This second edition of the *Encyclopedia of Psychopharmacology* is intended to reflect the many advances that have occurred in the field since the publication of the first edition in 2010. In the preclinical arena, this includes not only the substantial progress that has been made in the psychopharmacology of complex psychological and behavioral processes, such as cognition and drug self-administration, but also the introduction and refinement of novel methods and areas of inquiry, such as optogenetics and ultrasonic vocalization. At the clinical level, the release of the fifth edition of the *Diagnostic and Statistical Manual of Mental Disorders* (DSM-5) by the American Psychiatric Association signals the first major change in psychiatric diagnostic taxonomy since the publication of DSM-IV in 1994. Whatever one’s opinion as to the wisdom, necessity, or execution of that change (and contributors to the *Encyclopedia* reflect the full range of diversity in this regard), there can be no disputing the need for an up-to-date compendium of psychopharmacology to fully take it into account. It should be noted that some of the definitions given are based on those in the DSM or other standard sources of reference; we therefore acknowledge the role of such important works in the development of the *Encyclopedia*.

All of the 252 essays and approximately 1,150 brief definitions of the first edition have been reviewed and, as needed, revised to accommodate new findings and understanding or even just to improve readability. In addition, 32 new essays and about 10 new brief definitions have been added in order to more fully address topics that were either insufficiently covered in the first edition or have since emerged as important in their own right. Both old and new contributors were enlisted to accomplish this massive undertaking that has increased the size of the *Encyclopedia* by more than 30%. The panel of section editors was also expanded so that it now includes a member based in Asia and an expert to coordinate and develop the entries on substance abuse and dependence. Readers should be aware that there are areas in any active scientific field where experts do not agree with each other; our policy has not required authors to adhere strictly to the views of the section editors or the editors in chief; rather, we have aimed to allow scope for expert contributors to express their own views on the field and have encouraged them to indicate in their contributions the areas where controversy exists.

We extend our thanks, again, to the many staff members at Springer for their unflagging support of this project; to our exceptional section editors, whose careful oversight, detailed suggestions, and substantive essays so
profundely shaped the final product; and, finally, to our many contributing authors, who labored with such dedication to distill the broad and deep knowledge they have of their subjects into entries which, we hope, will be readily accessible and efficiently informative to the nonspecialist readers of this work.

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Preface to the First Edition

Psychopharmacology is the study of the effects of psychoactive drugs on the functioning of the central nervous system at all levels of analysis, thus embracing cognition, behavior, psychological states, neurophysiology, neurochemistry, gene expression, and molecular biology. It includes, as integral parts of its domain, the medicinal and social uses of the substances, the interaction of environmental and genetic factors with the actions of psychoactive drugs, their use for probing the functionality of the central nervous system, and drug dependence and abuse.

The modern science of psychopharmacology was developed in the second half of the twentieth century as a consequence of innovative “blue-skies” laboratory research and the parallel recognition of the specific therapeutic effects of a new generation of drugs that brought about the so-called psychopharmacological revolution. This Encyclopedia of Psychopharmacology attempts to bring together much of this knowledge that has been acquired in the last 50 years in a format that makes it accessible to a diverse range of nonspecialists and students. It facilitates the dissemination of what has been learned to a broader population of researchers, clinicians, and advanced students. The level of the entries is typically midway between articles for informed laypeople and reviews for specialized biomedical experts. The diversity of disciplinary areas of which psychopharmacology is comprised means that it is a useful educational resource when specialists need to extend their role into areas beyond their primary fields of expertise. People in related fields, students, teachers, and laypeople will benefit from the information on the most recent developments of psychopharmacology.

The scope of the product is defined by the definition above and by the scope of the journal Psychopharmacology, a premier peer-reviewed journal for publication of original research and expert reviews. The aim is to provide detailed information on psychopharmacology and its subdisciplines, such as clinical psychopharmacology, molecular neuropsychopharmacology, behavioral pharmacology in laboratory animals, and human experimental psychopharmacology. Nevertheless, the interdisciplinary nature of the field has engendered very different ideas about the meaning of the word “psychopharmacology,” and there is probably no definition that could meet with universal and permanent acclaim. It is like the proverbial story of the blind men and the elephant. Some see psychopharmacology primarily as the scientific study of the psychological and behavioral effects of substances in normal subjects. Others regard it as mainly concerned with the development and evaluation of
pharmacotherapies for psychiatric states. Yet a further important group of scientists have been engaged in defining the actions of psychoactive drugs across the huge range of disciplines of which neuroscience is composed, including, among others, neurochemistry, neurophysiology, and molecular biology. It is hoped that the project will help to shed light on the interconnections between the different parts of the elephant, showing how the effects of drugs within the intact conscious, behaving organism are related to their properties at the levels of molecules, cells, and neural systems.

The wide-ranging entries in the *Encyclopedia of Psychopharmacology* are written by leading experts, including basic and clinical scientists in academia and industry. The entries fall into several main categories. Target essays include descriptions of fundamental psychological and biological processes that are influenced by psychoactive drugs; here the emphasis is at the behavioral and psychological level, although important functions in the neuropharmacological and psychosocial domains are included. Targets at the molecular and cellular levels constitute the primary domain of the *Encyclopedia of Molecular Pharmacology* (Offermanns and Rosenthal, Eds. Springer 2008) that may be seen as a parallel endeavor. Those entries named according to psychiatric disorders describe the role of pharmacotherapy in treatment, with reference to differential therapies for subclasses of a disorder, with cross-references to essays on the drugs used. Conditions where drug treatment is not normally used are excluded except for substance use disorders, where the main characteristics of all the disorders are pertinent even though there is no pharmacotherapy for some of them. Drugs are the stock-in-trade of psychopharmacologists and therefore many entries are named according to drugs or drug classes. These essays review their general pharmacology, with an emphasis on psychotropic and other central nervous system effects; their neuropharmacological mechanisms of action are described in relation to receptor or enzymatic targets, key events that occur downstream from the receptor, and brain regions, with cross-references to the psychiatric states in which the drugs are used most often. Other essays focus upon the key methods used in the field, describing the main features of the techniques and outlining their roles in psychopharmacology, the types of information obtained, and why they are needed; the advantages and limitations of a technique may also be summarized.

The essays are complemented by more than 1,150 short definitions; essays and definitions cross-reference each other and other relevant entries. Entries appear in an alphabetical sequence that makes the printed encyclopedia easy to use. Users of the online version benefit from hyperlinks that correspond to the cross-references in the printed version.

I thank the many members of the publisher’s staff who have participated in this project and have supported it so ably. Throughout the enterprise I have also enjoyed the support of an outstanding team of Field Editors, all of whom have sustained internationally recognized records of scholarly activity in psychopharmacology. The team includes individuals based in pharmaceutical industry as well as in academia, reflecting the frequent and often essential collaborations between these sectors. It would not have been possible to produce the *Encyclopedia of Psychopharmacology* without their guidance.
on its content and their assistance with the selection of authors and reviews of the submitted entries. I also thank the hundreds of individual authors whose exceptional work forms the substance of the product and who have given so generously of their time and expertise.

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