A Clinician's Guide to Sperm DNA and Chromatin Damage

Armand Zini • Ashok Agarwal
Editors

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Springer

Editors
Armand Zini, MD, FRCSC
Professor
Department of Surgery
Division of Urology
McGill University
Montreal, QC, Canada

Ashok Agarwal, PhD
American Center for Reproductive Medicine
Glickman Urological and Kidney Institute
Cleveland Clinic
Cleveland, OH, USA

ISBN 978-3-319-71814-9 ISBN 978-3-319-71815-6 (eBook)
https://doi.org/10.1007/978-3-319-71815-6

Library of Congress Control Number: 2017963632

Printed on acid-free paper

This Springer imprint is published by Springer Nature
The registered company is Springer International Publishing AG
The registered company address is: Gewerbestrasse 11, 6330 Cham, Switzerland

Foreword

One of the great challenges for assessing male fertility is that with the microscope we can see the outside of a sperm and generally how it swims but that arguably the most important aspects of how it works to fertilize the egg and ultimately make a baby are hidden from view inside its head. One of the earliest ways of trying to crack that puzzle was to assess how deoxyribonucleic acid is packaged within the sperm and whether alterations in that packaging cause problems with male reproduction. Scientific and clinical studies abound, but the conclusions are varied and challenging to interpret. The editors and authors of this book have done a masterful job in assembling the most complete compendium to date on the subject of sperm DNA packaging and most importantly its clinical relevance. It's a reference work that will mark the era of sperm DNA assessment in the evaluation of male fertility and guide the clinician in what to order and how to interpret the results.

Craig Niederberger, MD, FACS
Department of Urology, UIC College of Medicine
Department of Bioengineering, UIC College of Engineering
Fertility and Sterility
Chicago, IL, USA

Preface

The essential role and pathophysiology of sperm DNA integrity in human reproduction has been increasingly recognized and extensively studied in the last few decades. Sperm DNA fragmentation (SDF) has emerged as a valuable tool for male infertility evaluation. Defects in sperm DNA integrity are associated with modifications during spermatogenesis, inflammatory processes, varicocele, and elevated post-testicular oxidative stress. Consequently, it has great potential as a functional diagnostic test that could complement the conventional sperm analysis. Clinical evidence is accumulating to show that the integrity of sperm DNA may also be linked with suboptimal embryo development, implantation failure, and recurrent miscarriage.

The focus on sperm DNA damage continues to generate enormous interest among reproductive health specialists and basic medical scientists, and this in part is fueled by the growing awareness that ICSI is not a panacea for all couples diagnosed with male infertility. Moreover, with the success rates of ICSI capping at 50–60%, the pursuit for a reliable test of sperm function which can accurately predict fertility in assisted reproduction has taken on a renewed sense of urgency.

Our book *A Clinician's Guide to Sperm DNA and Chromatin Damage* summarizes the role of SDF in male infertility. Firstly, the normal sperm chromatin structure and causative mechanisms of SDF are briefly introduced. Currently available SDF assays are also described. Secondly, the etiology of SDF and its implications on natural pregnancy and ART outcomes are presented. Finally, treatment options for high SDF and the clinical application of SDF tests are proposed.

The book is written by internationally recognized experts from 15 countries and is organized into five sections and 32 chapters. Part I contains three chapters on the basic aspects of sperm chromatin structure, whereas the various tests used to evaluate sperm DNA fragmentation are discussed in seven chapters under Part II. In Part III, the etiology of this enigmatic test is described within eight chapters, while the clinical usage of SDF tests, a must read, is well-elaborated in six chapters within the penultimate Part IV. The treatment options for men with clinically significant SDF are the subject of Part V which is highlighted in eight impressive chapters.

We are deeply grateful to our distinguished group of contributors for sharing their research and clinical knowledge and experience. Our book is an excellent and timely product of effective collaboration with members of the Springer Publishing House. The outstanding support of developmental editors Barbara Lopez-Lucio and Sarah Simeziane and editor Kristopher Spring was highly commendable. The editors are tremendously grateful to their families for their unwavering love and support.

Montreal, QC, Canada — Armand Zini, MD, FRCSC
Cleveland, OH, USA — Ashok Agarwal, PhD

Contents

Editors

Ashok Agarwal, PhD American Center for Reproductive Medicine, Glickman Urological and Kidney Institute, Cleveland Clinic, Cleveland, OH, USA

Armand Zini, MD, FRCSC Department of Surgery, Division of Urology, McGill University, Montreal, QC, Canada

Contributors

Ahmad H. Al-Malki, MB, BCh Department of Surgery, Division of Urology, McGill University, Montreal, QC, Canada

Elisabetta Baldi, BSc, PhD Center of Excellence DeNothe, University of Florence, Florence, Italy

Experimental and Clinical Biomedical Sciences, University of Florence, Florence, Italy

