Developmental Biology Of The Sea Urchin And Other Marine Invertebrates Methods And Protocols Methods In Molecular Biology

The marriage of evolutionary biology with developmental biology has resulted in the formation of a new field, evolutionary developmental biology, or “evo-devo. This volume reviews current research findings and thought in the broad field of evo-devo, looking at the developmental genetic mechanisms that cause variation and how alterations of these mechanisms can generate novel structural changes in a variety of plant and animal life. Reviews current research findings and thought on evolutionary developmental biology, providing researchers an overview and synthesis of the latest research findings and contemporary thought in the area Includes chapters discussing the evolutionary development of a wide variety of organisms and allows researchers to compare and contrast how genes are expressed in a variety of organisms—from fly to frog, to humans Emphasizes the role of regulatory DNA in evolutionary development to give researchers perspective on how the regions of the genome that control gene expression and the protein factors that bind them are ultimately responsible for the diversity of life that has evolved

Experimental Developmental Biology: A Laboratory Manual is designed for use in college-level laboratory courses in developmental biology. It offers challenging experiments for students to perform as independent investigators as they probe developmental processes in living embryos at the organizational, cellular, and subcellular levels. * Combines classical embryology with modern experimental methods * Provides numerous in-depth experiments in each exercise that focus on a single species of an organism * Concentrates on the living embryos of sea urchins, frogs, chicks, Drosophila, and sponges * Covers the procedures for gel electrophoresis and microscopy * Assembles essential references for background and further study * Offers guidelines for writing lab notes and reports * Contains an extensive preparer's guide to show students how to set up each lab * Outlines the theory of optics

This work comprises the entire gamut of animal developmental biology, ranging from gametogenesis to senescence and cell death, and includes chapters on: fertilization; cleavage; gastrulation; organ formulation and foetal membranes; experimental embryology; developmental processes after embryogenesis; and environmental regulation of animal development. Development genetics of Drosophila also finds a spot in the book. Some of the new topics discussed are cryopreservation of the embryo and hormone technology related to birth control. The contents of many chapters integrate descriptive embryology with modern concepts in developmental biology.

This book is addressed to the readers operating in the sea urchin field of research, as well as to the lovers of this fascinating organism. Sea urchin, among the most known marine invertebrates belonging to the deuterostomes, is more closely related to humans than other invertebrates, thus representing a suitable model system not only for developmental biology and ecotoxicology but also for biomedicine. The topics described highlight the validity and versatility of this organism for different kinds of investigations. A collection of interesting chapters contributes to this volume and clearly shows the reason of the high interest manifested by a huge number of scientists around the world for this organism over time. Each contribution is a separate and comprehensive chapter but within the book's aim.

Together with other volumes in this series, Volume 58 presents thoughtful and forward-looking articles on developmental biology and developmental medicine. Reviews include: * A role for endogenous electric fields in wound healing * The role of mitotic checkpoint in maintaining genomic stability * The regulation of oocyte maturation * Stem cells: A promising source of pancreatic islets for transplantation in type 1 diabetes * Differentiation potential of adipose derived adult stem (ASAS) cells The exceptional reviews in this volume of Current Topics in Developmental Biology will be valuable to both clinical and fundamental researchers, as well as students and other professionals who want an introduction to current topics in cellular and molecular approaches to developmental biology and clinical problems of aberrant development. * Series Editor Gerald Schatten is one of the leading minds in reproductive and developmental science * Presents major issues and astonishing discoveries at the forefront of modern developmental biology and developmental medicine * The longest-running forum for contemporary issues in developmental biology with over 30 years of coverage

The molecular biology revolution has transformed developmental biology into one of the most exciting and fruitful fields in experimental biomedical research today. In Developmental Biology Protocols, established leaders in this field demonstrate this achievement with a comprehensive collection of cutting-edge protocols for studying and analyzing the events of embryonic development. Drawing on state-of-the-art cellular and molecular techniques, as well as new and sophisticated imaging and information technologies, this 3rd volume and last volume introduces powerful techniques for the manipulation of developmental gene expression and function, the analysis of gene expression, the characterization of tissue morphogenesis and development, the in vitro study of differentiation and development, and the genetic analysis of developmental models of diseases. The 1st and 2nd volumes in this seminal set complete today's widest-ranging collection of techniques designed to decipher the exact cellular, molecular, and genetic mechanisms that control the form, structure, and function of the developing embryo. Volume 1 presents readily reproducible methods for establishing and characterizing several widely used experimental model systems, for both the study of developmental patterns and morphogenesis, and the examination of embryo structure and function. In addition, there are step-by-step methods for the analysis of cell lineage, the production and use of chimeras, and the experimental molecular manipulation of embryos, including the application of viral vectors. No less innovative, volume 2 describes state-of-the-art methods for the study of organogenesis, the analysis of abnormal development and teratology, the screening and mapping of novel genes and mutations, and the application of transgenesis, including the production of transgenic animals and gene knockouts. Highly practical and richly annotated, the three volumes of Developmental Biology Protocols describe multiple experimental systems and details techniques adopted from the broadest array of biomedical disciplines. Every researcher will not only better understand the principles, background, and rationale for how form and function are elaborated in an organism, but also gain full practical access to today's best methods for its analysis.

