

Cambridge University Press

978-0-521-14905-1 - Stahl's Illustrated Antipsychotics: Treating Psychosis, Mania and Depression, Second Edition

Stephen M. Stahl and Laurence Mignon

Frontmatter

[More information](#)



Stahl's Illustrated

Antipsychotics

Treating Psychosis, Mania and Depression

Second Edition

Stephen M. Stahl

University of California, San Diego

Laurence Mignon

Neuroscience Education Institute

Nancy Muntner

Illustrations



CAMBRIDGE
UNIVERSITY PRESS

Cambridge University Press
 978-0-521-14905-1 - Stahl's Illustrated Antipsychotics: Treating Psychosis, Mania and
 Depression, Second Edition
 Stephen M. Stahl and Laurence Mignon
 Frontmatter
[More information](#)

CAMBRIDGE UNIVERSITY PRESS
 Cambridge, New York, Melbourne, Madrid, Cape Town, Singapore,
 São Paulo, Delhi, Dubai, Tokyo

Cambridge University Press
 32 Avenue of the Americas, New York, NY 10013-2473, USA
www.cambridge.org
 Information on this title: www.cambridge.org/9780521149051

© Neuroscience Education Institute 2010

This publication is in copyright. Subject to statutory exception
 and to the provisions of relevant collective licensing agreements,
 no reproduction of any part may take place without the written
 permission of Cambridge University Press.

First published 2010

Printed in the United States of America

A catalog record for this publication is available from the British Library.

Library of Congress Cataloging in Publication data

Stahl, S. M.
 Stahl's illustrated antipsychotics : treating psychosis, mania, and depression / Stephen Stahl,
 Laurence Mignon. – 2nd ed.
 p. ; cm. – (Stahl's illustrated)
 Rev. ed. of: Antipsychotics / Stephen M. Stahl. 2009. Includes bibliographical references and index.
 ISBN 978-0-521-14905-1 (pbk.)
 1. Antipsychotic drugs. I. Mignon, Laurence. II. Stahl, S. M. Antipsychotics. III. Title.
 IV. Title: Illustrated antipsychotics. V. Series: Stahl's illustrated series.
 [DNLN: 1. Antipsychotic Agents – pharmacology. 2. Antipsychotic Agents – therapeutic use.
 3. Schizophrenia – drug therapy. QV 77.9 S781s 2010]
 RM333.5.S7336 2010
 615'.7882–dc22 2010006555

ISBN 978-0-521-14905-1 Paperback

Cambridge University Press has no responsibility for the
 persistence or accuracy of URLs for external or third-party Internet
 Web sites referred to in this publication and does not guarantee that
 any content on such Web sites is, or will remain, accurate or
 appropriate.

Every effort has been made in preparing this book to provide accurate and
 up-to-date information that is in accord with accepted standards and
 practice at the time of publication. Although case histories are drawn
 from actual cases, every effort has been made to disguise the identities of
 the individuals involved. Nevertheless, the authors, editors, and publishers
 can make no warranties that the information contained herein is totally
 free from error, not least because clinical standards are constantly
 changing through research and regulation. The authors, editors, and
 publishers therefore disclaim all liability for direct or consequential
 damages resulting from the use of material contained in this book. Readers
 are strongly advised to pay careful attention to information provided by
 the manufacturer of any drugs or equipment that they plan to use.



PREFACE

These books are designed to be fun. All concepts are illustrated by full-color images. The text can be used as a supplement to figures, images, and tables. The visual learner will find that this book makes psychopharmacology concepts easy to master, while the non-visual learner may enjoy a shortened text version of complex psychopharmacology concepts. Each chapter builds upon previous chapters, synthesizing information from basic biology and diagnostics to building treatment plans and dealing with complications and comorbidities.

Novices may want to approach this book by first looking through all the graphics, gaining a feel for the visual vocabulary on which our psychopharmacology concepts rely. After this once-over glance, we suggest going back through the book to incorporate the images with text from figure legends. Learning from visual concepts and textual supplements should reinforce one another, providing you with solid conceptual understanding at each step along the way.

Readers more familiar with these topics should find that going back and forth between images and text provides an interaction with which to vividly conceptualize complex psychopharmacology. You may find yourself using this book frequently to refresh your psychopharmacological knowledge. You may also find yourself referring your colleagues to this desk reference.

