Book Review

Review of 'Cell Cycle Control'

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Tel: 252 744 2704; Fax: 252 744 3104; E-mail: mccubreyj@mail.ecu.edu*Cell Death and Differentiation* (2005) 12, 1636–1637. doi:10.1038/sj.cdd.4401749**Cell Cycle Control, Mechanisms, and Protocols.** By T Humphrey and G Brooks. Humana Press, Totowa, New Jersey, USA: 2005, pp 402. ISBN: 1-59259-857-9. \$ 89.50

The book 'Cell Cycle Control' edited by Tim Humphrey and Gavin Brooks is very well structured into three main sections. Section one contains a series of reviews on the cell cycle in various organisms. The second section details some of the key experimental methods used to analyze the cell cycle. Lastly, the chapters in section three are dedicated to the introduction to various techniques used in the detection/monitoring of the molecules that control the cell cycle machinery.

The reviews in the first section are arranged in order starting with the 'relatively' simple cell cycle in yeast and ending with the more complex mammalian cell cycle. The chapters in the first section are all very well written. The authors have done a good job detailing all the key stages of the cell cycle in a clear manner using pictorial representations. One is left with the feeling that the authors have focused in making chapter 1 as understandable as possible. In the process, there is an impression that the authors fall short of providing some of the newest findings in the field. On the contrary, chapter 3 that deals with cell cycle in *Caenorhabditis elegans* is extremely up-to-date. This chapter describes some of the results from the latest studies. One of the key features of this chapter is the manner in which the authors present the details of experiments using the conventional mutant embryos and the latest RNAi techniques. Overall, it should be remembered that the understanding of cell cycle control has been an area of intense investigation for a number of years as it controls a variety of cellular functions in addition to cell proliferation, such as infections by some viruses. Accordingly, the field of study is rapidly advancing making it difficult for the authors to encompass the field in its entirety. The editors and authors of this book have done a very good job in this regard. There is a review for each of the main types of organisms (including plants) used to carry out cell cycle studies and thus the book provides a very good reference for anyone interested in learning more about this field.

In section two of the book, methods and techniques are provided to study the cell cycle. For example, chapter 7 is on synchronizing the cell cycle, a valuable technique for any investigator studying the cell cycle. Also included in this section is a chapter for mapping the origins of DNA replication in eucaryotes. While this technique is not a necessity for

everyone studying the cell cycle, it is a valuable addition to the book. Over the last decade, magnetic beads have been extensively used in separating and isolating cells, DNA, and specific proteins. In chapter 10, the author describes a technique that utilizes magnetic beads to sort and concentrate cells expressing specific marker proteins to analyze the effects of transfecting short hairpin RNAs. These sorted cells can then be tested by various biochemical assays as Western blotting, Northern blotting, FACS, and others to monitor cell cycle. This technique is novel and a welcome addition to the text as this technique can be used in cases where the transfection efficiency may be too low for a particular analysis.

Chapters 11 and 12 of section two elaborate on various techniques in general that can be utilized to analyze cell cycle with respect to virus infection and analyzing proteins or protein–protein interactions by NMR and crystallography. The techniques described in these chapters are very standard to the fields of virology and protein chemistry, respectively. However, the highlight of these chapters is that they are penned by some of the experts in their fields. This makes it worth the reading as they have provided modifications for each technique based on their research. One of the best examples is in the protocol for purifying CDK2 and cyclin A3 proteins to study their interactions. The authors suggest technical ways to avoid inclusion body formation by both untagged or His-tagged CDK2 expression in *Escherichia coli*. Such information is not generally provided in most texts.

Section 3 of the book is also a methods section that blends with the second section of the book. For example, chapter 12 of section two contains a detailed method on the preparation of protein complexes that regulate the cell cycle, while chapter 16 in section three examines measuring the activity of these complexes. Any relevant text will definitely have a chapter on cell cycle as it is one of the integral spokes in cell biology; and there will definitely be a section describing various methods to detect or monitor cell cycle. This section, however, will often include just the names of various techniques used, or at the most provide an outline of the techniques. This section and the proceeding section of 'Cell Cycle Control' provide every aspect of the specific experiments in minute detail and thus making a huge difference.

Overall, the book is well written and the methods section provides sufficient detail to perform the techniques listed in chapters 2 and 3. The strength of the book is its comprehensive reviews of the cell cycle in many different organisms. This also leads to a slight weakness in the text as well. In this regard, in sections two and three of the book, one technique might be applicable in yeast while another technique was aimed more towards mammalian cells. Thus, depending on the specific organism, a person's studies, there may be technical gaps in the text. To try and cover all the organisms would have been nearly impossible for a book of this size; however, section two and three could have focused the technical section on one particular organism such as plants or yeast and left the other organisms for a subsequent text. Overall, this book will be very useful in labs that are working on cell cycle or that have plans to do so in the future because each and every experiment required to probe some of the difficult aspects of cell cycle is provided in this methods and scientific overview text. The editors and contributors have

done a very good job of presenting the material in a clear manner and have provided the reader with a very good background on the subject. After all, any text that provides methods and techniques will only make sense if the person who is referring to it has a thorough understanding of the subject matter. This book is strongly recommended to anyone who is in or above the level of graduate school. We are convinced that the reading and understanding of this book will give the person a better understanding of the cell cycle, irrespective of the subfield of biology they may be in.

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