CONTENTS

FOREWORD
Edwin I. Goldenthal, PhD, ATS ix

PREFACE xi

CONTRIBUTORS xiii

1 Introduction to the Study Director
Mary Ellen Cosenza, PhD, MS, DABT, RAC 1

2 Good Laboratory Practice Regulations: Roles of the Study Director, Management, and Quality Assurance Unit
Barbara Randolph, BS, MT (ASCP), MBA, RQAP (GLP) 7

3 International Guidelines and Regulations of Nonclinical Studies
Bert Haenen, PhD, ERT, Linda Blous, Msc, and Anne Harman Chappelle, PhD, DABT 27

4 Facilities, Operations, Laboratory Animal Care, and Veterinary Services
Susan A. MacKenzie, VMD, PhD, DABT, Gregory W. Ruppert, BA, and David G. Serota, PhD, DABT 43

5 Regulatory Inspections
Russell James Eyre, PhD, DABT, Lijie Fa, PhD, MPH, Fellow ATS, and Eric Austin, PhD, DABT 73

6 Project Management and the Role of a Study Director
Debra Kirchner, PhD, DABT, Parthena Martin, PhD, DABT, and Brenda Frantz, BS 83

7 Managing Multi-site Studies: Roles of the Principal Investigator and the Study Director
Suzanne R.T. Wolford, PhD, DABT 95
CONTENTS

8 Prestudy Preparation, the Protocol, Data Interpretation, and Reporting 107
   Carol S. Auletta, DABT, MBA, RAC

9 Study Conduct 131
   Lisa Biegel, PhD, Heather Dale, PhD, and Mark Morse, PhD, DABT

10 In Vitro Toxicology Models 145
   Gertrude-Emilia Costin, PhD, MBA, and Hans Raabe, MS

11 Analytical Chemistry and Toxicology Formulations 171
   Eric S. Bodle, PhD, and Nutan Gangrade, PhD

12 Statistical Design and Analysis of Studies 191
   John W. Green, PhD

13 Clinical Pathology 225
   Niraj K. Tripathi, BVSc, MVSc, PhD, DACVP, Lila Ramaiah, BSc, DVM, PhD,
   DACVP, and Nancy E. Everds, DVM, DACVP

14 Effective Incorporation and Utilization of Biomarkers in Nonclinical Studies 245
   Michael R. Bleavins, PhD, DABT

15 Pathology: Necropsy and Gross Pathology 259
   Charles B. Spainhour, VMD, PhD, DABT

16 Histopathology in Toxicity Studies for Study Directors 275
   Kevin Keane, DVM, PhD, Fellow IATP

17 Toxicokinetics and Bioanalysis 297
   Anthony L. Kiorpes, PhD, DVM, DABT

18 The Planning, Conduct, and Interpretation of Safety Pharmacology Studies: The Role of the Study Director in Safety Pharmacology Investigations 313
   Simon Authier, DVM, MSc, MBA, PhD, DSP, Michael J. Curtis, PhD, FHEA, FBPharmacolS, DSP, and Michael K. Pugsley, PhD, FBPharmacolS, DSP

19 Genetic Toxicology Studies 333
   Robert R. Young, MS, Mark Powley, PhD, Timothy E. Lawlor, MA, and Marilyn J. Aardema, PhD

20 Carcinogenicity Studies 355
   Reem Elbekai, BPharm, PhD, DABT, and Catherine M. Kelly, BS

21 Contemporary Practices in Core Developmental, Reproductive, and Juvenile Toxicity Assessments 371
   Ali Said Faqi, DVM, PhD, DABT, Fellow ATS
22 Immunotoxicology in Nonclinical Studies 393
Florence G. Burleson, PhD, and Stefanie C.M. Burleson, PhD

23 Nonclinical Safety Assessment of Biotechnology-Derived Products: Considerations and Challenges 405
Barbara Mounho, PhD, DABT

24 Gene and Cell Therapy Products 427
Peter Working, PhD, DABT, Fellow ATS

25 Vaccines: Preventive and Therapeutic Product Studies 439
Deborah L. Novicki, PhD, DABT, Jayanthi J. Wolf, PhD, Lisa M. Plitnick, PhD, and Melanie Hartsough, PhD

26 Toxicology Studies Conducted for Pesticides and Commodity Chemicals 465
Elliot Gordon, PhD, DABT, and Linda A. Malley, PhD, DABT

27 Medical Devices 485
Gregory A. Kopia, PhD, and John F. Dooley, PhD

28 Lessons from the Front Lines 505
Christopher P. Chengelis, PhD, DABT, and C. Steven Godin, PhD, DABT

INDEX 519