This book is intended as a conceptual overview of different topics; we provide you with a visual-based language to incorporate the rules of psychopharmacology at the sacrifice of discussing the exceptions to these rules. A Suggested Readings section at the end of this book gives you a good start for more in-depth learning about particular concepts presented here.

When you come across an abbreviation or figure you don't understand, you can refer to the Abbreviation and Symbols legend in the back. After referring to these several times you will begin to develop proficiency in the visual vocabulary of psychopharmacology. Stahl's Essential Psychopharmacology, 3rd Edition, and Stahl's Essential Psychopharmacology: The Prescriber's Guide, 3rd Edition can be helpful supplementary tools for more in-depth information on particular topics in this book. Now you can also search topics in psychopharmacology on the Neuroscience Education Institute's website (www.neiglobal.com) for lectures, courses, slides, and related articles.

Whether you are a novice or an experienced psychopharmacologist, hopefully this book will lead you to think critically about the complexities involved in psychiatric disorders and their treatments.

Best wishes for your educational journey into the fascinating field of psychopharmacology!





Table of Contents

Preface	iii
CME Information	vii
Objectives	xiii
Chapter 1:	
Neurobiology of Schizophrenia and Mood Disorders	1
Chapter 2:	
Multifunctionality of Antipsychotics	31
Chapter 3:	
Side Effects of Antipsychotics:	
Metabolic Issues and Sedation	89
Chapter 4:	
Individual Antipsychotic Drugs	109
Chapter 5:	
Schizophrenia Pharmacy and Switching Strategies	145
Summary	163
Abbreviations and Symbols	164
Suggested Readings	165
Index	173
Continuing Medical Education Posttest	183
Activity Evaluation	185



CME Information

Overview

This book aims to visually explain the underlying pathophysiology of schizophrenia, give an overview of the receptor profiles of conventional and atypical antipsychotics, and to provide information on best treatment approaches. The book is divided into five chapters for ease of reading and referencing. Chapter 1, "Neurobiology of Schizophrenia and Mood Disorders," focuses on the known and hypothetical causes underlying the pathophysiology of schizophrenia and mood disorders. Chapter 2, "Multifunctionality of Antipsychotics," is divided into multiple parts, focusing on the different receptor profiles and properties of antipsychotic medications. Chapter 3, "Side Effects of Antipsychotics: Metabolic Issues and Sedation," explains the importance of monitoring patients initiated on antipsychotic medication. Chapter 4, "Individual Antipsychotic Drugs," describes each antipsychotic medication currently available in terms of their approval, side effects profile, dosing tips, and drug interactions. Finally, Chapter 5, "Schizophrenia Pharmacy and Switching Strategies," presents different ways to treat the various symptoms of schizophrenia and describes ways to switch between different antipsychotic agents. The visual component of this minibook is designed to allow the reader to easily grasp concepts.


Target Audience

This activity was designed for healthcare professionals, including psychiatrists, neurologists, primary care physicians, nurses, pharmacists, and others who treat patients with psychiatric conditions.

Statement of Need

The following unmet needs regarding antipsychotics were revealed following a vigorous assessment of activity feedback, expert faculty assessment, literature review, and through new medical knowledge:

- The neurobiology underlying schizophrenia is based on the dopamine hypothesis, but many other neurotransmitter systems are also involved. It is important to understand the interaction among these neurotransmitter systems in order to get the full picture of the underlying causes of schizophrenia.
- Many of the neurotransmitter systems involved in schizophrenia are also involved in mood disorders, and thus could be targeted by drugs effective in schizophrenia. A better understanding of the neurobiology of mood disorders can lead to a more precise choice of medication.
- The pharmacological agents used to treat schizophrenia affect neurobiological systems in specific ways; understanding the relationship between the medications and the underlying pathophysiology of schizophrenia is essential in order to select appropriate treatment for a patient.

- 
- Atypical antipsychotics are complex drugs, affecting at least 17 different receptor subtypes, each of which may contribute to efficacy and side effects. This multifunctionality of antipsychotics also allows them to be used for disorders besides schizophrenia, such as mood disorders.
 - Acquiring a better knowledge of the different antipsychotics on the market and in development is necessary to ascertain proper dosing and switching strategies and thus to maximize treatment benefits and minimize side effects.
 - Based on evaluations obtained at NEI Academies, participants wanted more information on psychosis-related matters, and additional information on dosing issues.

To help fill these unmet needs, quality improvement efforts need to increase understanding of the neurobiology of psychiatric disease states and the pharmacology of available, new, and in-development medications.