Rod Balhorn, BSc, PhD SHAL Technologies, Inc., Livermore, CA, USA

Noelia Fonseca Balvís, BSc, MS Department of Animal Reproduction, Spanish National Institute for Agricultural and Food Research and Technology (INIA), Madrid, Spain

Ferran Barrachina, MSc Molecular Biology of Reproduction and Development Research Group, Department of Biomedicine, Faculty of Medicine, and Biochemistry and Molecular Genetics Service, Institut d'Investigacions Biomèdiques August Pi i Sunyer (IDIBAPS), University of Barcelona, and Hospital Clínic, Barcelona, Spain

Guylain Boissonneault, PhD Department of Biochemistry, Université de Sherbrooke, Sherbrooke, QC, Canada

Mona Bungum, MedDr, MSc, PhD Reproductive Medicine Centre, Malmö University Hospital, Malmö, Sweden

Zeynep Cakar, BSc American Center for Reproductive Medicine, Cleveland Clinic, Cleveland, OH, USA

Eva Pericuesta Camacho, PhD Department of Animal Reproduction, Instituto Nacional de Investigación y Tecnología Agraria y Alimentaria (INIA), Madrid, Spain

Douglas T. Carrell, PhD Department of Surgery (Urology), Department of Human Genetics, Department of Obstetrics and Gynecology, University of Utah School of Medicine, Salt Lake City, UT, USA

Tiphanie Cavé, MSc Department of Biochemistry, Université de Sherbrooke, Sherbrooke, QC, Canada

Peter T.K. Chan, MD Department of Surgery (Urology), McGill University and the McGill Univeristy Health Centre, Montreal, QC, Canada

Elva I. Cortés-Gutiérrez, PhD Department of Genetics, Centro de Investigación Biomédica del Noreste, Instituto Mexicano del Seguro Social, IMSS, Monterrey, Mexico

Unit of Genetics, Department of Biology, Universidad Autónoma de Madrid, Madrid, Spain

Martha I. Dávila-Rodríguez, PhD Department of Genetics, Centro de Investigación Biomédica del Noreste, Instituto Mexicano del Seguro Social, IMSS, Monterrey, Mexico

Unit of Genetics, Department of Biology, Universidad Autónoma de Madrid, Madrid, Spain

Alejandro Chacón de Castro, MSc Reproduction Department, Instituto Nacional de Investigación y Tecnología Agraria y Alimentaria (INIA), Madrid, Spain

Hasan M. El-Fakahany, MD, PhD Department of Dermatology, STDs and Andrology, Al-Minya University, Al-Minya, Egypt

Juris Erenpreiss, MD, PhD Riga Stradins University, Riga, Latvia

Sandro C. Esteves, MD, MSc, PhD Andrology and Human Reproduction Clinic, ANDROFERT, Campinas, Brazil

Donald P. Evenson, PhD, HCLD SCSA Diagnostics, Inc., Brookings, SD, USA

Sarah K. Fatool, BS Medical School for International Health, Ben-Gurion University of the Negev, Be'er Sheva, Israel

Soroka University Medical Center, Ben-Gurion University of the Negev, Be'er Sheva, Israel

José Luis Fernández, MD, PhD Unidad de Genética, Complejo Hospitalario Universitario A Coruña (CHUAC), Instituto de Investigación Biomédica de A Coruña (INIBIC), A Coruña, Spain

Laboratorio de Genética Molecular y Radiobiología, Centro Oncológico de Galicia, A Coruña, Spain

Raul Fernández-González Department of Animal Reproduction, Instituto Nacional de Investigación y Tecnología Agraria y Alimentaria (INIA), Madrid, Spain

Shaghayegh Foroozan-Boroojeni, BSc Department of Reproductive Biotechnology, Reproductive Biomedicine Research Center, Royan Institute for Biotechnology, ACECR, Isfahan, Iran

Aleksander Giwercman, PhD Lund University, Malmö, Sweden

Jaime Gosálvez, BSc, Hons PhD Unidad de Genética, Facultad de Biología, Universidad Autónoma de Madrid, Spain

Marie-Chantal Grégoire, PhD Department of Biochemistry, Université de Sherbrooke, Sherbrooke, QC, Canada

Sezgin Gunes, PhD Ondokuz Mayis University, Samsun, Turkey

Alfonso Gutiérrez-Adan, PhD Department of Animal Reproduction, Instituto Nacional de Investigación y Tecnología Agraria y Alimentaria (INIA), Madrid, Spain

Avi Harlev, MD Soroka University Medical Center, Ben-Gurion University of the Negev, Be'er Sheva, Israel

Ralf Henkel, PhD Department of Medical Bioscience, University of the Western Cape, Bellville, South Africa

Meritxell Jodar, PhD Molecular Biology of Reproduction and Development Research Group, Department of Biomedicine, Faculty of Medicine, and Biochemistry and Molecular Genetics Service, Institut d'Investigacions Biomèdiques August Pi i Sunyer (IDIBAPS), University of Barcelona, and Hospital Clínic, Barcelona, Spain

