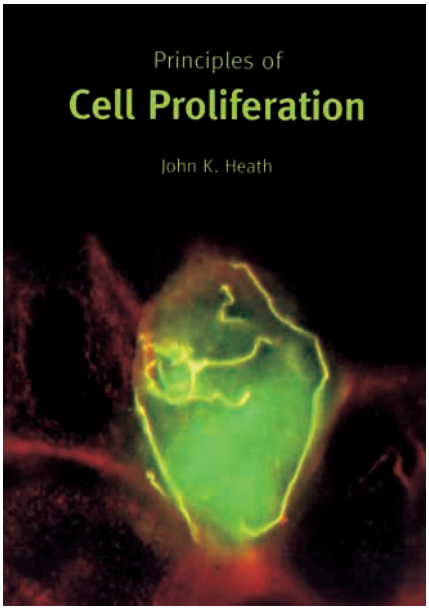
## Principles recycled




### Principles of Cell Proliferation

**by John K. Heath**

Blackwell Science (2001) 137 pages. ISBN 0-632-04886-7
£22.50

To those in the know, cell cycle control and cell proliferation couldn't be simpler: ligand meets receptor, fluid membranes lubricate dimeric coupling and, before you know where you are, the pitter-patter of tiny pseudopodia. You would expect an average undergraduate to get the main points into an essay, particularly if it was 130 pages long. Indeed *Principles of Cell Proliferation*, aimed at biology students, does mention most of the key points in a logical sequence, commencing with the cell cycle and moving on to intracellular signalling pathways, oncogenes and tumour suppressor genes. Furthermore, a genuine effort has been made to keep the story simple by using minimalist diagrams. Nevertheless, the reader faces a major challenge in dissecting the facts from the errors (typographical, linguistic and scientific) that wallow in a text imbued with all the dreadful clumsiness of a struggling first-year student. The Preface acknowledges a colleague for having given the book a 'stylistic workover'. The remit implied by this televisual phrase evidently did not include critical editing.

A consequence for the reader is that even simple concepts are obfuscated. One of many examples is the existence of multiple tyrosine residues as potential phosphorylation sites in the cytoplasmic domains of receptor tyrosine kinases. This does not emerge from the text and, despite the effort to produce simple diagrams, none show this key point. Equally confusing is the general introduction to G proteins that includes the unqualified statement that GTP binding induces G proteins to dissociate from ligand-occupied receptors. Subsequently RAS and proteins that promote GTP binding to RAS are introduced but without reference to the foregoing. In the section on tumour suppressor genes we read that p53 was 'found to interact also with the DNA viral oncogenes encoded by the human papilloma viruses.' Presumably this refers to p53 binding to E6 - but what are students to make of this gibberish?

The lack of clarity in both text and sketches is compounded by factual errors too numerous to list fully (e.g. neurofimbrin rather than neurofibromin, *neu* isn't HER-2, cytochrome c is not an outer membrane protein), together with variable nomenclature throughout. The precise form used for genes and proteins matters less than consistency, but here names vary within the text and between text and figures. More confusing still are figures including information not mentioned in the accompanying text - to say nothing of the one showing a northern blot that not only appears to have had a nasty accident but, being completely devoid of annotation, is utterly meaningless.

Things are further obscured by the author's obsession with protein structures. I took the goobledegook of 'The catalytic function of the tyrosine kinase domain has been powerfully informed by determination of the three-dimensional structure of the FGFR1 and insulin kinase domains' to mean that resolution of structure has told us a lot about receptor tyrosine kinase function. In fact it's difficult to think of an example of the resolution of a protein structure that has told us anything we didn't know already from biochemical data. The inclusion of no fewer than 14 ribbon structures certainly exceeds the optimum for these fashion accessories by… well, 14! This would still be true if the structures were the usual colour-coded variety in which you can at least make out the key bits. Here they are half-tones, and their contribution ranges from negligible to verging on the comical (e.g. VEGF and its receptor, evidently generated by a photo-copier on the blink, looking like an aerial view of Clapham Junction).

So, despite the use of 'clear' (or 'clearly') on average every 3.5 pages, *Principles of Cell Proliferation* is dogged rather than lucid, its weaknesses being evident as early as the front cover, about which one unavoidably muses why oh why, when there are so many stunning colour pictures available of cells dividing etc., does it show a lightning strike in the primordial pea-soup?