Learning Objectives

After completing this activity, participants should be better able to:

- Describe the hypothetical neurobiology of schizophrenia
- Describe the hypothetical neurobiology of mood disorders
- Understand the complex pharmacology of antipsychotics
- Recognize how different drug properties affect the various symptoms of schizophrenia
- Recognize how different drug properties affect the various symptoms of mood disorders
- Recognize that side effects are linked to the drug's receptor profile
- Develop an understanding of the best treatment practices and switching methods for schizophrenia

Accreditation and Credit Designation Statements

The Neuroscience Education Institute is accredited by the Accreditation Council for Continuing Medical Education to provide continuing medical education for physicians.

The Neuroscience Education Institute designates this educational activity for a maximum of 3.0 *AMA PRA Category 1 Credits*[™]. Physicians should only claim credit commensurate with the extent of their participation in the activity. Non-physicians may receive a certificate of participation for completing this activity.

Activity Instructions

This CME activity is in the form of a printed monograph and incorporates instructional design to enhance your retention of the information and pharmacological concepts


Cambridge University Press

978-0-521-14905-1 - Stahl's Illustrated Antipsychotics: Treating Psychosis, Mania and Depression, Second Edition

Stephen M. Stahl and Laurence Mignon

Frontmatter

[More information](#)



that are being presented. You are advised to go through the figures in this activity from beginning to end, followed by the text, and then complete the posttest and activity evaluation. The estimated time for completion of this activity is 3.0 hours.

Instructions for CME Credit

To receive your certificate of CME credit or participation, please complete the posttest (you must score at least 70% to receive credit) and activity evaluation found at the end of the monograph and mail or fax them to the address/number provided. Once received, your posttest will be graded and a certificate sent if a score of 70% or more was attained. Alternatively, **you may complete the posttest and activity evaluation online and immediately print your certificate.** There is a fee for CME credits for this activity.

NEI Disclosure Policy

It is the policy of the Neuroscience Education Institute to ensure balance, independence, objectivity, and scientific rigor in all its educational activities. Therefore, all individuals in a position to influence or control content development are required by NEI to disclose any financial relationships or apparent conflicts of interest that may have a direct bearing on the subject matter of the activity. Although potential conflicts of interest are identified and resolved prior to the activity being presented, it remains for the participant to determine whether outside interests reflect a possible bias in either the exposition or the conclusions presented.

These materials have been peer-reviewed to ensure the scientific accuracy and medical relevance of information presented and its independence from commercial bias. The Neuroscience Education Institute takes responsibility for the content, quality, and scientific integrity of this CME activity.

Individual Disclosure Statements

Authors

Stephen M. Stahl, MD, PhD

Adjunct Professor, Department of Psychiatry, University of California, San Diego School of Medicine

Board Member: Cypress Bioscience, Inc.; NeuroMolecular Pharmaceuticals; Pierre Fabre; Tetrigenix Pharmaceuticals

Grant/Research: Alkermes, Inc.; AstraZeneca Pharmaceuticals LP; Bristol-Myers Squibb Company; Cephalon, Inc.; Cyberonics; Eli Lilly and Company; GlaxoSmith-Kline; Janssen Pharmaceutica Inc.; Jazz Pharmaceuticals; Neurocrine Biosciences Inc.; Novartis; Organon; Pfizer Inc; Sepracor Inc.; Shire Pharmaceuticals Inc.; Somaxon Pharmaceuticals, Inc.; Takeda Pharmaceuticals North America, Inc.; Wyeth Pharmaceuticals

Consultant/Advisor: ACADIA Pharmaceuticals Inc.; Amylin Pharmaceuticals, Inc.; AstraZeneca Pharmaceuticals LP; Avera Pharmaceuticals, Inc.; Azur Pharma Inc; Biovail Pharmaceuticals, Inc.; Boehringer Ingelheim Pharmaceuticals, Inc.; Bristol-Myers


Cambridge University Press

978-0-521-14905-1 - Stahl's Illustrated Antipsychotics: Treating Psychosis, Mania and Depression, Second Edition

Stephen M. Stahl and Laurence Mignon

Frontmatter

[More information](#)



