
Preface

Without animal testing, there will be no new drugs for new or hard-to-treat diseases... Rather than apologise for medicine as it is pursued today, society should be seeking to strengthen it. Animal research is an essential part of compassionate humanistic endeavour.

(*The Lancet*, Volume 364, Issue 9 437, Pages 815–816, 4 September 2004.)

Within the past few years, research in the fields of neuroscience and psychiatry has greatly advanced, especially with the introduction of high-throughput techniques applied on the cellular and molecular levels. This new technology has been enhanced with the development of experimental, customizable animal models that are predictive of human neuropsychiatric pathology and give insights on the mechanisms and pathways involved. The need for developing and studying these animal models cannot be overstressed, paving the way for the development of novel treatments and therapeutics. The techniques and protocols describing these animal models would provide researchers and clinicians with road map methodology for conducting translational bench-to-beside studies that could lead to novel targets relevant to human neuropsychiatric disorders and diseases.

Both neuroscience and psychiatric research are multidisciplinary entities, apparent by the number of scientists attending neuroscience conferences (Attendance for the *Society for Neuroscience* 2011 conference topped more than 34,000). While researchers and laboratories may master some of the useful techniques applied on animal models, we believe that providing a detailed description of these protocols (modified successfully from their original source) will benefit researchers aiming to broaden their experimental repertoire. It will also serve as a guide for students and novice postgraduates who are starting their scientific careers seeking novel techniques as well as novel models relevant to their research areas. Thus, this volume should be useful for graduates, postdoctoral workers, and established scientists, working on behavioral and molecular neuropsychiatric research.

In preparing this book, *Psychiatric Disorders: Methods and Protocols*, we invited top of the line neuroscience and psychiatry experts who are practitioners in academia and industry as well as clinicians to write integrated chapters on neuropsychiatric research sharing their insightful expertise and opinions focusing on both the animal models as well as the cutting edge techniques applied.

As this book is focused on methods and protocols, we strive to provide a comprehensive overview of the *in vivo* as well as the *in vitro* models available to demonstrate these disorders.

Each *Method* chapter starts with a short introduction, which outlines the background and literature of the animal model discussed along with the methodology and descriptions of the principles of its application and utility. In addition, coupled to these introductions, each of these chapters ends with a troubleshooting notes section that highlights the alterations and expected pitfalls of the protocol outlined. This is derived from the expert's experience in that particular protocol and is different from what is published in its original manual.

In this book, we included 37 chapters divided into five primary parts describing the protocols, techniques, methods, and different models applied in neuropsychiatric disorders.

The first part consists of three chapters and offers an overview of the experimental modeling of neuropsychiatric studies by describing the usefulness and the need of animal models to relate the cellular and molecular changes occurring in human mental illness (Kaffaman and Krystal). In the second chapter, a detailed and elegant description of the pros and cons of having preclinical animal models of psychiatric diseases and their relevance to mimic human disorders is presented (Edwards and Koob). Lastly, this is followed by a discussion chapter detailing the dilemma of the qualitative vs. quantitative nature of psychiatric research (Razafsha and Gold et al.).

The second part (consisting of nine chapters) is dedicated to experimental models of neuropsychiatric illness, including cognitive decline models, a self-injurious behavior animal model, anxiety testing, and depression models, etc. The third part (consisting of ten chapters) discusses animal models of substance abuse and is complementary to the items in Part II. It discusses experimental models related to alcohol, nicotine, cannabis, cocaine, methamphetamine, and tobacco abuse paradigms and methods used to develop these models as well as the techniques to assess their outcome and their effects. Collectively, Parts II and III illustrate modeling neuropsychiatric illness and drug abuse paradigms and techniques.

The last two parts outline the novel approaches and techniques recently introduced to decipher and investigate topics considered “nonclassical” to the areas of neuropsychiatric disorders. Among, the topics discussed are biomarker identification, autoimmune inflammatory response, and neuroendocrine alteration in the areas of psychiatry (Part V). Lastly, Part VI (consisting of eight chapters) describes the state-of-the-art “*Omics* approaches” and neurosystems biology/data mining techniques to compute and analyze genomic and proteomics alteration occurring within neuropsychiatric models. The last part offers a new dimension for researchers especially in the areas translational research.

We hope that this book will benefit researchers conducting studies at all stages related to neuropsychiatry. Actually, the methods and concepts described throughout demonstrate the formidable power of utilizing these animal models. It is our hope that this book enables neuroscientists and psychiatrists to handle several unanswered scientific questions with a more creative and insightful approach.

Gainesville, FL, USA

Firas H. Kobeissy, PhD

Psychiatric Disorders

Methods and Protocols

Kobeissy, F.H. (Ed.)

2012, XXI, 610 p. 102 illus., Hardcover

ISBN: 978-1-61779-457-5

A product of Humana Press