

GASTRULATION: FROM CELLS TO EMBRYO.

Edited by Claudio D Stern. Cold Spring Harbor (New York): Cold Spring Harbor Laboratory Press. \$150.00.

xvi + 731 p; ill.; index. ISBN: 0-87969-707-5. 2004.

All bona fide embryologists will identify with the passion for embryos and the process of gastrulation expressed by Claudio Stern in the introduction to this new volume. The introduction should be read to inform readers of the myriad decisions Stern made as an editor, and to delineate his goal—namely, to provide a lasting, scholarly summation of gastrulation studies in metazoans from early studies to modern times.

The book succeeds by not limiting discussion to today's most popular model organisms and trendy molecules, but by including many organisms that have virtually disappeared from meeting presentations. The book contains 54 chapters separated into five parts that cover embryology, cell biology, molecular biology, evolution, and a brief overview of remaining questions. Chapter authors were encouraged to cite the primary literature in lieu of reviews, which should ensure that the book stands as a lasting resource for current and future developmental biologists.

Intended for researchers, teachers, and students, some chapters will be accessible to all, while others will only be readily understood by advanced readers. One example is the mouse chapter by Tam and Gad. A lot of thinking went into the presentation of this chapter, which offers new insights into how best to visualize the complex mouse gastrula. This chapter works well for researchers and advanced students, but is likely too complicated for most students and teachers. If the book is truly intended for a wide audience, a simpler introductory chapter on mouse gastrulation, followed by the Tam and Gad chapter, would better serve readers. By demonstrating how complex our understanding of gastrulation has become, the book provides a strong argument that developmental biology may have matured into a science like physics or chemistry. In these disciplines, students are taught grossly simplified phenomena in lower-level coursework, followed by nuts-and-bolts explanations in advanced courses. This volume makes one realize that this may be the only way to teach vertebrate gastrulation to students in the very near future.

It is a treat to skip through the chapters of this book. Readers will find it worth the price, and I thank Stern and Cold Spring Harbor Laboratory Press for compiling this snapshot of gastrulation studies at the turn of the 21st century.

MARY CONSTANCE LANE, *Biomolecular Chemistry, School of Medicine, University of Wisconsin, Madison, Wisconsin*

MODULARITY IN DEVELOPMENT AND EVOLUTION. Based on a symposium held at Delmenhorst, Germany, May 2000.

Edited by Gerhard Schlosser and Günter P Wagner. Chicago (Illinois): University of Chicago Press. \$90.00 (hardcover); \$35.00 (paper). x + 600 p; ill.; index. ISBN: 0-226-73853-1 (hc); 0-226-73855-8 (pb). 2004.

The realization that developmental pathways are highly conserved during evolution, but sets of its components are repeatedly reshuffled to produce novel structures, has brought renewed interest into the modular nature of development and evolution. Organisms are composed of autonomous parts or *modules* tightly integrated within themselves, but largely independent of each other. This modularity is apparent throughout embryonic development and a key feature in the evolution of complexity.

Despite all the attention, a clear definition of a *module* remains something of a challenge. *Modularity in Development and Evolution* is one of the most recent attempts at clarifying the concept of modularity and its implications for evolution. It gathers 21 contributions organized into four parts, and tied together by introductory and conclusion chapters by the editors. The different contributions represent a variety of perspectives and examples of evolutionary and developmental modularity, and stand as a clear demonstration of just how difficult it can be to firmly formalize this "fashionable" concept.

The first part, which addresses the molecular and developmental basis of modularity, contains seven papers that illustrate examples of developmental modules at different levels of organization. These include particular types of genes and gene networks that operate in a variety of developmental processes, the prevalence of pleiotropy within functional and developmental modules, and higher-level modules composed of many cells. Part 2 deals with the recognition and modeling of modules and it contains five chapters on how developmental modules can be identified using large bodies of gene expression data and theoretical modeling approaches. The third part contains six papers on the evolutionary dynamics and origin of modules. The possible origin of modularity from both nonadaptive evolutionary mechanisms or as a direct result of natural selection is discussed, as are examples of the evolutionary implications of different developmental modules. The final part consists of three contributions that take a perspective less often discussed in the context of evolution and development, that of individuals as modules in higher-level units. This special kind of modularity is discussed in relation to important transitions in biological organization: the symbiotic origin of

novel cellular functions, the origin of multicellularity, and transitions between colonial and solitary lifestyles.

