BOOK REVIEW

Developmental gene regulatory networks in detail

Genomic control process: development and evolution
Edited by: Isabelle S Peter and Eric H Davidson
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The Human Genome Project, completed in April 2003, has given the ability to understand the blueprint for building a person. The completed human DNA sequence revealed detailed information about the structure, organisation, and function of the complete set of human genes. Although it is considered the basic set of inheritable instructions for the development of a human being, the DNA sequence does not directly predict the process of development. Instead, genomic control of development is encoded in a complex programme that is distributed in many parts of the genome and referred to in *Genomic Control Process* as the regulatory genome, which is one of the central themes of this book (*Genomic Control Process: Development And Evolution*, edited by Isabelle S Peter and Eric H Davidson). The authors provide a conceptual framework that makes the principles by which the genomic control system operates the developmental and evolutionary process accessible.

The book is an excellent source of information on the many aspects of the genomic control system, which includes its hierarchy, its logic processing functions, and its structural organisation in the form of gene regulatory networks. The book is organised into seven chapters and begins with the molecular biology of the sequence-dependent regulation of gene expression in animal development. The main focus of subsequent chapters is gene regulatory networks: the system of regulatory genes and their encoded interactions that determine the genetic functions to be expressed in time and space. Important topics that are highlighted in the various chapters reveal the genomic strategies for embryonic development, genomic control processes in adult body part formation, and genomic strategies for terminal cell fate specification. Using many diverse examples, the authors illustrate the means by which the transcriptional regulatory system is deployed in the pre-gastrula development of

bilateria, explain the genomically encoded mechanisms underlying the formation of body parts, and further explore the differentiation of cell types as the final readout of the preceding spatial specification processes in the development of the body plan. Stating that the structural and functional properties of gene regulatory networks can be accessed mainly by use of models, the authors also consider diverse forms of developmental gene regulatory network models, including topological network models, ODE models of circuit dynamics, and Boolean models of network logic. A special chapter is dedicated to the evolution of bilateria: processes of change and stasis in hierarchical developmental gene regulatory networks. Undeniably, the evolutionary change in body plans must have been caused by evolutionary change in developmental gene regulatory networks. According to the authors, we can understand the process of the development of the body plan of bilateria, or the process of evolution of the body plan of bilateria, only in light of the properties of the encoded developmental gene regulatory networks.

The book is reader-friendly, with good headings and brief introductory paragraphs providing the overview to the chapter. Abundant illustrations are detailed, but easy to read and convey essential facts, effectively complementing the text. The discussion is maintained on two different levels, making the book a perfect educational textbook and at the same time providing valuable in-depth information for experts in the field. Each chapter concludes with an extensive list of references to peer-reviewed literature to support further reading. This more-than-400-page book can be highly recommended to a wide range of readers interested in genomics and genomic control mechanisms.

The authors Isabelle S Peter and Eric H Davidson should be congratulated on a very valuable work. This excellent book will be a leading reference for the genomic control process for years to come.

CONFLICT OF INTEREST

The authors declare no conflict of interest.

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