BASIC PHARMACOKINETICS AND PHARMACODYNAMICS

An Integrated Textbook and Computer Simulations

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PREFACE

The behavior and characteristics of therapeutic drugs vary enormously. For example, doses differ more than a thousandfold. Some drugs must be taken three times a day, others once daily, and some every month. The response to some therapies occurs immediately, whereas for others it may take days or even weeks for the response to be apparent. Some drugs must be taken with food; others must be taken on an empty stomach. Concurrent medications interact with some drugs but not with others. The study of pharmacokinetics (the dose–concentration relationship) and pharmacodynamics (the concentration–response relationship), which have been referred to as the pillars of clinical pharmacology, unlocks the mystery of this behavior and brings clarity to diverse patterns of drug action. The goal of this book is to provide straightforward, uncomplicated, but comprehensive coverage of the essentials of pharmacokinetics and pharmacodynamics. I hope the book will enable a large and diverse group of students to develop an interest in this subject and gain a better understanding of the properties and behaviors of drugs.

Basic Pharmacokinetics and Pharmacodynamics: An Integrated Textbook and Computer Simulations is an introductory textbook suitable to accompany courses in pharmacokinetics, pharmacodynamics, and clinical pharmacology in pharmacy and medical schools. It is also directed toward people in the pharmaceutical field who want to gain an understanding of this area through self-study. The book is organized and written with several objectives in mind. First, as an introductory textbook, the intent is to present the material in as simple a way as possible, without compromising the accuracy and scope of the material. I think it is important that students not be overwhelmed during their initial exposure. Interested students can always find more advanced literature. Second, simulations are integrated into the text to allow students to visualize important concepts and to promote understanding. Pharmacokinetics and pharmacodynamics are subjects that must be approached with the goal of understanding, not memorizing, the material. The text provides exercises to guide readers through simulations, but readers are also encouraged to experiment with simulations on their own. A third goal is to balance the qualitative side of pharmacokinetics with the quantitative side, or equations. Although only a fraction