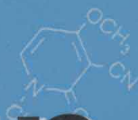
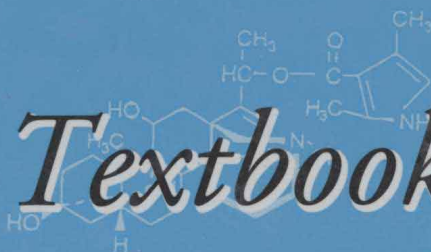


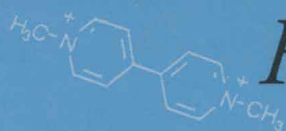


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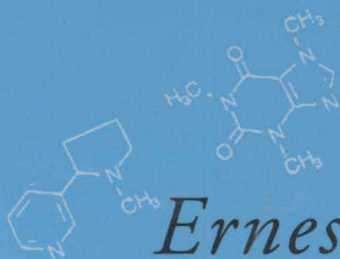
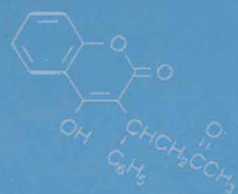


A Textbook of **Modern Toxicology**

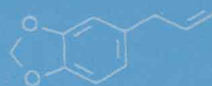
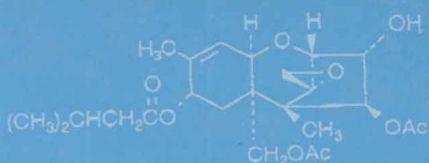
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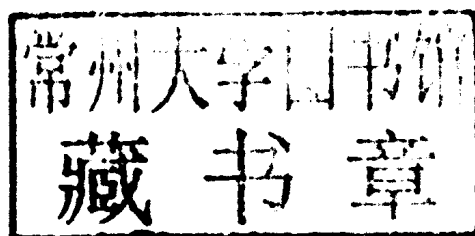
A TEXTBOOK OF MODERN TOXICOLOGY

FOURTH EDITION

Edited by

Ernest Hodgson

North Carolina State University
Raleigh, North Carolina



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PREFACE TO THE FOURTH EDITION

There are some excellent general reference works in toxicology, including *Casarett and Doull's Toxicology*, 6th edition, edited by Curt Klaassen, and the 13-volume *Comprehensive Toxicology*, the second edition currently being edited by Charlene McQueen, as well as many specialized monographs on particular topics. However, the scarcity of textbooks designed for teacher and student to use in the classroom setting that impelled us to produce editions 1 through 3 of this work is still apparent and the choice continues to be limited. The authors are, or have been, involved in teaching general toxicology at North Carolina State University and thus have insights into the actual teaching process and in the broader scope of toxicology as well as the subject matter of their areas of specialization.

Rapid advances are occurring in toxicology, particularly in the molecular and integrative aspects, and we hope these are reflected in this textbook. As an aid to students and teaching faculty, we have added sample questions to each chapter. Answering these questions not only indicates that the material presented has been understood but is, in itself, a learning experience.

At North Carolina State University, we continue to teach a course in general toxicology (TOX801) that is open to graduate students and undergraduate upper-classmen. Our experience leads us to believe that this textbook is suitable, in the junior or senior year, for undergraduate students with some background in chemistry, biochemistry, and animal physiology. For graduate students, it is intended to lay the foundation for subsequent specialized courses in toxicology, such as those in biochemical and molecular toxicology, environmental toxicology, chemical carcinogenesis, risk assessment, and so forth.

We share the view that an introductory text must present all of the necessary fundamental information to fulfill this purpose, but in as uncomplicated a manner as possible. To enhance readability, references have been omitted from the text, although Suggested Reading or Bibliography is recommended at the end of each chapter.

As with previous editions, the amount of material and the detail with which some of it is presented, is more than is needed for the average general toxicology course. This, however, will permit each instructor to select and emphasize those areas they feel need particular emphasis. The obvious biochemical and molecular bias of some chapters is not accidental; rather, it is based on the philosophy that progress in toxicology continues to depend on further understanding of the fundamental basis of toxic action at the cellular and molecular levels. The depth of coverage of each topic represents that chapter author's judgment of the amount of material appropriate to the beginning level as compared to that appropriate to a more advanced course or text such as Smart and Hodgson, *Molecular and Biochemical Toxicology*, 4th edition (John Wiley and Sons, 2008).

Thanks to all of the authors and to the students and faculty of the Department of Environmental and Molecular Toxicology at North Carolina State University. Particular thanks to Jonathan Rose of John Wiley and Sons, who facilitated the project by his hard work, his goodwill and, not least, for his patience.

Raleigh, North Carolina
March 2010

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