Contents

Dedication ................................................................. v
Foreword ............................................................... vii
Preface ................................................................. ix
Acknowledgments ...................................................... xi
Contributors .......................................................... xvii

PART I  OVERVIEW OF THE ANIMAL RESEARCH IN PSYCHIATRIC ILLNESS AND SUBSTANCE ABUSE

1 New Frontiers in Animal Research of Psychiatric Illness ......................... 3
   Arie Kaffman and John J. Krystal

2 Experimental Psychiatric Illness and Drug Abuse Models: From Human to Animal, an Overview .................. 31
   Scott Edwards and George F. Koob

3 Qualitative Versus Quantitative Methods in Psychiatric Research .............. 49
   Mahdi Razafsha, Hura Behforuzi, Hassan Azari, Zhiqun Zhang,
   Kevin K. Wang, Firas H. Kobeissy, and Mark S. Gold

PART II  METHODS IN ANIMAL MODELS OF PSYCHIATRIC ILLNESS

4 Animal Models of Self-Injurious Behaviour: An Overview ....................... 65
   Darragh P. Devine

5 Rodent Models of Adaptive Decision Making ......................................... 85
   Alicia Izquierdo and Annabelle M. Belcher

6 Animal Models of Depression and Neuroplasticity: Assessing Drug Action in Relation to Behavior and Neurogenesis ................. 103
   Ying Xu, Philip A. Barish, Jianchun Pan, William O. Ogle, and James M. O’Donnell

7 Modeling Depression in Animal Models ............................................... 125
   David H. Overstreet

8 Behavioral Model for Assessing Cognitive Decline ................................ 145
   Michael Guidi and Thomas C. Foster

9 The Pemoline Model of Self-Injurious Behaviour ................................... 155
   Darragh P. Devine

10 Modeling Risky Decision Making in Rodents ....................................... 165
    Nicholas W. Simon and Barry Setlow

11 Open Space Anxiety Test in Rodents: The Elevated Platform with Steep Slopes ................................. 177
    Abdelkader Ennaceur
12 An Animal Model to Study the Molecular Basis of Tardive Dyskinesia .......................... 193

Mahendra Bishnoi and Ravneet K. Boparai

PART III METHODS IN ANIMAL MODELS OF SUBSTANCE ABUSE

13 Models of Chronic Alcohol Exposure and Dependence .............................................. 205

Darin J. Knapp and George R. Breese

14 Rat Models of Prenatal and Adolescent Cannabis Exposure .................................... 231

Jennifer A. DiNieri and Yasmin L. Hurd

15 Modeling Nicotine Addiction in Rats ................................................................. 243

Stephanie Caille, Kelly Clemens, Luis Stinus, and Martine Cador

16 Animal Models of Nicotine Withdrawal: Intracranial Self-Stimulation
and Somatic Signs of Withdrawal .............................................................................. 257

Rayna M. Bauzo and Adrie W. Bruijnzeel

17 Methods in Drug Abuse Models: Comparison of Different Models
of Methamphetamine Paradigms .............................................................................. 269


18 Cocaine Self-Administration in Rats: Hold-Down Procedures ................................. 279

Benjamin A. Zimmer and David C.S. Roberts

19 Cocaine Self-Administration in Rats: Discrete Trials Procedures ............................. 291

Carson V. Dobrin and David C.S. Roberts

20 Cocaine Self-Administration in Rats: Threshold Procedures .................................... 303

Erik B. Oleson and David C.S. Roberts

21 Assessing Locomotor-Stimulating Effects of Cocaine in Rodents ............................ 321

Drake Morgan, Jameson P. DuPree, Alex D. Bibbey, and Glen M. Sizemore

22 Methods in Tobacco Abuse: Proteomic Changes Following Second-Hand Smoke Exposure ......................................................................................... 329

Joy Guingab-Cagmat, Rayna M. Bauzo, Adrie W. Bruijnzeel, Kevin K. Wang, Mark S. Gold, and Firas H. Kobeissy

PART IV METHODS IN ANIMAL MODELS OF EATING DISORDERS

23 Animal Models of Sugar and Fat Bingeing: Relationship to Food Addiction and Increased Body Weight ................................................................. 351

Nicole M. Avena, Miriam E. Bocarsly, and Bartley G. Hoebel

24 Animal Models of Overeating ................................................................................. 367

Neil E. Rowland

25 The Activity-Based Anorexia Mouse Model .......................................................... 377

Stephanie J. Klenotich and Stephanie C. Dulawa
PART V  BIOMARKERS, NEUROENDOCRINE AND INFLAMMATORY PROFILES RELEVANT TO NEUROPSYCHIATRIC DISORDERS

26 Dissociating Behavioral, Autonomic, and Neuroendocrine Effects of Androgen Steroids in Animal Models ........................................ 397
Amy S. Kohtz and Cheryl A. Frye

27 Interleukin-2 and the Septohippocampal System: Intrinsic Actions and Autoimmune Processes Relevant to Neuropsychiatric Disorders .................................................. 433
John M. Petitto, Zhi Huang, Danielle Meola, Grace K. Ha, and Daniel Dauer

28 Experimental Schizophrenia Models in Rodents Established with Inflammatory Agents and Cytokines ........................................ 445
Hiroyuki Nawa and Kiyofumi Yamada

29 P11: A Potential Biomarker for Posttraumatic Stress Disorder ................................................................. 453
Lei Zhang, Robert J. Ursano, and He Li

PART VI  “OMICS” ANALYSIS AND SYSTEMS BIOLOGY APPLICATIONS IN PSYCHIATRIC DISORDERS

30 Investigation of Age-Specific Behavioral and Proteomic Changes in an Animal Model of Chronic Ethanol Exposure .................................................. 471
Antoniette M. Maldonado-Devinci, Stanley M. Stevens Jr., and Cheryl L. Kirstein

31 Quantitative Peptidomics to Measure Neuropeptide Levels in Animal Models Relevant to Psychiatric Disorders .................................................. 487
Julia S. Gelman, Jonathan Wardman, Vadiraja B. Bhat, Fabio C. Gozzo, and Lloyd D. Fricker

32 ADHD Animal Model Characterization: Transcriptomics and Proteomics Analyses .................................................. 505
Yoshinori Masuo, Junko Shibato, and Randeep Rakwal

33 Psychiatric Disorder Biomarker Discovery Using Quantitative Proteomics .................................................. 531
Michaela D. Filiou and Christoph W. Turck

34 Gene Profiling of Laser-Microdissected Brain Regions and Individual Cells in Drug Abuse and Schizophrenia Research .................................................. 541
Pietro Paolo Sanna, Vez Repunte-Canonigo, and Alessandro Guidotti

35 Stable Isotope Labeling with Amino Acids in Cell Culture-Based Proteomic Analysis of Ethanol-Induced Protein Expression Profiles in Microglia .................................................. 551
Bin Liu, David S. Barber, and Stanley M. Stevens Jr.
36 Systems Biology in Psychiatric Research: From Complex Data Sets
Over Wiring Diagrams to Computer Simulations....................... 567
Felix Tretter and Peter J. Gebicke-Haerter

37 Data Mining in Psychiatric Research................................. 593
Diego Tovar, Eduardo Cornejo, Petros Xanthopoulos,
Mario R. Guaraccino, and Panos M. Pardalos

Index......................................................................................... 605