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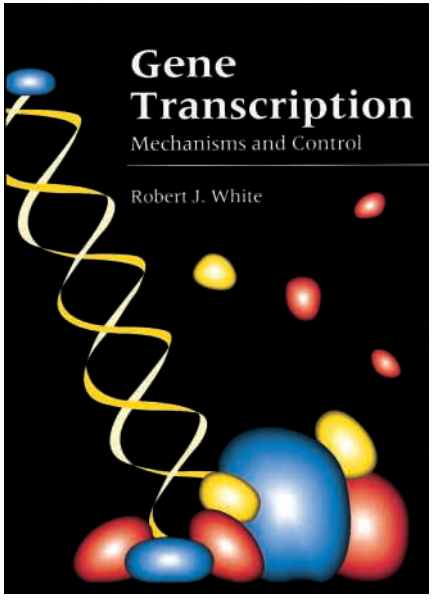
## A launch pad to gene transcription

### Gene Transcription: Mechanisms and Control

**by Robert J. White**

Blackwell Science (2001) 273 pages. ISBN 0-632-04888-3
£29.50

The study of transcription and its regulation must be one of the most rapidly progressing fields in modern molecular biology. It seems that advances are made on a weekly basis, with pivotal discoveries appearing with phenomenal regularity and frequency. It is a daunting task to attempt to write a definitive text on this dynamic field. However, Bob White has set out to achieve this aim in his new text book *Gene transcription*. A minor quibble is that a more accurate title would be 'Gene transcription in eukaryotes' since the space constraints, by the authors own admission, forced him to restrict his work to an analysis of the vast body of work available in eukaryotes.




The author divides this subject into 14 chapters. The book begins with an elementary summary of core molecular biology and then plunges into a chapter covering the intricacies of the structure and function of eukaryotic nuclear RNA polymerases. This is followed by a chapter containing a discussion of the various DNA-binding modules present in eukaryotic transcription factors. The subsequent two chapters focus on the mechanism and regulation of RNA polymerase II transcription. In a logical and easily followed progression, the author describes the molecular interplay between the general transcription factors leading to the recruitment of RNA polymerase itself and then reveals the mechanisms by which gene-specific regulators can impinge, either directly or via co-factors, upon the basal machinery. The RNA polymerase I and III systems are then discussed.

Having set the stage and introduced the principal players, the author embarks on a discussion of the fundamentally important interplay between the transcription machinery and chromatin. Regulation of the regulators is the topic of the next three chapters, followed by a description of how transcription is regulated during the cell cycle. The penultimate chapter describes the growing body of data revealing how transcription is integrated with other nuclear events, such as RNA processing and DNA repair. Finally, the key role of transcription in controlling developmental processes is discussed.

Throughout, this book is eminently readable and flows readily over the vast array of data available on the regulation of eukaryotic transcription. The breadth of coverage accurately reflects the innate complexity of the subject matter; yet the appropriate use of examples allows the reader to grasp the underlying principles. An excellent feature is the critical description of the techniques employed to analyse events in the regulation of transcription, ranging from gel shift and footprinting assays to chromatin immunoprecipition. These techniques are described in boxes separated from the main text, meaning that readers already familiar with the techniques do not have to wade through unnecessary detail. The book is well supplied with diagrams cartooning the various processes being described. These are generally a useful aid to interpretation, although the monochrome representations of some of the many crystal structures depicted are poorly reproduced and can be rather hard to interpret.

So does this work ‘demystify the subject’ of eukaryotic transcription? Largely, I feel that it does. It is an inevitable consequence of the time between writing and publishing of any book on such a rapidly developing field that significant recent advances will not be included. In this respect, it is a shame that the recent development of a high-resolution model of RNA polymerase II structure and elucidation of the function of TBP homologues in developmental processes and *Drosophila* RNA polymerase III transcription are not included. However, given these temporal limitations, this book supplies an excellent, comprehensive analysis of the recent state of transcription research. It is aimed at an advanced undergraduate/postgraduate audience and hits the mark almost perfectly. Basic principles are well described, appropriate examples are used and a selective bibliography provides a good launch pad to the experimental literature. This book can definitely be recommended to students with an interest in transcription and the cash to spare. In addition, the work provides a valuable reference volume and course framework for those of us involved in teaching this fascinatingly complex subject.

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