Current Topics in Developmental Biology, Volume 45 surveys the major issues at the forefront of developmental biology. This volume, like others in the serial, is valuable to researchers in the fields of animal and plant development, and to students and other professionals who want an introduction to current topics in cellular and molecular approaches to developmental biology. Chapters on the nervous system, reproductive system, and flowering introduce new models and concepts for understanding these processes. Includes development of the nervous and reproductive systems Covers flowering in plants Highlights the roles of homeobox-related transcription factors and growth factors in axis and organ development

This book should be regarded as the continuation to my previous book Developmental Biology of the Sea Urchin Embryo, edited by the Academic Press in 1973, rather than as a new edition. Due to the exceedingly high rate of development in this field (something like 2000 papers have been published on this subject in these last 10 years), I preferred, in fact, not to describe again in detail the enormous amount of the old literature, as was attempted in my previous book, but to briefly summarize the state of the art in each problem and to describe in some detail the experiments per formed in the last 12 years. In doing so, more emphasis was given to the more recent ones and to those which can be considered as corner stones in each subject. Care was, however, taken to mention the reviews or key papers in which the reader can find a source of the details of the older

literature, besides refering him to my previous book.
Marine biology has always played an important role in biological research, being at the origin of many key advances. To a certain extent, the influence of marine biology on the biological sciences was overshadowed over a period of several years by the remarkable advances that were made using powerful model organisms from terrestrial environments. This situation is now changing again, however, due primarily to spectacular developments in genomic methodologies that have significantly accelerated research in a broad spectrum of marine biology disciplines ranging from biodiversity to developmental biology to biotechnology. The data generated by marine genomics projects have had an impact on questions as diverse as understanding planetary geochemical cycles, the impact of climate change on marine fauna and flora, the functioning of marine ecosystems, the discovery of new organisms and novel biomolecules, and investigation of the evolution of animal developmental complexity. This book represents the first attempt to document how genomic technologies are revolutionising these diverse domains of marine biology. Each chapter of this book looks at how these technologies are being employed in a specific domain of marine research and provides a summary of the major results obtained to date. The book as a whole provides an overview of marine genomics as a discipline and represents an ideal starting point for exploring this rapidly developing domain.
Developmental Biology of the Sea Urchin and Other Marine InvertebratesMethods and ProtocolsHumana
This fully revised and expanded edition of Sea Urchins provides a wide-ranging understanding of the biology and ecology of this key component of the world's oceans. Coverage includes reproduction, metabolism, endocrinology, larval ecology, growth, digestion, carotenoids, disease and nutrition. Other chapters consider the ecology of individual species that are of major importance ecologically and economically, including species from Japan, New Zealand, Australia, Europe, North America, South America and Africa. In addition, six new contributions in areas such as immunology, digestive systems and community ecology inform readers on key recent developments and insights from the literature. Sea urchins are ecologically important and often greatly affect marine communities. Because they have an excellent fossil record, they are also of interest to paleontologists. Research on sea urchins has increased in recent years, stimulated first by recognition of their ecological importance and subsequently their economic importance. Scientists around the world are actively investigating their potential for aquaculture and fisheries, and their value as model systems for investigations in developmental biology continues to increase. Continues the series "Developments in Aquaculture and Fisheries Science" with a newly revised volume Collects and synthesizes the state of knowledge of sea urchin biology and ecology Expanded from previous edition to include non-edible species, providing the needed basis for broader evolutionary understanding of sea urchins
