

## REVIEWS

**Textbook of Biopharmaceutics and Clinical Pharmacokinetics.** By S. NIAZI. Appleton-Century-Crofts, 292 Madison Ave., New York, NY 10017. 1979. 332 pp. 17 × 23 cm. Price \$18.50.

The author claims that this book presents the principles needed to understand and control drug therapy with sufficient depth and breadth for the undergraduate pharmacy student.

The first chapter briefly describes the disciplines of biopharmaceutics, pharmacokinetics, and clinical pharmacokinetics and defines the scope of the book.

Chapters 2–4 concern the introduction of a drug into the body. In Chapter 2, definitions are presented and various formulation factors are described. Chemical form, ionization constant, polymorphism, solvation, complexation, particle size, and surface-active agents are mentioned. Each topic is described, and numerous examples are cited. The evaluation of dosage forms is the topic of Chapter 3. Different types of dosage forms and the various *in vitro* tests required of a dosage form are described. Bioavailability testing and evaluation also are covered. Chapter 4 describes various routes of drug administration with descriptions of numerous factors that can influence absorption.

The distribution of drugs is the subject of Chapter 5. Protein binding, tissue distribution, and volume of distribution are included. Drug excretion and metabolism are included in Chapter 6 as ways in which the body terminates drug action. Factors influencing renal, biliary, salivary, and mammary excretion are detailed and referenced. Metabolism pathways and Michaelis–Menten kinetics also are described.

Pharmacokinetic principles, with full development of numerous useful equations, are the subject of Chapter 7. One- and two-compartment plasma and urine data are treated. Administration as a bolus, infusion or absorption, single and multiple dose is included. The final sections briefly discuss nonlinear, physiologically based, and pharmacological models.

In Chapters 8 and 9, the effect of various factors on the value of pharmacokinetic parameters and the development of suitable dosage regimens for various drug classes based on the clinical status of the patient are described.

This book covers all of the topics of importance in an undergraduate biopharmaceutics and pharmacokinetics course. There are many referenced examples and tables of data given for each phenomenon discussed. Many questions are included at the end of most chapters. Although advanced material is at times given with only brief explanation, this text should serve admirably as a textbook accompanying a lecture course in biopharmaceutics and pharmacokinetics.

Reviewed by David Bourne  
Division of Pharmaceutics  
College of Pharmacy  
University of Kentucky  
Lexington, KY 40506

**Sterile Dosage Forms: Their Preparation and Clinical Application.**

2nd ed. By S. TURCO and R. E. KING. Lea & Febiger, Philadelphia, PA 19106. 1979. 456 pp. 15 × 24 cm. Price \$18.50.

This book represents an updated version of the text introduced in 1974. The major changes include the addition of a chapter on Blood and Blood Substitutes and an Appendix entitled "Hazards Associated with Parenteral Therapy." Other major revisions include six pages added to the end of Chapter 7 (Biopharmaceutic Factors Influencing Drug Avail-

ability), pages 209–225 added to the end of Chapter 8 (Large Volume Sterile Solutions), and a complete rewriting of Chapter 13 (Radiopharmaceuticals). All of these new sections are worthwhile additions, especially the discussions of hospital-based intravenous teams, flow control devices for intravenous therapy, and the work of the National Coordinating Committee on Large Volume Parenterals (NCCLVP). Another significant improvement throughout the text is the use of *numbered* references. In the first edition, it was virtually impossible to match the discussion with the *unnumbered* reference listing at the end of each chapter.

Thus, the second edition of what was a reasonably good text to begin with is improved significantly. However, I feel that a number of considerations could improve the text even further. For example, some additional discussion of parenteral stability and the fundamental equations for calculating the shelflife of various admixtures could have been added to Chapter 11 (Parenteral Admixtures and Incompatibilities). Since the book appears to be directed toward the hospital pharmacist, I believe that it is well within their spectrum of duties to have to research a stability problem. Thus, the fundamental information necessary for performing simple stability studies would have been a worthwhile addition.

In the discussion of osmolality (pp. 262–263), it is stated that 0.9% sodium chloride injection has an osmotic pressure of 308 mOsm/liter since sodium chloride *ionizes* into two ions. In fact, it is only at infinite dilution that discrete "particles" exist since in more concentrated solutions the sodium and chloride ions are not completely *dissociated*. The net effect of this incomplete dissociation is that for electrolytes such as sodium chloride, the osmotic pressure will not normally be equal to the molarity of the salt multiplied by the number of ions formed. Instead, the molarity must be multiplied by an effective concentration or "i value" (van't Hoff term), which for 0.9% (w/v) NaCl is ~1.9, thereby producing an osmotic pressure of about 293 mOsm/liter for normal saline.

The discussion of particulate matter provided in Chapter 3 is adequate. It could be improved with a somewhat expanded description of the official standards presently in effect in the United States and other countries and some further mention of the present methodology. This is an area in which hospital pharmacists have made extensive contributions, and additional discussion is warranted.

The bimolecular leaflet model of the cell membrane proposed by Danielli and Davson (p. 148) seems to have fallen into disfavor among membrane biologists and has been largely replaced by the fluid mosaic model of Singer and Nicolson. Thus, a picture of the fluid mosaic model might have been more appropriate for Fig. 7–3.

Some references in the extensive listing on pages 431–441 use *et al.*, presumably because this section is appended since this procedure was not used in earlier sections of the book. I am opposed to the use of *et al.* in reference listings since it fails to give credit to deserving cocontributors.

Finally, some typographical errors noticed are as follows: in the index (p. ix), line 4, Flow Control in I.V. Therapy starts on p. 212, not 203; the caption to Fig. 1–2 in both the first and second editions refers to Johann Daniel "Taylor", which should be Johann Daniel "Major."

In spite of these limitations and suggestions for improvement, I still recommend this text as a major contribution in the area of parenterals. It should find use as a reference work for hospital and research pharmacists and will no doubt become a required text for course offerings in pharmacy and nursing colleges. It is attractively packaged and well illustrated through the use of numerous photographic plates, and the price is reasonable in relation to other texts of comparable size.

Reviewed by James Blanchard  
Department of Pharmaceutical Sciences  
College of Pharmacy  
University of Arizona  
Tucson, AZ 85721