



Molecular Biology: Principles of Genome Function

By Nancy Craig, Orna Cohen-Fix, Rachel Green, Carol Greider, Gisela Storz, Cynthia Wolberger

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Molecular Biology: Principles of Genome Function offers a fresh, distinctive approach to teaching one of today's most fascinating scientific subjects. Its perspective reflects the challenge of teaching a subject that is in many ways unrecognizable from the molecular biology of the 20th century--a discipline in which our understanding has advanced immeasurably, but about which many intriguing questions remain.

FEATURES:

- * **A focus on underlying principles**--rather than an attempt to offer exhaustive detail--equips students with a robust conceptual framework to which they can add further details from the vast amount of scientific information available today.
- * **An emphasis on the commonalities** that exist between bacteria, archae, and eukaryotes--along with coverage of their differences--provides an accurate depiction of our current understanding of the conserved nature of molecular biology and the variations that underpin biological diversity.
- * **An integration of key themes and concepts** demonstrates how molecular phenomena like chromatin modification and RNA silencing have diverse impacts on genome function. It also helps students to appreciate molecular biology as a unified discipline, with many components and phenomena acting in concert.
- * **Clear demonstrations of the experimental basis of molecular biology (set off in the text in "Experimental Approach" panels)** reflect the central importance of experimental evidence to furthering our understanding of molecular biology. These panels describe pieces of research that have been particularly valuable in elucidating different aspects of the discipline.
- * **Pedagogical features** including full-color, custom-drawn artwork; end-of-chapter summaries; suggested readings grouped by topic; and an extensive glossary of key terms further enhance the text.

* **An extensive Companion Website** features additional materials for both instructors and students. **For adopters of the text:** figures from the book, available to download for use in lectures, and "Journal Club," suggested research papers and discussion questions linked to topics featured in the book. **For students and instructors:** "New and noteworthy"--key highlights from the field, updated for the start of each semester--and a library of three-dimensional models of key molecular structures featured in the book.

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Editorial Review

Review

"Concise and current. A great text for undergraduates." --Steve Wright, Carson Newman College

"Provides a current, comprehensive, and balanced approach on the topic of molecular biology. The organization of the topics, artwork, and presentation of the material are all very well done. The organization of the chapters allows the instructor to present the material at various levels of detail suitable to the background of the students." --Rey Sia, Brockport College

"Clearly summarizes the core information of contemporary molecular biology. Explanations are clear and straightforward, nicely balancing prokaryotic and eukaryotic material. The explosion of genomic information could overwhelm any student (or author), but the authors build a coherent framework for understanding molecular biology with its consistent focus on the regulation of gene expression, providing a unifying theme for the book." --Chris Cole, Morris University

"An engaging textbook that is both thorough and interesting; a rare thing today with textbooks that read like encyclopedias and dictionaries." --Doug Burks, Wilmington University

About the Author

Nancy L Craig received an AB in Biology and Chemistry in 1973 from Bryn Mawr College, Pennsylvania. She received her PhD in Biochemistry in 1980 at Cornell University, where she worked on the role of RecA function in the lysogenic induction of bacteriophage lambda. During postdoctoral work at the National Institutes of Health in Bethesda, Maryland, from 1980-1984, she studied the mechanism of bacteriophage lambda site-specific recombination. In 1984, she joined the faculty at the University of California San Francisco and began her studies of the transposition of the bacterial transposon Tn7. She spent a sabbatical in 1989-1990 with Allan Spradling at the Carnegie Institution of Embryology studying P element transposition in *Drosophila*. In 1991, she moved to The Johns Hopkins University School of Medicine in Baltimore, where she is a Howard Hughes Medical Institute Investigator and a Professor in the Department of Molecular Biology and Genetics, and continues her studies on Tn7 transposition. Orna Cohen-Fix graduated from the Tel Aviv University, Israel in 1987 and received a PhD in biochemistry with Zvi Livneh at the Weizmann Institute of Science, Israel, in 1994. After a post-doctoral fellowship at the Carnegie Institution of Washington with Doug Koshland she moved to the National Institute of Diabetes and Digestive and Kidney Diseases where she is now a Senior Investigator. Her research focuses on two main topics: cell cycle regulation and nuclear architecture, using budding yeast as a model organism. Rachel Green graduated in chemistry from the University of Michigan in 1986 and then completed her doctoral work in biological chemistry in 1992 with Jack W Szostak at Harvard University studying catalytic RNA. She then did postdoctoral work in the laboratory of Harry F Noller at the University of California, Santa Cruz, studying the role played by the ribosomal RNAs in the function of the ribosome. She is currently a Professor in the Department of Molecular Biology and Genetics at The Johns Hopkins University School of Medicine. Her work continues to focus on the mechanism of translation. Carol W Greider received a BA from the University of California at Santa Barbara in 1983. In 1987, she received her PhD from the University of California at Berkeley where she and her advisor, Elizabeth Blackburn, discovered telomerase, the enzyme that maintains telomere length. In 1988, she went to Cold Spring Harbor Laboratory as an independent Fellow and remained as a Staff Scientist until 1997, when she moved to The Johns Hopkins University School of Medicine. She is currently a Professor and Director of the Department of Molecular Biology and

Genetics and her work focuses on telomerase and the role of telomeres in chromosome stability and cancer. She is a member of the US National Academy of Sciences and is the winner of the 2006 Lasker Award for Basic Medical Research with Elizabeth Blackburn and Jack Szostak for the discovery of telomerase. Gisela Storz graduated in biochemistry from the University of Colorado at Boulder in 1984 and received a PhD in biochemistry with Bruce Ames at the University of California at Berkeley in 1988. After postdoctoral fellowships with Sankar Adhya and Fred Ausubel, she moved to the National Institute of Child Health and Human Development where she is now a Senior Investigator. Her research is focused on understanding gene regulation in response to environmental stress as well as elucidating the functions of small regulatory RNAs. Cynthia Wolberger received her undergraduate degree in Physics from Cornell University in 1979 and a doctorate in Biophysics from Harvard University in 1987, where she worked with Stephen C Harrison and Mark Ptashne on the structure of a phage repressor bound to DNA. She went on to study the structures of eukaryotic protein-DNA complexes as a postdoctoral fellow in the laboratory of Carl O Pabo at The Johns Hopkins University School of Medicine in Baltimore, Maryland, where she is now Professor of Biophysics and Biophysical Chemistry and Investigator in the Howard Hughes Medical Institute. Her research focus is on the structural and biochemical mechanisms underlying combinatorial regulation of transcription.

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