This Series provides a comprehensive survey of the major topics in the field of developmental biology. The volumes are valuable to researchers in animal and plant development, as well as to students and professionals who want an introduction to cellular and molecular mechanisms of development. This year marks a major milestone for the Series as it completes its thirtieth year of publication, making it the longest-running forum for contemporary issues in developmental biology.
This multi-author, six-volume work summarizes our current knowledge on the developmental biology of all major invertebrate animal phyla. The main aspects of cleavage, embryogenesis, organogenesis and gene expression are discussed in an evolutionary framework. Each chapter presents an in-depth yet concise overview of both classical and recent literature, supplemented by numerous color illustrations and micrographs of a given animal group. The largely taxon-based chapters are supplemented by essays on topical aspects relevant to modern-day EvoDevo research such as regeneration, embryos in the fossil record, homology in the age of genomics and the role of EvoDevo in the context of reconstructing evolutionary and phylogenetic scenarios. A list of open questions at the end of each chapter may serve as a source of inspiration for the next generation of EvoDevo scientists. Evolutionary Developmental Biology of Invertebrates is a must-have for any scientist, teacher or student interested in developmental and evolutionary biology as well as in general invertebrate zoology. This chapter is dedicated to the Deuterostomia, comprising the Echinodermata and Hemichordata (usually grouped together as the Ambulacraria) as well as the Cephalochordata and the Tunicata.
Ascidians, or sea squirts, are ubiquitous, sessile marine animals. In the field of developmental biology, the animal has long provided a model system for studying the cellular and molecular mechanisms involved in so-called 'mosaic' development. The book first discusses the general and basic patterns of ascidian embryogenesis. It then moves on to discuss two important ways in which heterogeneity can be generated among embryonic cells: through prelocalised egg cytoplasmic information and through cell-cell interactions. These matters are covered in detail and the book finishes with discussions of colonial ascidians, ascidian regenerative abilities (which are considerable), and the fundamental problems associated with asexual development.
Developmental Biology, Sixth Edition explores and synthesizes the organismal, cellular, and molecular aspects of animal development, and expands its coverage of the medical, environmental, and evolutionary aspects of developmental biology. Shorter than the previous edition by some 200 pages (deleted material available at www.devbio.com), the Sixth Edition features up-to-date research, a new full-color art program, chapter reorganization and new chapter summaries, and two new chapters -- "Mechanisms of Plant Development, " by Susan R. Singer of Carleton College, and "Metamorphosis, Regeneration, and Aging." Included with every copy of the book, and referenced throughout the text, is Vade Mecum: An Interactive Guide to Developmental Biology, a CD-ROM by Mary S. Tyler and Ronald N. Kozlowski of the University of Maine.
This detailed second edition presents a wide variety of marine invertebrate model systems, from cephalochordata to holothurians, along with novel experimental protocols for taking advantage of their unique properties. The techniques range from culturing the organisms to modifying their DNA. Written for the highly successful Methods in Molecular

