

Dartmouth College

Dartmouth Digital Commons

Dartmouth Scholarship

Faculty Work

1-1-2005

Discovering Cell Mechanisms: The Creation of Modern Cell Biology

Michael Dietrich
Dartmouth College

Follow this and additional works at: <https://digitalcommons.dartmouth.edu/facoa>



Part of the [Biology Commons](#)

Dartmouth Digital Commons Citation

Dietrich, Michael, "Discovering Cell Mechanisms: The Creation of Modern Cell Biology" (2005). *Dartmouth Scholarship*. 51.

<https://digitalcommons.dartmouth.edu/facoa/51>

This Book Review is brought to you for free and open access by the Faculty Work at Dartmouth Digital Commons. It has been accepted for inclusion in Dartmouth Scholarship by an authorized administrator of Dartmouth Digital Commons. For more information, please contact dartmouthdigitalcommons@groups.dartmouth.edu.

also separated, and while this is not a volume that is likely to be read from cover to cover, the ordering could have been more logical. Nevertheless, there are some very good chapters (for example, on cGMP signaling) and the book also discusses important aspects such as nitrosylation, although this last chapter is disappointingly brief. The latter part of the volume is concerned with the role of nitric oxide in controlling gene expression, with a final chapter on tumor biology.

For an in-depth discussion of certain aspects of nitric oxide in mammalian systems, this is a very good book to read, with the excellent referencing that will allow for expanded further reading. However, for anyone looking for an introduction to nitric oxide biology, or for information on nitric oxide in other biological systems, this is unfortunately not the place to start.

JOHN T HANCOCK, *School of Biosciences, University of the West of England, Bristol, United Kingdom*



CELLULAR BIOLOGY

DISCOVERING CELL MECHANISMS: THE CREATION OF MODERN CELL BIOLOGY. *Cambridge Studies in Philosophy and Biology*.

By William Bechtel. Cambridge and New York: Cambridge University Press. \$75.00. xii + 323 p; ill.; index. ISBN: 0-521-81247-X. 2006.

In the decades following World War II, biologists explored the "terra incognita" of the cellular interior. Bechtel's masterful history of these decades documents not only the impact of new technologies, such as the centrifuge and electron microscope, but charts the emergence of cell biology as a discipline. With his focus on research concerning membranes, mitochondria, ribosomes, and golgi bodies, the author argues that what makes the history of modern cell biology distinctive is not the search for grand unifying theories, but rather the discovery, articulation, and analysis of cellular mechanisms.

Bechtel's historical chapters are introduced by an important discussion of mechanisms. He argues for the central role of mechanisms in biological explanations. Indeed, his analysis of the decomposition of biological systems and the process of localizing the operations of its parts provides the philosophical foundation for the history of cell biology that follows. The creation of centrifugation and electron microscopy as credible tools, for instance, is explained in terms of their reliability as guides to dis-

covering component parts of cellular systems and then elucidating their operations. This process required separating fact from artifact through a confluence of results from centrifugation regimes, electron microscopy, and other techniques.

Discovering Cell Mechanisms offers the first detailed history of cell biology in the postwar period. As such, this book makes a very important contribution to our understanding of the history of modern cell biology. At the same time, Bechtel's informed and insightful analysis challenges us to reconsider the significance of the search for mechanisms in experimental biology.

MICHAEL R DIETRICH, *Biological Sciences, Dartmouth College, Hanover, New Hampshire*

LEUKOCYTE TRAFFICKING: MOLECULAR MECHANISMS, THERAPEUTIC TARGETS, AND METHODS.

Edited by Alf Hamann and Britta Engelhardt. Weinheim (Germany): Wiley-VCH Verlag GmbH. \$255.00. xl + 517 p; ill.; index. ISBN: 3-527-31228-5. [CD-ROM included.] 2005.

This book is a comprehensive overview of leukocyte trafficking research, and the editors have assembled experts to discuss each topic in the context of five sections that revolve around one unifying theme: understanding the multistep cascade of leukocyte-endothelial interactions. The 23 chapters present an analysis of the field in a meticulous fashion, initially providing readers with a thorough explanation of molecular components, followed by a logical progression to physiological mechanisms in whole animal models, application to human medicine, and methodology. Included are a number of useful color illustrations and a CD-ROM that contains digital movie files that demonstrate experimental approaches discussed within the text of specific chapters. The digital movie files are an invaluable resource to fully appreciate the dynamic nature of the immune system.

The first chapter, appropriately written by Eugene Butcher, is a historical perspective of the multistep paradigm for leukocyte trafficking that provides a framework by which the subsequent chapters build upon. The first part of the book provides essential background to understand the molecular components used by leukocytes to navigate through the vasculature, focusing on two key players: adhesion molecules and chemokines. Once the molecules that mediate leukocyte trafficking are defined, Parts II and III move readers forward into the bigger picture, namely understanding how combinatorial diversity of adhesion molecules and chemokines can be integrated into physiological mechanisms. The next part has a translational emphasis, and contains two chapters that discuss mo-