

Contents

Contributors vii

Preface xiii

UNIT 1

GENERAL PRINCIPLES OF TOXICOLOGY 1

1. **History and Scope of Toxicology**
Michael A. Gallo 1
2. **Principles of Toxicology**
David L. Eaton and Steven G. Gilbert 5
3. **Mechanisms of Toxicity**
Zoltán Gregus 21
4. **Risk Assessment**
Elaine M. Faustman and Gilbert S. Omenn 49

UNIT 2

DISPOSITION OF TOXICANTS 61

5. **Absorption, Distribution, and Excretion of Toxicants**
Lois D. Lehman-McKeeman 61
6. **Biotransformation of Xenobiotics**
Andrew Parkinson, Brian W. Ogilvie, David B. Buckley, Faraz Kazmi, Maciej Czerwinski, and Oliver Parkinson 79
7. **Toxicokinetics**
Danny D. Shen 109

UNIT 3

NONORGAN-DIRECTED TOXICITY 121

8. **Chemical Carcinogenesis**
James E. Klaunig 121
9. **Genetic Toxicology**
R. Julian Preston and George R. Hoffmann 135
10. **Developmental Toxicology**
John M. Rogers 149

UNIT 4

TARGET ORGAN TOXICITY 163

11. **Toxic Responses of the Blood**
John C. Bloom, Andrew E. Schade, and John T. Brandt 163
12. **Toxic Responses of the Immune System**
Barbara L.F. Kaplan, Courtney E.W. Sulentic, Michael P. Holsapple, and Norbert E. Kaminski 177
13. **Toxic Responses of the Liver**
Hartmut Jaeschke 195
14. **Toxic Responses of the Kidney**
Rick G. Schnellmann 209
15. **Toxic Responses of the Respiratory System**
George D. Leikauf 223
16. **Toxic Responses of the Nervous System**
Virginia C. Moser, Michael Aschner, Rudy J. Richardson, and Martin A. Philbert 237
17. **Toxic Responses of the Ocular and Visual System**
Donald A. Fox and William K. Boyes 255
18. **Toxic Responses of the Heart and Vascular System**
Y. James Kang 271
19. **Toxic Responses of the Skin**
Robert H. Rice and Theodora M. Mauro 291
20. **Toxic Responses of the Reproductive System**
Paul M.D. Foster and L. Earl Gray Jr. 303
21. **Toxic Responses of the Endocrine System**
Patricia B. Hoyer and Jodi A. Flaws 319

UNIT 5

TOXIC AGENTS 333

22. **Toxic Effects of Pesticides**
Lucio G. Costa 333
23. **Toxic Effects of Metals**
Erik J. Tokar, Windy A. Boyd, Jonathan H. Freedman, and Michael P. Waalkes 347
24. **Toxic Effects of Solvents and Vapors**
James V. Bruckner, S. Satheesh Anand, and D. Alan Warren 361
25. **Toxic Effects of Radiation and Radioactive Materials**
David G. Hoel 373
26. **Toxic Effects of Plants and Animals**
John B. Watkins, III 381
27. **Toxic Effects of Calories**
Martin J. Ronis, Kartik Shankar, and Thomas M. Badger 401

UNIT 6

ENVIRONMENTAL TOXICOLOGY 411

28. **Nanotoxicology**
Gunter Oberdörster, Agnes B. Kane, Rebecca D. Kapler, and Robert H. Hurt 411
29. **Air Pollution**
Daniel L. Costa and Terry Gordon 425

UNIT 7

APPLICATIONS OF TOXICOLOGY 441

30. **Ecotoxicology**
Richard T. Di Giulio and Michael C. Newman 441
31. **Food Toxicology**
Frank N. Kotsonis and George A. Burdock 453
32. **Analytical and Forensic Toxicology**
Bruce A. Goldberger and Diana G. Wilkins 463
33. **Clinical Toxicology**
Louis R. Cantilena Jr. 471
34. **Occupational Toxicology**
Peter S. Thorne 481

Answers to Chapter Questions 491

Index 495