The modular nature of development and its implications for evolutionary change are widely accepted and often discussed. Modularity appears at different levels of organization (examples in this book range from units of gene regulation to entire organisms) and in different degrees (with variable levels of integration and autonomy of the modules). Even if these properties might hinder a unique, universal definition of modularity, it is fundamental that researchers do come together to explore and formalize this concept as was attempted in this book.

PATRICIA BELDADE, *Ecology & Evolutionary Biology*, University of California, Irvine, California



MICROBIOLOGY

ALCAMO'S FUNDAMENTALS OF MICROBIOLOGY. *Seventh Edition.*

By Jeffrey C Pommerville. Sudbury (Massachusetts): Jones and Bartlett Publishers. \$99.95. xxx + 1001 p + A1-A23 + G1-G24 + I1-I32; ill.; index. ISBN: 0-7637-0067-3. 2004.

The revised seventh edition of this excellent microbiology textbook offers extensive new material in biochemistry and molecular biology, and contains useful student learning aides in the rapidly growing field of microbiology. The revised volume represents an improvement over prior editions. It contains new important topics, including recent advancements in molecular biology such as bacterial genomics, a discussion of the SARS epidemic in China, prion diseases, information on mechanisms of protein folding, and topics on bioterrorism with bacteria and viruses associated with anthrax, smallpox, and Ebola disease.

The text is aimed at the community college students in nursing, dental hygiene, and related health science areas. One-half of the pages of the book are devoted to pathogenic microorganisms, immunology, and the control of human infectious disease. The volume clearly satisfies this objective, but is also applicable to undergraduates seeking four-year degrees in the areas of physical and occupational therapy, medical technology, food technology, waste water and sanitary water treatment, as well as technicians and assistant scientists employed in the more routine laboratory protocols in biotechnology. Although the text is aimed pri-

marily at the junior college/health science level, it contains considerable advanced treatment of basic chemistry, biochemistry, and modern molecular biology. This volume may provide the impetus for students in two-year degree programs to decide to major in four-year degree and graduate programs at colleges and universities.

The book is organized into seven major parts that contain 27 chapters. The first part consists of three chapters on historical foundations, essential basic chemistry and biochemistry, and fundamentals of microbial diversity, taxonomy, and microscopy. Part Two includes four chapters that deal with bacterial structure and growth, microbial metabolism, microbial genetics, and genetic engineering, plus a new section on bacterial genomics. Parts Three and Four contain chapters that discuss microbial (bacterial, fungal, viral, and parasitic) disease. This important area is covered by seven large chapters. Part Five consists of four chapters on infection and disease, the basic essentials of the human immune system, and the fundamentals of immunology and serology. The next part includes three chapters that deal with the physical and chemical control of microorganisms and their control by antibiotics and chemotherapeutic agents. The final part discusses microbiology and public health issues, with chapters on food microbiology, environmental microbiology, as well as industrial microbiology and biotechnology.

This volume is unique in its approach to a broad and difficult subject. The author, a passionate biology and microbiology science educator, employs a number of special student aides that help to reduce the stress and anxiety often associated with students who try to master large and complex science subjects. An electronic learning aide is used to enhance the student's comprehension of microbiology, and a new website has been established that offers free online E-learning study guides to chapter outlines, chapter essay questions, key term reviews, and short study quizzes. Other interesting learning aides include the use of short essays and descriptions of possible careers in microbiology and biotechnology, and boxes that provide important historical contributions of key microbiologists and other biological scientists to the current status of modern microbiology and chemical biology. The author uses crossword puzzles and column matching quizzes to enhance the learning of important microbiology subject areas. There is a section on the correct pronunciation of microorganism names, a useful and complete glossary, an index, and a *Study Guide* that contains over 3000 practice exercises and various types of questions to help students learn and retain important information in the text.