Contents

10.9 One Compartment First-Order Absorption Model 233
10.10 Two Compartment Bolus IV Injection (Instantaneous Absorption) Model 240
10.11 Two Compartment IV Infusion (Zero-Order Absorption) Model 248
10.12 Two Compartment First-Order Absorption Model 253
10.13 Generalized Multicompartment Models 260
10.14 Multiple Dosing Models 264
10.15 Advanced Pharmacokinetic Modeling Topics 271
10.16 Summary of Key Points 276

Chapter 11 Bioanalytical Tools for Drug Analysis 279
11.1 Introduction 279
11.2 Small Molecule Chemical Bioanalysis 280
11.3 Theoretical Fundamentals of Chromatography 284
11.4 Analytical Separations in Practice 290
11.5 Key Points and Conclusions 301

Chapter 12 Drug–Drug Interactions with an Emphasis on Drug Metabolism and Transport 303
12.1 Introduction 303
12.2 DDIs Associated with Altered Drug Metabolism 307
12.3 Drug Transporters and DDIs 317
12.4 DDIs Associated with Protein Binding 320
12.5 Conclusions and Key Points 324

Chapter 13 Adverse Drug Reactions 327
13.1 Introduction 327
13.2 Type A ADRs 327
13.3 Examples of Type A ADRs 331
13.4 Avoiding Type A ADRs 332
13.5 Pharmacovigilance and ADR 333
13.6 Type B ADRs 334
13.7 Summary 349

Chapter 14 Risk Assessment 353
14.1 History 353
14.2 Hazard Identification 354
14.3 Dose Response Assessment 355
14.4 Exposure Assessment 356
14.5 Risk Characterization 357
14.6 Radiological Risk Assessments 364
14.7 Risk Management 365
14.8 Risk Communication 367

Chapter 15 Drug Resistance 371
15.1 Introduction 371
15.2 Cancer Cell Drug Resistance 371
15.3 Drug Resistance in Infectious Diseases 379
15.4 Summary 385

Chapter 16 Ion Channels 387
16.1 Introduction 387
16.2 Ion Channel Structure and Function: Basic Principles and Mechanisms 391
16.3 Ion Channel Pharmacology: Principles and Mechanisms 396
16.4 Ion Channel Groups: Functional Implications and Pharmacological Modulators 398
16.5 Methods for the study of ion channels 414
16.6 Ion Channels and Disease 420
16.7 Ion Channels as Drug Targets 421
16.8 Key Points and Conclusions 424

Chapter 17 Targeting the Cell Cycle to Kill Cancer Cells 429
17.1 Introduction 429
17.2 The Cell Cycle 430
17.3 Cell Cycle Checkpoints 432
17.4 Mitotic Kinases as Targets of New Chemotherapeutics 442
17.5 Conclusions 447

Chapter 18 Programmed Cell Death 455
18.1 Introduction 455
18.2 Mechanism and Regulation of PCD 456
18.3 Apoptosis in Health and Disease 465
18.4 Therapeutic Strategies for Targeting Apoptosis 467
18.5 Key Points and Conclusions 473

Chapter 19 Drug Discovery 475
19.1 Introduction 475
19.2 Underlying Principles 485
19.3 Drug Discovery Case Studies 532
19.4 Summary 554

Chapter 20 Genomics and Proteomics in Drug Design and Discovery 561
20.1 Introduction 561
20.2 Genomics and Proteomics 561
20.3 Major Technological Platforms of Genomics and Proteomics 563
20.4 Current Achievements and Potential Application of Genomics and Proteomics in Drug Design and Discovery 565
20.5 Conclusion and Future Prospects 569

Chapter 21 The Future of Pharmacology 575
21.1 Introduction 575
21.2 The Problem 575
21.3 Strategies for Searching for Future Drugs 576
21.4 Tools for Searching for Future Drugs 577
21.5 The Drugs of the Future 578

Index 581