Squibb Company; Cephalon, Inc.; CSC Pharmaceuticals; Cyberonics; Cypress Bioscience, Inc.; Dainippon Pharmaceutical USA Corporation; Eli Lilly and Company; EPIX Pharmaceuticals, Inc.; Forest Pharmaceuticals, Inc.; GlaxoSmithKline; Janssen Pharmaceutica Inc.; Jazz Pharmaceuticals, Inc.; Labopharm Inc.; Neurocrine Biosciences Inc.; NeuroMolecular Pharmaceuticals; Neuronetics, Inc.; Novartis; Organon; Pamlab, L.L.C.; Pfizer Inc; Pierre Fabre; sanofi-aventis U.S. LLC; Schering-Plough Corporation; Sepracor Inc.; Shire Pharmaceuticals Inc.; SK Corporation; Solvay Pharmaceuticals; Somaxon Pharmaceuticals, Inc.; Tethys Pharmaceutical, Inc.; Tetragenix Pharmaceuticals; Vanda Pharmaceuticals Inc.; Wyeth Pharmaceuticals
Speakers Bureau: AstraZeneca Pharmaceuticals LP; Cephalon, Inc.; CSC Pharmaceuticals; Eli Lilly and Company; Pfizer Inc; Wyeth Pharmaceuticals

Laurence Mignon, PhD

Medical Writer, Neuroscience Education Institute, Carlsbad, CA

Stockholder: Aspreva Pharmaceuticals Corporation; Vanda Pharmaceuticals Inc.; ViroPharma Incorporated

Content Editor

Meghan Grady

Director, Content Development, Neuroscience Education Institute, Carlsbad, CA

No other financial relationships to disclose.

Peer Reviewer

Electa Stern, PharmD, CACP

Clinical Supervisor, Pharmacy Services, Sharp Grossmont Hospital, La Mesa, CA

Attended Advisory Board re anti-infective: Johnson & Johnson Pharmaceutical Services, L.L.C.; Pfizer Inc

Design Staff

Nancy Muntner

Director, Medical Illustrations, Neuroscience Education Institute, Carlsbad, CA

No other financial relationships to disclose.

Disclosed financial relationships have been reviewed by the Neuroscience Education Institute CME Advisory Board to resolve any potential conflicts of interest. All faculty and planning committee members have attested that their financial relationships do not affect their ability to present well-balanced, evidence-based content for this activity.

Disclosure of Off-Label Use

This educational activity may include discussion of products or devices that are not currently labeled for such use by the Food and Drug Administration. Please consult the product prescribing information for full disclosure of labeled uses.

Cambridge University Press
978-0-521-14905-1 - Stahl's Illustrated Antipsychotics: Treating Psychosis, Mania and Depression, Second Edition
Stephen M. Stahl and Laurence Mignon
Frontmatter
[More information](#)



Disclaimer

The information presented in this educational activity is not meant to define a standard of care, nor is it intended to dictate an exclusive course of patient management. Any procedures, medications, or other courses of diagnosis or treatment discussed or suggested in this educational activity should not be used by clinicians without full evaluation of their patients' conditions and possible contraindications or dangers in use, review of any applicable manufacturer's product information, and comparison with recommendations of other authorities. Primary references and full prescribing information should be consulted.

Participants have an implied responsibility to use the newly acquired information from this activity to enhance patient outcomes and their own professional development. The participant should use his/her clinical judgment, knowledge, experience, and diagnostic decision-making before applying any information, whether provided here or by others, for any professional use.

Sponsorship Information

This activity is sponsored by Neuroscience Education Institute.

Support

This activity is supported solely by the sponsor, Neuroscience Education Institute. Neither the Neuroscience Education Institute nor Stephen M. Stahl, MD, PhD has received any funds or grants in support of this educational activity.

Date of Release/Expiration

Release Date: May, 2008

CME Credit Expiration Date: April, 2011

Cambridge University Press
978-0-521-14905-1 - Stahl's Illustrated Antipsychotics: Treating Psychosis, Mania and Depression, Second Edition
Stephen M. Stahl and Laurence Mignon
Frontmatter
[More information](#)



Stahl's Illustrated

Objectives

-
- Describe the hypothetical neurobiology of schizophrenia
 - Describe the hypothetical neurobiology of mood disorders
 - Understand the complex pharmacology of antipsychotics
 - Recognize how different drug properties affect the various symptoms of schizophrenia
 - Recognize how different drug properties affect the various symptoms of mood disorders
 - Recognize that side effects are linked to the drug's receptor profile
 - Develop an understanding of the best treatment practices and switching methods for schizophrenia