

## **An Introduction to Male Reproductive Medicine**

---

# An Introduction to Male Reproductive Medicine

---

Edited by

**Craig Niederberger, MD, FACS**

Clarence C. Saelhof Professor and Head, Department of Urology,  
University of Illinois, Chicago, College of Medicine, and Professor,  
Department of Bioengineering, University of Illinois, Chicago,  
College of Engineering, Chicago, IL, USA



**CAMBRIDGE**  
UNIVERSITY PRESS

Cambridge University Press & Assessment  
978-0-521-17302-5 — An Introduction to Male Reproductive Medicine  
Edited by Craig Niederberger  
Frontmatter  
[More Information](#)



Shaftesbury Road, Cambridge CB2 8EA, United Kingdom  
One Liberty Plaza, 20th Floor, New York, NY 10006, USA  
477 Williamstown Road, Port Melbourne, VIC 3207, Australia  
314–321, 3rd Floor, Plot 3, Splendor Forum, Jasola District Centre, New Delhi – 110025, India  
103 Penang Road, #05–06/07, Visioncrest Commercial, Singapore 238467

Cambridge University Press is part of Cambridge University Press & Assessment, a department of the University of Cambridge.  
We share the University’s mission to contribute to society through the pursuit of education, learning and research at the highest international levels of excellence.

[www.cambridge.org](http://www.cambridge.org)  
Information on this title: [www.cambridge.org/9780521173025](http://www.cambridge.org/9780521173025)  
© Cambridge University Press & Assessment 2011

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 & Assessment.  
First published 2011

*A catalogue record for this publication is available from the British Library*  
*Library of Congress Cataloging-in-Publication data*  
An introduction to male reproductive medicine / edited by Craig Niederberger.  
p. ; cm.  
Includes bibliographical references and index.  
ISBN 978-0-521-17302-5 (Paperback)  
1. Infertility, Male. I. Niederberger, Craig S., 1960– editor.  
[DNLM: 1. Infertility, Male. WJ 709]  
RC889.I62 2011  
616.6’92–dc22 2010045952

ISBN 978-0-521-17302-5 Paperback

Cambridge University Press & Assessment 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.

.....  
Every effort has been made in preparing this book to provide accurate and up-to-date information which 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.

Contents

<i>List of contributors</i>	<i>page</i> vi
<i>Preface</i>	vii
1. Male reproductive medicine: anatomy and physiology Ettore Caroppo	1
2. Clinical evaluation of the male Craig Niederberger	29
3. An introduction to male reproductive surgery Daniel H. Williams	58
4. Non-surgical therapy Randall B. Meacham	77
5. Male reproductive immunology Robert E. Brannigan	84
6. Genetics of male reproductive medicine Moshe Wald	103
7. Semen: analysis and processing Grace M. Centola	121
8. What to know about the infertile female Bradley J. Van Voorhis	134
<i>Index</i>	152
<i>The color plate section can be found between pages 120 and 121.</i>	

## Contributors

**Robert E. Brannigan, MD**

Associate Professor, Department of Urology, Northwestern University,  
Feinberg School of Medicine, Chicago, IL, USA

**Ettore Caroppo, MD**

Reproductive Unit and Andrology Outpatients Clinic,  
ASL BARI, PO “F. Iaia”, Conversano (Ba), Italy

**Grace M. Centola, PhD, HCLD (ABB)**

President, Cryobank Compliance Services, Rochester, NY, USA

**Randall B. Meacham, MD**

Professor and Chief, Division of Urology, The University of Colorado  
School of Medicine, Denver, CO, USA

**Craig Niederberger, MD, FACS**

Clarence C. Saelhof Professor and Head,  
Department of Urology, University of Illinois, Chicago,  
College of Medicine, and  
Professor, Department of Bioengineering,  
University of Illinois, Chicago, College of Engineering,  
Chicago, IL, USA

**Bradley J. Van Voorhis, MD**

Professor of Reproductive Endocrinology, and Director,  
Division of Reproductive Endocrinology and Infertility,  
University of Iowa Carver College of Medicine, Iowa City, IA, USA

**Moshe Wald, MD**

Assistant Professor, Department of Urology, University of Iowa,  
Iowa City, IA, USA

**Daniel H. Williams IV, MD**

Assistant Professor, Department of Urology,  
University of Wisconsin School of Medicine and Public Health,  
Madison, WI, USA

## Preface

Few medical fields are moving as fast as male infertility. Current treatment for a patient experiencing difficulty impregnating his partner bears only a fair resemblance to therapies of even two decades ago. This rapid progress is in part influenced by parallel advances in female reproductive medicine, such as the development of technology that allows a single sperm injected into an ovum to yield a baby. Nevertheless, even by itself, male reproductive medicine over the past few years has been a rushing current of innovations in medical treatment and surgery.

Evaluation and treatment of the infertile male can appear to be an arcane, confusing maze. Male reproductive problems are not rare events that only an occasional physician will encounter; a male factor causes infertility in couples as often as a female factor does. We wrote this book to help you unravel the mysteries of male infertility and to prepare you to treat the patient who has difficulty impregnating his partner. The fourth edition of *Infertility in the Male* is an excellent reference text, but at nearly 700 dense pages, it can be challenging to navigate when you're first beginning to see and treat male patients. This book is a companion to that reference text, including pointers to locations with expanded discussions of salient topics.

Each chapter in this book is written by a single author who will take you through one of the eight basic components of male reproductive medicine: biology, clinical evaluation, surgery, medicine, immunology, genetics, semen analysis, and integration with care for the female. All are designed to be easy to read. We don't shy away from our opinions; when you see patients you ultimately have to make decisions, and opinions form the basis for those choices. We are describing how we evaluate and treat infertile men, providing our reasoning, and pointing you to fuller explanations in the fourth edition of *Infertility in the Male*. As you progress in learning this field, we hope you will read the reference text, as you may come to your own, reasoned opinions about the best way to approach an infertile man.

The fundamental intent of this book is to be an accessible entry into the field of male reproductive medicine. Enjoy the book, and welcome to one of the most interesting and gratifying areas of medicine.