*Molecular Biology of the Cell** and *Molecular Biology of the Cell: A Problems Approach*[+]

***By Bruce Alberts, Alexander Johnson, Julian Lewis, Martin Raff, Keith Roberts and Peter Walter**

[+]By Tim Hunt and John Wilson

Reviewed by Bernhard Haubold, Fachhochschule Weihenstephan, Germany

The success of an academic discipline has a lot to do with the attractiveness of its founding ideas and discoveries. These in turn reach the next generation of practitioners through textbooks. Three years after the completion of the Human Genome Project, it is safe to say that molecular cell biology is a success story. The fourth edition of its premiere textbook, *Molecular Biology of the Cell* (*MBoC*), has been out for some time now (it was published in 2002), but it is still well worth drawing attention to this marvellous teaching device.

What is your favourite discovery in molecular biology since you last studied the subject at school or university? My list includes the realisation in the late 1990s that non-coding RNA plays a central role in cell regulation, the high-resolution 3D structure of ribosomes in 2001, and the first draft of the sequence of the human genome in 2001. All three topics are dealt with in *MBoC*. In fact, genomics is treated in several places, starting on the cover, which shows a portion of the human genome sequence.

Apart from its comprehensiveness, *MBoC* is crammed with attractive illustrations embedded in clear and carefully paced explanatory prose. This feature makes the book useful for readers with diverse levels of proficiency. For example, the panels summarising the chemical constituents of cells are useful for students preparing for university entry exams, whereas the chapter on cancer contains a lot of material that will be news to all but the experts in the field.

All of this richness is distributed over four parts containing 25 chapters and adds up to a tome comprising substantially more than 1,500 pages. If you find books of this size too heavy to carry, let alone read, fear not, for you can turn to the abridged version of *MBoC*, published as *Essential Cell Biology* by the same team of authors as the parent volume.

There is a strange paradox about good textbooks, however. The easier they make it for the reader to assimilate complex new ideas, the more they distort the process by which the discoveries presented on their glossy pages were actually made. And it is this process of discovery, which is usually nothing but anarchic, that is at the heart of the attraction of the natural sciences.

For this reason, Tim Hunt (2001 Nobel laureate) and John Wilson have written a companion book to *MBoC*: *Molecular Biology of the Cell: A Problems Approach*. The book consists of 1,389 problems supplementing chapters 1-8 and 10-18 of *MBoC*. In addition, it contains detailed answers to half of the problems; the answers to the other half are available to instructors from the publisher without fuss. As Hunt and Wilson write, their problems can be read as a "running commentary on *MBoC*". They range from simple true/false questions to concise presentations of the decisive data contained in classical research papers. An example of a typical true/false statement is "Since introns are largely genetic 'junk', they do not have to be removed precisely." As to research, the beautiful experiment by Meselson and Stahl published in 1958, which established the semi-conservative nature of DNA replication, serves as the basis for several problems. In addition, there are also a large number of problems designed to test the reader's ability to perform the kind of order of magnitude estimations

expected of working cell biologists. For example, how long are the DNA molecules contained in the nucleus of a single human cell? (Answer: roughly 2 m.) Such computations are never mathematically challenging, but always biologically illuminating.

MBoC is a prime example of what a good textbook in the biological sciences should be: comprehensive, vivid and up-to-date. However, it is Wilson and Hunt's companion volume that makes *MBoC* truly special. Whether you are looking for interesting class problems or just wish to test your own understanding of cell biology, *The Problems Approach* is the closest you can get to experiencing the excitement of research without exchanging the safety of your armchair for the vagaries of the laboratory.

Details

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The Third Man of the Double Helix

By Maurice Wilkins

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In this autobiographical book, Maurice Wilkins presents the chronological story of the discovery of DNA structure in 1953. As *The Third Man of the Double Helix*, Wilkins is well placed to describe the complex scientific background and people involved in the breakthrough that earned him and fellow scientists Francis Crick and James Watson the 1962 Nobel Prize in Physiology or Medicine.

Since it is an autobiography, Wilkins puts himself in the centre by stressing his own point of view. Disturbed by concerns that Rosalind Franklin was not given the credit she deserved for her part in the discovery, he states in the preface that "this book is in some way my attempt to respond to these questions, and to tell my side of the story." And that is precisely what Wilkins does, presenting his viewpoint while including his own shortcomings and those of others who worked for decades on the question of how the cell copies genetic information.

The title suggests a rather exciting detective story, but the book starts off at a much slower pace by leading the reader through the author's family tree. It takes some patience not to skip this first chapter completely. By chapter two, Wilkins has begun to describe his educational background, painstakingly building up the story to make the reader understand why he worked for some time on the development of the atomic bomb in Berkeley, California, in the early 1940s. Finally, he describes the research team under Professor Randall at King's College, London, also called 'Randall's Circus'. From then on, *The Third Man* evolves and keeps the reader in suspense. The book ends with the very simple conclusion that if Wilkins and Rosalind Franklin had been a more compatible team, they would have found the solution to the DNA structure much earlier.

This historic event is an excellent example of the necessity of teamwork across science subjects, interdisciplinary exchanges and group co-operation. With today's competition for research funding, it is even more difficult to work selflessly for the common good. Wilkins' message is to focus first on the idealistic advancement of science and to put one's own fame on the backburner. Students need to learn to work co-operatively in groups, to gain knowledge from each other and to accept other opinions. Creative criticism leads to discussions and these might lead to solutions.

The Third Man of the Double Helix would appeal to teachers and high-school students of biology. However, to get the full picture of this landmark discovery, one should also read Jim Watson's book *The Discovery of the Double Helix* and Brenda Maddox's *Rosalind Franklin*.

The historic relevance of all three books is especially important for younger teaching faculty who were not contemporary witnesses to this period of scientific progress.

Details

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