

Cambridge University Press
978-0-521-86717-7 - Neurobiology of Peripheral Nerve Regeneration
Douglas W. Zochodne
Frontmatter
[More information](#)

Neurobiology of Peripheral Nerve Regeneration

Peripheral nerve disorders are among the most common neurological problems that clinicians face, yet few therapies and interventions are available to arrest or reverse the damage associated with them. Summarizing this important, but neglected, area of neuroscience, Doug Zochodne addresses the peripheral, not central, nervous system and its unique neurobiology. He summarizes current basic ideas about the molecular mechanisms involved in both nerve degeneration and regeneration and what approaches can be used to address it experimentally. Heavily illustrated throughout, and including a 32-page color plate section, this book will serve as a valuable reference for academic researchers and graduate students.

DR. DOUGLAS ZOCHODNE is a Professor with Tenure and a Consultant Neurologist in the Department of Clinical Neurosciences, Hotchkiss Brain Institute at the University of Calgary. He has recently served (1999–2007) as Editor-in-Chief of the *Canadian Journal of Neurological Sciences*. Dr. Zochodne has run an externally funded research laboratory investigating problems of peripheral nerves since 1989. The work has been funded by the Canadian Institutes of Health Research, Canadian Diabetes Association, Alberta Heritage Foundation for Medical Research, and the Muscular Dystrophy Association of Canada.

Cambridge University Press
978-0-521-86717-7 - Neurobiology of Peripheral Nerve Regeneration
Douglas W. Zochodne
Frontmatter
[More information](#)

Neurobiology of Peripheral Nerve Regeneration

DOUGLAS W. ZOCHODNE
University of Calgary, Canada



Cambridge University Press
 978-0-521-86717-7 - Neurobiology of Peripheral Nerve Regeneration
 Douglas W. Zochodne
 Frontmatter
[More information](#)

CAMBRIDGE UNIVERSITY PRESS

Cambridge, New York, Melbourne, Madrid, Cape Town, Singapore, São Paulo, Delhi

Cambridge University Press
 The Edinburgh Building, Cambridge CB2 8RU, UK

Published in the United States of America by Cambridge University Press, New York

www.cambridge.org
 Information on this title: www.cambridge.org/9780521867177

© D. W. Zochodne 2008

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 2008

Printed in the United Kingdom at the University Press, Cambridge

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

Library of Congress Cataloging in Publication data

Zochodne, Douglas W.

Neurobiology of peripheral nerve regeneration / Douglas W. Zochodne.
 p. ; cm.

Includes bibliographical references and index.
 ISBN 978-0-521-86717-7 (hardback)

1. Nerves, Peripheral-Regeneration. I. Title.
 [DNLM: 1. Peripheral Nerves-physiology. 2. Nerve Regeneration-physiology.
3. Peripheral Nervous System-physiology. WL 500 Z84n 2008]

QP363.5.Z63 2008

573.8'5-dc22

2008022860

ISBN 978-0-521-86717-7 hardback

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

Cambridge University Press
978-0-521-86717-7 - Neurobiology of Peripheral Nerve Regeneration
Douglas W. Zochodne
Frontmatter
[More information](#)

Dedicated to my wife Barbara and my children Julia and William

Contents

Acknowledgments viii

- 1 Introduction 1
- 2 The intact peripheral nerve tree 8
- 3 Injuries to peripheral nerves 39
- 4 Addressing nerve regeneration 58
- 5 Early regenerative events 85
- 6 Consolidation and maturation of regeneration 133
- 7 Regeneration and the vasa nervorum 153
- 8 Delayed reinnervation 170
- 9 Trophic factors and peripheral nerves 182
- 10 The nerve microenvironment 206

References 220

Index 267

Color plate section pp. 152–153

Acknowledgments

I owe particular thanks to Barbara Zochodne, my wife, who provided the encouragement and detailed editing that made this book possible. Barbara, my daughter Julia and my son William put up with my long hours devoted to this book.

I am grateful to many members who have worked with me in our laboratory over the years and who have captured a number of the images that are illustrated in this book. In particular I acknowledge Drs. Chu Cheng, Christine Webber, and David McDonald for their help. I enjoyed the opportunity to work with Scott Rogers who provided many artistic illustrations for this text. Dr. James Kennedy, Dr. Cory Toth, Dr. Hong Sun, Dr. X-Q. Li, Dr. Q-G. Xu, Dr. Y. Q. Xu, Lam Ho, Dr. Dan Levy, Dr. Ahmet Hoke, Dr. Valentine Brussee, Wei-Qiao Liu, G. F. Guo, J. A. Martinez, K. Vanneste, and Noor Ramji have all contributed to this work among many others I have had the privilege to work with. Brenda Boake has provided expert secretarial assistance and unswerving support over the same time.

The Peripheral Nerve Society (PNS) has been an intellectual home for many of us interested in the biology of peripheral nerves and a potent stimulus for me to proceed with this work.

Our laboratory is grateful for support from the Alberta Heritage Foundation for Medical Research, Canadian Institutes of Health Research, Canadian Diabetes Association and Muscular Dystrophy Association of Canada.

“Nature uses only the longest threads to weave her patterns, so each small piece of her fabric reveals the organization of the entire tapestry.”
(Richard Feynman, *The Character of Physical Law*, 1965)