Book Reviews

Peptide Hormone Action—A Practical Approach. Edited by K. Siddle and J. C. Hutton (University of Cambridge). Oxford University Press: Oxford. 1990. xix + 256 pp. $78.00. ISBN 0-19-963070-4.

The stated purpose of this book is to provide both the underlying principles and the experimental protocols for examining the actions of peptide hormones. The actions covered are primarily those of interest to a biochemist, with particular emphasis on the receptor and the second messenger systems. This is an admirable task, especially considering the ever increasing number of hormones and their diverse biochemical, pharmacological, and biological actions. This book does a good job of presenting the experimental protocols in a number of areas of interest to biochemists, endocrinologists, pharmacologists and others interested in examining the actions of peptide hormones at receptors and the subsequent second messenger events that accompany peptide hormone–receptor interactions. It does a less adequate job of discussing the underlying principles and placing the methodologies discussed in a larger context, or in critically evaluating the various methodologies discussed, their strengths, and their limitations. This reviewer would also have liked to have seen a more careful evaluation of the circumstances under which one can utilize a particular method, and those in which the method or protocol is less likely to succeed. In many cases, the methodologies or protocols that are given are simply presented without any comment regarding their pitfalls, limitations, or difficulties. Whereas this may not be a serious drawback for someone already in the field who is going to be trained in the various methodologies and is knowledgeable about the chemistry and physics that underlie many of the protocols discussed, it will often make it difficult for the "newcomer" or someone else who becomes interested in some new aspect of the field to enter with a critical view of the many outstanding developments in this area and the serious problems that still remain.

Despite these general criticisms (which by the way do not apply to every topic), this is potentially a very useful book that provides immediate access to the myriad of chemical, physical, and analytical methods available to the modern scientist interested in peptide hormone action. The chapters covered include the following: (1) Peptide hormone receptors; (2) Receptor characterization; (3) Cyclic nucleotides; (4) Cytoplasmic free calcium, measurement and manipulation in living cells; (5) Inositol phosphate second messengers; (6) Lipid-related second messengers; and (7) The insulin receptor tyrosine kinase. Considering the multiple authorship, the general organization of each chapter is quite similar, with an emphasis on the "hands on" aspects of each topic. Specific applications are mentioned and in some cases discussed. Selected references to the literature are provided for the reader who needs more comprehensive information. The book is printed in hardback form, but with a binder format which makes it particularly practical at the bench. Indeed this is where this book will be used most frequently.

This is a good book that will find wide use.

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Periodic Precipitation. By Heinz K. Henisch (Pennsylvania State University). Pergamon Press: New York. 1991. xiv + 122 pp. $41.00. ISBN 0-08-04276-3.

This is the third of Henisch's books on crystallization and periodic precipitation (*Crystal Growth in Gels* (Pennsylvania State University Press, 1970) and *Crystals in Gels and Liesegang Rings* (Cambridge University Press, 1988) being the other two). While the other two monographs describe the physical phenomena, this book concentrates on the microcomputer modeling of the processes.

The basic phenomenon of interest is the formation of bands as a result of the interaction between diffusion and precipitation. These structures form mainly because precipitation (or crystallization) is autocatalytic and because big particles can grow at the expense of small particles. Due to the autocatalytic feed back, the process is complex making an analytical approach virtually impossible; hence, one turns to the computer to get some insight.

The first chapter is a very brief introduction to periodic precipitation and the mathematical description of the processes involved. Readers who are not familiar with Liesegang rings and related phenomena will have to look through the references and the previous two books by the author in order to see the broader scope and the context of this topic. Though this chapter is clearly written, it has many typographical errors (we noted 12 errors in this chapter of 16 pages). The rest of the chapters do not seem to contain as many obvious errors.

The remaining five chapters are a steady progression of the computer algorithms. The algorithms are for (i) binary systems in which two species A and B diffuse and precipitate under certain conditions and (ii) monomers that condense as the solubility changes. They include diffusion and an idealized version of drift due to electric fields. The language used in the examples is True BASIC. This should be very useful to anyone with a good background in nucleation, crystal growth, and kinetics but who has little experience in computer modeling. An author notes: "Another of its cardinal virtues is that its code (albeit not on the same disk!) will run on Macintosh as well as IBM compatible machines" (page 6). All the algorithms are for a one-dimensional system. At each stage, checks are made to see if the algorithm is doing what is expected of it. The limitations and pitfalls of the algorithm are also carefully pointed out.

In Chapter 2, the algorithms for diffusion are introduced. Here, algorithms for Fick's law and modifications of it, such as position and concentration dependent diffusion, are developed. Chapter 3 deals with nucleation algorithms. In this chapter, the reader begins to see the autocatalytic effects of nucleation, but a more detailed picture appears in Chapter 4. Chapter 4 shows how the algorithm produces bands of precipitate; these bands are dynamic and show a very complex behavior. Some stochastic aspects of nucleation and growth are also introduced in this chapter.

Having developed algorithms that include most of the important physical processes, the author turns to "computer experimentation" in Chapters 5 and 6. This "experimentation" is basically an exploration of the parameter space to see the complex behavior of this system. The parameters varied are diffusion constants, precipitation thresholds, and solubility products, among others. Chapter 5 deals with binary systems. Here, one can see complex behavior, but it is not clear what phenomena observed on the computer have been experimentally observed. Chapter 6 is where the programmer begins to see more complexity and even some chaotic behavior.

While such computer experimentation may be a lot of fun, the units used in these computer programs are not directly related to the real world; thus, the user of this program does not know the time and length scales of the pictures on the computer screen. "Their translation into absolute real-world terms is another matter, always possible in principle, but frequently cumbersome" says the author (page 35). "The purpose of the exercise" the author explains, "Is in any event to study, clarify and predict modes, and not (or, at any rate, not necessarily) to calculate specific features in terms of laboratory magnitudes" (page 35). We find this to be a great weakness of this book and the software that can be obtained through the order form that comes with the book. Even if the values of all the necessary constants are not known, the user should be able to enter approximate values in terms of real-world units: "Computer experiments" tend to become "Computer games" if they are not in absolute real-world terms.

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