges of understanding marine organisms and the environments in which they live Students will benefit from a more thorough examination of the topics introduced in the text and lecture through observation and critical thinking activities in the *Laboratory and Field Investigations in Marine Life* Also the lab manual includes suggested topics for additional investigation which provides flexibility for both instructors and for students to explore further various topics of interest The only lab manual of its kind *Laboratory and Field Investigations in Marine Life* is the ideal complement to any marine biology teaching and learning package

Designer Biology Ronald L. Sandler, John Basl, 2013-07-18 Advances in our scientific understanding and technological power in recent decades have dramatically amplified our capacity to intentionally manipulate complex ecological and biological systems An implication of this is that biological and ecological problems are increasingly understood and approached from an engineering perspective In environmental contexts this is exemplified in the pursuits of geoengineering designer ecosystems and conservation cloning In human health contexts it is exemplified in the development of synthetic biology bionanotechnology and human enhancement technologies *Designer Biology* The Ethics of Intensively Engineering Biological and Ecological Systems consists of thirteen chapters twelve of them original to the collection that address the ethical issues raised by technological intervention and design across a broad range of biological and ecological systems Among the technologies addressed are geoengineering

human enhancement sex selection genetic modification and synthetic biology This collection advances and enriches our understanding of the ethical issues raised by these technologies and identifies general lessons about the ethics of engineering complex biological and ecological systems that can be applied as new technologies and practices emerge The insights that emerge will be especially valuable to students and scholars of environmental ethics bioethics or technology ethics Aquatic Animal Health Management Rajendran Kooloth Valappil,Iddya Karunasagar,Indrani

Karunasagar,2025-08-31 This book covers detailed accounts of viral bacterial and fungal diseases affecting shrimp finfish and molluscan aquaculture It also discusses different aquatic animal health management measures such as disease diagnostics biosecurity bioremediation and application of probiotics antibiotics and vaccines Further the book provides information on the roles of genetics and genomics disease surveillance aquatic animal health policies and the effects of climate change in aquaculture The book is structured into five sections i Pathogens and Diseases of Finfish ii Pathogens and Diseases of Shellfish iii Aquatic Animal Health and Environment iv Health Management in Aquaculture and v Aquatic Animal Health Policy and Regulations Aquaculture plays a pivotal role in food and nutritional security export earnings and the livelihood of millions of people globally However aquatic animal diseases have been a major limiting factor in sustainable aquaculture production in terms of economic losses caused by mass mortality and morbidity In order to combat these endemic and emerging diseases researchers are formulating strategies to mitigate the negative impact of diseases by understanding the pathogens hosts and their environment This book is a useful reference book for students researchers aquaculture technicians farm and hatchery managers and policy makers of aquaculture regulatory agencies Model Organisms in Embryonic Development Michael Schubert,Gabriella Lania,Alice Jouneau ,Denhi Schnabel,2025-08-25

The field of developmental biology and the study of embryonic development relies on a diverse range of model systems that offer unique advantages and perspectives allowing researchers to uncover fundamental principles and mechanisms underlying this intricate process This Research Topic aims to explore the diverse array of model organisms used in the study of embryonic development and highlight their valuable insights Contributions to this collection may encompass various experimental approaches comparative analysis revealing different models specific strengths and contributions and covering all aspects of research investigating embryonic development From the more well established models such as fruit flies zebrafish and *Caenorhabditis elegans* which have elucidated the mechanisms of embryogenesis pattern formation and tissue morphogenesis to mice frogs and more which have allowed us to in depth genetic manipulation and greater experimental accessibility We welcome many article types including Original Research articles mini Reviews Methods Perspectives and Opinion pieces to provide a comprehensive and multidimensional view of the field Topics of interest include but are not limited to Comparative studies examining similarities and differences in embryonic development across different model organisms shedding light on evolutionary conserved mechanisms Studies investigating the genetic and molecular factors regulating key developmental

processes such as gastrulation organogenesis tissue patterning and cell fate determination Research exploring the roles of various signaling pathways such as Wnt Notch TGF beta and Hedgehog in orchestrating embryonic development in different organisms A full list of accepted article types including descriptions can be found at [this link](#)

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