Biology series, chapters include introductions to their respective topics, lists of the necessary materials and reagents, step-by-step, readily reproducible laboratory protocols, and tips on troubleshooting and avoiding known pitfalls. Authoritative and up-to-date, Developmental Biology of the Sea Urchin and Other Marine Invertebrates: Methods and Protocols, Second Edition is an ideal guide for researchers working with these versatile organisms and for furthering our understanding of fundamental biological questions.
This intensive manual provides students with valuable information and insights into animal development at the organismal, cellular, and subcellular levels. The book uses both descriptive and investigative approaches that emphasize techniques, key experiments, and data analysis. Provides a broad introductory view of developmental systems Teaches both classical embryology and modern experimental approaches Contains seventeen laboratory exercises, written in step-by-step style Organized with additional notes to students and preparators Lists questions and references for each exercise Special chapters give introductions to the scientific process, use of the microscope, and the writing of scientific papers Illustrated with detailed line drawings
Developmental biology took shape between 1880 and the 1920s Basic concepts like the developmental role of chromosomes and the germ plasm (today's genome), self differentiation, embryonic regulation and induction, gradients and organizers hail from that period; indeed, the discipline was defined as a whole by the programmatic writings of Wilhelm Roux as early as 1889. The present essays cover the period up to the Nobel prize-winning work of Hans Spemann and Hilde Mangold. They were originally published in Roux's Archives of Developmental Biology, from Vol. 200 onward to the journal's centennial issues in 1995/96. The essays aim at introducing current adepts of developmental biology to observations and experiments that have lead their predecessors towards basic concepts still influential today.
This book provides a practical guide to experimental methods for studying the development invertebrate deuterostomes as animal model systems. The chapters provide detailed experimental protocols that cover a broad range of topics in modern experimental methods. Topics covered range from rearing embryos to the care of adult animals, while also presenting the basic experimental methods including light and electron microscopy, used to study gene expression, transgenics, reverse genetics, and genomic approaches. * Covers a wide range of methods, from classical embryology through modern genomics * Discusses animals related to vertebrates, providing a valuable evolutionary perspective * Includes a practical guide to the use of sea urchins in the teaching laboratory
Essential Developmental Biology is a comprehensive, richly illustrated introduction to all aspects of developmental biology. Written in a clear and accessible style, the third edition of this popular textbook has been expanded and updated In addition, an accompanying website provides instructional materials for both student and lecturer use, including animated developmental processes, a photo gallery of selected model organisms, and all artwork in downloadable format. With an emphasis throughout on the evidence underpinning the main conclusions, this book is an essential text for both introductory and more advanced courses in developmental biology. Shortlisted for the Society of Biology Book Awards 2013 in the Undergraduate Textbook category. Reviews of the Second Edition: "The second edition is a must have for anyone interested in development biology. New findings in hot fields such as stem cells, regeneration, and aging should make it attractive to a wide readership. Overall, the book is concise, well structured, and illustrated. I can highly recommend it." —Peter Gruss, Max Planck Society "I have always found Jonathan Slack's writing thoughtful, provocative, and engaging, and simply fun to read. This effort is no exception. Every student of developmental biology should experience his holistic yet analytical view of the subject." —Margaret Saha, College of William & Mary
Echinoderms, Volume 150 in the Methods in Cell Biology series, highlights new advances in the field, with this update presenting interesting chapters on procuring animals and culturing of eggs and embryos, cryopreservation of sea urchin gametes, emerging echinoderm models, culturing of sand dollars, cidaroids and heart urchins, culturing echinoderm larvae through metamorphosis, microinjection methods, injection of exogenous messages and protein overexpression, blastomere transplantation, visualization of embryonic polarity, larval immune cell approaches, methods for analysis of sea urchin primordial germ cells, and protocols and best practices for toxicology and pH studies using echinoderms and several new chapters outlining the use of sea urchins in the classroom. Clear, concise protocols provided by experts who have established the echinoderms as a model system Highlights new advances in the field, with this update presenting interesting chapters on echinoderms
Developmental Biology of the sea Urchin Embryo.
No field of contemporary biomedical science has been more revolutionized by the techniques of molecular biology than developmental biology. This is an outstanding concise introduction to developmental biology that takes a contemporary approach to describing the complex process that transforms an egg into an adult organism. The book features exceptionally clear two-color illustrations, and is designed for use in both undergraduate and graduate level courses. The book is especially noteworthy for its treatment of development in model organisms, whose contributions to developmental biology were recognized in the 1995 Nobel Prize for physiology and medicine.
This manual presents 27 laboratory exercises for student practical classes in developmental biology.
Focusing on the area of developmental biology, this work is intended for students.
Current Topics in Developmental Biology
In this volume of ASPA, devoted to developmental biology research, 9 authors from different fields of developmental biology present their investigations on various developing plant and animal models. An a priori concern in mind that weightlessness might have negative effects on developmental processes, it is encouraging to know that the overall development of various organisms tested so far is essentially correct under spaceflight conditions, leading to viable individuals with viable offspring. On the other hand, particular studies on specifically neurophysiological aspects in developing organisms reveal important flight or postflight disturbances; however it is encouraging to know that they appear to be transient only. The book contains ten chapters, giving details on how, in technical terms, experiments for spaceflights are prepared, performed and analysed and on how, in scientific terms, the available results have to be interpreted. One contribution is devoted to plant systems, five consider the overall aspects of embryonic

