PSYCHIATRY,
PSYCHOANALYSIS, AND
THE NEW BIOLOGY OF
MIND

By

Eric R. Kandel, M.D.

With commentaries by

Arnold M. Cooper, M.D.
Steven E. Hyman, M.D.
Thomas R. Insel, M.D.
Donald F. Klein, M.D.
Joseph LeDoux, Ph.D.
Eric J. Nestler, M.D., Ph.D.
John M. Oldham, M.D.
Judith L. Rapoport, M.D.
Charles F. Zorumski, M.D.

Washington, DC
London, England
Note: The authors have worked to ensure that all information in this book is accurate at the time of publication and consistent with current psychiatric and medical standards, and that information concerning the dosage, schedules, and routes of administration is accurate at the time of publication and consistent with standards set by the U.S. Food and Drug Administration and the general medical community. As medical research and practice continue to advance, however, therapeutic standards may change. Moreover, specific situations may require a specific therapeutic response not included in this book. For these reasons and because human and mechanical errors sometimes occur, we recommend that readers follow the advice of physicians directly involved in their care or the care of a member of their family.

Books published by American Psychiatric Publishing, Inc., represent the views and opinions of the individual authors and do not necessarily represent the policies and opinions of APPI or the American Psychiatric Association.

Copyright © 2005 American Psychiatric Publishing, Inc.
ALL RIGHTS RESERVED

Manufactured in the United States of America on acid-free paper
09 08 07 06 05 04 03 5 4 3 2 1
First Edition

Typeset in Adobe's Berkeley and Eurostile

1000 Wilson Boulevard
Arlington, VA 22209-3901
www.appi.org

Library of Congress Cataloging-in-Publication Data
Kandel, Eric R.
Psychiatry, psychoanalysis, and the new biology of mind / by Eric R. Kandel ; with commentaries by Arnold M. Cooper ... [et al.].—1st ed.
p. ; cm.
Includes bibliographical references and index.
ISBN 1-58562-199-4 (alk. paper)
RC435.2.K36 2005
616.89—dc22
2004029916

British Library Cataloguing in Publication Data
A CIP record is available from the British Library.
CONTENTS

CONTRIBUTORS ............................................. XI
FOREWORD .................................................. XIII
INTRODUCTION ............................................. XVII

1 PSYCHOTHERAPY AND THE SINGLE SYNAPSE:
THE IMPACT OF PSYCHIATRIC THOUGHT
ON NEUROBIOLOGIC RESEARCH ................. 1
Eric R. Kandel, M.D.
With commentary by Judith L. Rapoport, M.D.

2 A NEW INTELLECTUAL FRAMEWORK FOR
PSYCHIATRY ........................................... 27
Eric R. Kandel, M.D.
With commentary by Thomas R. Insel, M.D.

3 BIOLOGY AND THE FUTURE OF PSYCHOANALYSIS:
A NEW INTELLECTUAL FRAMEWORK
FOR PSYCHIATRY REVISITED ................. 59
Eric R. Kandel, M.D.
With commentary by Arnold M. Cooper, M.D.

4 FROM METAPSYCHOLOGY TO
MOLECULAR BIOLOGY: EXPLORATIONS
INTO THE NATURE OF ANXIETY ............... 107
Eric R. Kandel, M.D.
With commentaries by Donald F. Klein, M.D.,
and Joseph LeDoux, Ph.D.

5 NEUROBIOLOGY AND MOLECULAR BIOLOGY:
THE SECOND ENCOUNTER ....................... 157
Eric R. Kandel, M.D.
With commentary by Eric J. Nestler, M.D., Ph.D.
6 NEURAL SCIENCE: A CENTURY OF PROGRESS
AND THE MYSTERIES THAT REMAIN .......... 199

Thomas D. Albright, Ph.D.
Thomas M. Jessell, Ph.D.
Eric R. Kandel, M.D.
Michael I. Posner, Ph.D.

With commentary by Steven E. Hyman, M.D.

7 THE MOLECULAR BIOLOGY OF MEMORY
STORAGE: A DIALOGUE BETWEEN GENES
AND SYNAPSES ......................... 337

Eric R. Kandel, M.D.

With commentary by Charles F. Zorumski, M.D.

8 GENES, BRAINS, AND SELF-UNDERSTANDING:
BIOLOGY'S ASPIRATIONS FOR A NEW
HUMANISM ............................. 373

Eric R. Kandel, M.D.

With commentary by John M. Oldham, M.D.

AFTERWORD ............................ 385

INDEX ............................... 389