

Book Review

doi:10.1017/S0016672307008671

From a to α . Yeast as a Model for Cellular Differentiation. H. Madhani. Cold Spring Harbor Laboratory Press, 2007. 108 pages. ISBN-13 978-087969738-9. ISBN-10 087969738-5. Price \$39. (paperback)

To researchers working on yeast today, the idea that what we will learn will likely hold important clues as to how things work in multi-cellular organisms is second nature. This book agreeably affirms this notion with the demonstration that many concepts derived from studies on yeast are applicable to the specification of cell type in more complex systems. Dr. Madhani describes mechanisms of cellular differentiation in the budding yeast *Saccharomyces cerevisiae* with simple clarity and draws on examples from humans and other systems to illustrate the parallels. The book is written in a straightforward, narrative style and sets out the main facts, excluding the experimental evidence or attention to unnecessary details. The main text is punctuated with uncomplicated figures and boxes highlighting related concepts. These features make for very easy and enjoyable reading.

The book is divided conceptually into 9 chapters. The over-riding theme of the book is based on the ability of *S. cerevisiae* to exist in two haploid states (or mating types, called *a* and α , hence the book's title) that can mate to form a diploid (called *a/α*). The transcriptional circuits that distinguish the *a*, α and *a/α* cell type are discussed, as are the cell-type specific signals that are generated by haploids and the molecular response that results in mating and cell fusion. Also covered is the ability of haploid yeast cells to "switch" their mating type and the associated mechanism of gene silencing, the discovery of which

has been particularly informative in understanding development by epigenetic regulation in other systems. The book also touches on the determination of cell polarity in yeast and the evolution of genetic circuitry, giving us a glimpse of how work on yeast is likely to continue to lead the way in the future.

Notably missing from the book is an in-depth description of the two kinds of cellular differentiation known to be available to diploid *S. cerevisiae* cells, namely meiosis and pseudohyphal growth. The differentiation of a diploid yeast cell to genetically diverse haploid spores during meiosis is a fitting model for gametogenesis in other organisms, but was not covered in any molecular detail. Similarly, the switch of diploid cells into pseudohyphal growth during nitrogen starvation and associated change in cell shape is a true differentiation event that deserved more attention. Rather than negatively impacting the quality of this book, however, these omissions left me wishing that these topics were covered with the same clarity and simplicity as the rest of the book.

Overall, this is an excellent account of the mechanisms and concepts involved in the cellular differentiation that accompanies mating in yeast. It is very pleasurable to read and should appeal both to beginners and established yeast researchers. Furthermore, it could be beneficial for researchers working on other systems. As demonstrated very convincingly by Dr. Madhani, what we learn from yeast is likely to continue to offer some hints for our understanding of cellular differentiation in more complex systems.

ADELE MARSTON

*The Wellcome Trust Centre for Cell Biology
School of Biological Sciences
The University of Edinburgh*