development in invertebrates and vertebrates, two focus on neurophysiological aspects and one reports on the "mother-offspring system" in weightlessness in a mammalian model, the last chapter presents new ESA facilities and instruments to be integrated into the European research Laboratory "Columbus" of the ISS.

A laboratory manual for developmental biology offering basic, easy to use, laboratory investigations (18 experiments) spanning various models including echinoderm (Sea Urchin), amphibian (Frog), chick embryo, and fern gametophyte.

This book gives an overview of the diverse marine fauna and flora of Japan and includes practical guides for investigating the biology and ecology of marine organisms. Introducing marine training courses offered at a range of Japanese universities, this is the first English textbook intended for marine biology instructors and students in Japan. It provides essential information on experimental procedures for the major areas of marine biology, including cell and developmental biology, physiology, ecology and environmental sciences, and as such is a valuable resource for those in Asian countries that share a similar flora and fauna. It also appeals to visitors interested in attending Japanese marine courses from countries around the world.

The proceedings of the Seventh International Echinoderm Conference, held at Atami, Japan, September 1990. In addition to sections covering ecology, evolution, reproduction, morphology, molecular biology, developmental biology, physiology, behavior, and paleontology, there are four plenary lectures a

Sea urchins are a major component of marine environments found throughout the world's oceans. A major model for research in developmental biology, they are also of major economic importance in many regions and interest in their management and aquaculture has increased greatly in recent years. This book provides a synthesis of biological and ecological characteristics of sea urchins that are of basic scientific interest and also essential for effective fisheries management and aquaculture. General chapters consider characteristics of sea urchins as a whole. In addition, specific chapters are devoted to the ecology of 17 species that are of major commercial interest and ecological importance. Features include: • A synthesis of what is known about the basic biological characteristics of the sea urchin, useful for the direction of future research. • Case histories of 17 species that illustrate their ecological role in a variety of environments. • With the catastrophic decline in fisheries resulting primarily from over-fishing, it is essential that the populations be managed effectively and that aquaculture be developed. This book provides knowledge of the biology and ecology of the commercially important sea urchins that will contribute to these goals. • The only book available in present literature devoted to sea urchins. With this new title experts provide a broad synthetic treatment and in depth analysis of the biology and ecology of sea urchins from around the world, designed to provide an understanding of the group and the basis for fisheries management and aquaculture.

Reproductive Biology of Invertebrates Volume IV Fertilization, Development, and Parental Care Edited by K.G. Adiyodi and R.G. Adiyodi About 95 per cent of all known animal species are invertebrates. A knowledge of their sexual, reproductive, and developmental biology is essential for the effective management of species that are economically useful to man or are harmful to him, his crops, and livestock. This treatise is the first to cover all aspects of reproduction and development of the entire spectrum of invertebrates—terrestrial, marine, freshwater, brackish-water, free-living, and parasitic. The chapters, by leading world experts in their fields, are up-to-date and informative, and suggest a number of problems for future research. Fertilization, Development, and Parental Care is the fourth volume in the series. Part A: Porifera through Annelida—Polychaeta Contents Series Preface; Preface to Volume IV; Systematic Résumé of the Invertebrates; Porifera, P.E. Fell; Cnidaria, D.G. Fautin, F.-S. Chia, and J.G. Spaulding; Platyhelminthes—Turbellaria, L. Galleni and V. Gremigni; Platyhelminthes—Eucestoda, R.E. Davis and L.S. Roberts; Mesozoa, B.H. McConnaughey; Nemertina, C.-E. Cantell; Gnathostomulida, M. Mainitz; Rotifera, J.J. Gilbert; Gastrotricha, W.D. Hummon and M.R. Hummon; Kinorhyncha, A.E. Needham; Nematoda and Nematomorpha, A.F. Bird and R.I. Sommerville; Acanthocephala, D.W.T. Crompton; Priapulida, A. Nørrevang and Jacob van der Land; Sipuncula, M.E. Rice; Mollusca, R.L. Brahmachary; Echiura, F.C. Davis; Annelida—Polychaeta, P.C. Schroeder; Species Index; Subject Index. Part B: Annelida-Clitellata through Urochordata—Larvacea Tentative Contents Series Preface; Preface to Volume IV; Systematic Resume of the Invertebrates; Annelida—Clitellata, A.E. Needham; Pogonophora, T. Bakke; Tardigrada, R. Bertoiani; Onychophora, H. Ruhberg; Arthropoda—Chelicerata, Sperm Transfer in, P. Weygoldt; Arthropoda—Crustacea, G.W. Hinsch; Arthropoda—Myriapoda, J.-M. Demange; Pentastomida, J.T. Self; Phoronida, C.C. Emig; Bryozoa Ectoprocta, C. Nielsen; Bryozoa Entoprocta, C. Nielsen; Brachiopoda, S.H. Chuang; Chaetognatha, A. Alvariño; Echinodermata: Molecular and Cellular Biology of the Sea Urchin Embryo, G. Spinelli and I. Albanese; Urochordata—Ascidiacea, R.A. Cloney; Urochordata—Thaliacea, J.E.A. Godeaux; Urochordata—Larvacea, C. Galt; Species Index; Subject Index.

This lab manual is designed for upper level undergraduates or graduate students, to introduce them to the field of developmental biology. After spending two weeks learning how to handle and manipulate a variety of embryonic organisms, students will begin a series of experiments that more or less keep pace with the sequence of most developmental biology textbooks (axial patterning, plant cell totipotency, fertilization, early plant development, morphogenesis, cell adhesion, embryogenesis,gametogenesis, regeneration and metamorphosis. The manual is heavily illustrated and gives students a solid grounding in classic developmental biology as well as modern techniques in immunohistochemistry and homeobox gene expression. Appendices of recipes, needed chemicals, and sources for animals are included.