

A close-up photograph of a hand holding a test tube containing a red liquid. The test tube is positioned over a beaker that also contains a red liquid. The background is dark and out of focus, suggesting a laboratory setting. The lighting is dramatic, highlighting the red color of the liquid in the test tube.

Introductory Chemistry for Health Professionals

LISKA / PRYDE

Introductory Chemistry **for Health Professionals**

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Preface

TO THE STUDENT

We wrote this book with a special kind of student in mind: the pre-health professional. We wrote it for those of you who are planning a career in nursing, nutrition, dietetics, dental hygiene, medical technology, physical therapy, x-ray technology, or any other of the related health professions. As we wrote each chapter, we asked ourselves this question: How do chemical principles relate to patient care and to clinical practice? We discovered dozens of modern applications of chemistry to practice, and you in turn will discover these as you read each chapter.

The text is written at a basic level with considerable descriptive material included. We have presented enough theory to set the stage for understanding applications important for the health professional. So that we would have more room for clinical applications, we have left out detailed discussions of reaction mechanisms, seldom-encountered chemical topics, many types of calculations, and much theoretical organic chemistry. In their place we have included topics which should prove fascinating and useful to you in your future career. Here's just one example: in Chapter 10, we tell the story of a woman who drank several liters of ethylene glycol (auto antifreeze) and was taken to a hospital. The emergency room personnel knew that ethylene glycol is oxidized in the body to oxalic acid, the real poisonous threat. We describe the chemistry involved in glycol metabolism and the treatment that saved this patient from serious injury.

Be sure to become acquainted with the important features of this book that will help you to learn from it. Each chapter starts with an introduction that will provide you with an overview of what the chapter is about. The sequence of topics has been carefully considered. Sample problems are provided to help you master the ideas presented. At the end of the chapter you will find a summary restating the key ideas of the chapter. Key terms and study questions complete the chapter. The answers to all of the odd-numbered

problems are in an appendix. You will also find a very large glossary of chemical, medical, and biological terms in an appendix.

In addition to this text, we have provided a study guide and a laboratory manual suited to your needs and interests. The student study guide contains many more sample problems, self-tests, and other study aids.

You should realize that studying chemistry may not be the same process for you as reading other types of books. Learning chemistry has to be a very interactive process. We encourage you to read each section several times, to underline, make notes, summarize material in your own words, and try all sample problems. Examine the figures and tables carefully to see what ideas are presented. Keep track of new terms as they arise so that you can build your chemical vocabulary gradually. Use the chapter-end questions and the study guide to test your own progress. Ask your teacher for other sources to read and study. You may find that computer-assisted programs are available at your school to help you learn basic skills in chemistry.

As you start your study of chemistry, we wish you all will find the joy of inquiry and the pride of success. It may not always be easy for you, but beginning to understand the chemical nature of our world is a goal well worth pursuing.

TO THE TEACHER

We have long taken the stance that in the area of education of pre-health professionals, we must relate the theory to what is happening in the clinic, on the hospital ward, or in consultation with a patient or his family. Our own feelings were reinforced by Lance Factor and Robert Kooser, who examined and criticized textbooks written for the allied health field. In a report entitled "Value Presuppositions in Science Textbooks—a Critical Bibliography", they wrote:

It is possible, we believe, to argue that the standard chemical facts are actually irrelevant to the practice of allied health sciences. This notion of the irrelevance of basic chemistry . . . does suggest that what is and is not relevant to a practitioner in the allied health sciences has been established in the confines of chemistry department offices and not from the floor of an emergency room.

We have taken that statement seriously. This textbook for students of the allied health professions places as much emphasis on clinical applications as it does on chemistry itself. Ultimately, there must be decisions made on how to balance the necessary foundations of theory and mathematical reasoning with the clinical topics we feel are essential. Whatever decisions have been made to omit material have been based on the idea of gaining more room to give the students of the health professions all the clinical relevance they can possibly get in their early training.

This text includes chapters you will not find in most other allied health textbooks. Chapter 10 on Medicinal Chemistry, Chapter 14 on Steroids, Chapter 15 on Body Fluids, Chapter 16 on Biotransformations, and Chapter 17 on Diet and Body Chemistry all present related material in one place rather than placing it piecemeal in other chapters.

We have included many topics that bear directly on the modern clinical scene. For example, we have discussed transdermal drug delivery systems, synthetic polymers used in drug prostheses, methotrexate in cancer chemotherapy, interferon and the anti-viral state, current theories of atherosclerosis, clinical signs of electrolyte imbalance, diagnosis of pathology using enzymes, application of blood gas data, hyperbaric chambers, and herpetic infections. We discuss recombinant DNA techniques, hemodialysis, salt and the diet, inborn errors of metabolism, and modern scanning techniques such as PETT. We have used the language of the health professional and have included some highly original illustrations such as crystallographic evidence for a receptor site with the antimetabolite in place.

Finally, as you consider the effectiveness of this text as a tool for learning, you should know that it is part of an entire package of **text, laboratory manual, teachers guide, and student study guide**. All parts of the package have been prepared by the authors of this text.

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Fundamentals of Matter and Measurement