Stephen Johnston, BSc, Hons PhD School of Agriculture and Food Sciences, The University of Queensland, Gatton, Australia

Michelle M. Kim, MD, PhD Urology Resident, Department of Urology, Massachusetts General Hospital, Harvard Medical School, Boston, MA, USA

Ricardo Laguna-Barraza, PhD Veterinarian Science, Department of Animal Reproduction, Instituto Nacional de Investigación y Tecnología Agraria y Alimentaria (INIA), Madrid, Spain

Angela Patricia López-Cardona, DZoot, MSc, PhD Department of Animal Reproduction, Instituto Nacional de Investigación y Tecnología Agraria y Alimentaria (INIA), Madrid, Spain

Carmen López-Fernández, PhD Unit of Genetics, Department of Biology, Universidad Autónoma de Madrid, Madrid, Spain

Ahmad Majzoub, MD Department of Urology, Hamad Medical Corporation, Doha, Qatar

Gayatri Mohanty, PhD Redox Biology Laboratory, Department of Zoology, School of Life Sciences, Ravenshaw University, Cuttack, India

Monica Muratori, BSc, PhD Center of Excellence DeNothe, University of Florence, Florence, Italy

Experimental and Clinical Biomedical Sciences, University of Florence, Florence, Italy

Mohammad Hossein Nasr-Esfahani, PhD Department of Reproductive Biotechnology, Reproductive Biomedicine Research Center, Royan Institute for Biotechnology, ACECR, Isfahan, Iran

Isfahan Fertility and Infertility Center, Isfahan, Iran

Krzysztof Oleszczuk, MD, PhD Reproductive Medicine Centre, Skåne University Hospital, Malmö, Sweden

Rafael Oliva, MD, PhD Molecular Biology of Reproduction and Development Research Group, Department of Biomedicine, Faculty of Medicine, and Biochemistry and Molecular Genetics Service, Institut d'Investigacions Biomèdiques August Pi i Sunyer (IDIBAPS), University of Barcelona, and Hospital Clínic, Barcelona, Spain

Serafín Perez-Cerezales, PhD Department of Animal Reproduction, Instituto Nacional de Investigación y Tecnología Agraria y Alimentaria (INIA), Madrid, Spain

Benjamin Planells, BSc, MSc Department of Animal Reproduction, Instituto Nacional de Investigación y Tecnología Agraria y Alimentaria (INIA), Madrid, Spain

Priscila Ramos-Ibeas, PhD, DVM, MsC Department of Animal Reproduction, Instituto Nacional de Investigación y Tecnología Agraria y Alimentaria (INIA), Madrid, Spain

Bernard Robaire, PhD Departments of Pharmacology & Therapeutics and of Obstetrics & Gynecology, McGill University, Montreal, QC, Canada

Matheus Roque, MD ORIGEN – Center for Reproductive Medicine, Rio de Janeiro, Brazil

Katherine Rotker, MD Department of Urology, UMASS Medical School & Memorial Healthcare System, Worcester, MA, USA

Denny Sakkas, PhD Boston IVF, Waltham, MA, USA

Luna Samanta, PhD Redox Biology Laboratory, Department of Zoology, School of Life Sciences, Ravenshaw University, Cuttack, India

Manesh Kumar Panner Selvam, PhD American Center for Reproductive Medicine, Glickman Urological and Kidney Institute, Cleveland Clinic, Cleveland, OH, USA

Semra Sertyel, MSc Embryology Laboratory, Centrum IVF Clinic, Ankara, Turkey

Rakesh Sharma, PhD American Center for Reproductive Medicine, Cleveland Clinic, Cleveland, OH, USA

Mark Sigman, MD Department of Surgery (Urology), Warren Alpert School of Medicine of Brown University, Rhode Island Hospital and The Miriam Hospital, Providence, RI, USA

Olivier Simard, BSc Department of Biochemistry, Université de Sherbrooke, Sherbrooke, QC, Canada

Luke Simon, PhD Department of Surgery (Urology), University of Utah, Salt Lake City, UT, USA

Ada Soler-Ventura, MSc Molecular Biology of Reproduction and Development Research Group, Department of Biomedicine, Faculty of Medicine, and Biochemistry and Molecular Genetics Service, Institut d'Investigacions Biomèdiques August Pi i Sunyer (IDIBAPS), University of Barcelona, and Hospital Clínic, Barcelona, Spain

Michael Solomon, PhD Department of Medical Bioscience, University of the Western Cape, Bellville, South Africa

Marcello Spanò, MD Laboratory of Biosafety and Risk Assessment, Division of Technologies and Methodologies for Health Protection, ENEA (Italian National Agency for New Technologies, Energy and Sustainable Economic Development), Rome, Italy

W. Steven Ward, PhD Institute for Biogenesis Research, John A. Burns School of Medicine, University of Hawaii at Manoa, Honolulu, HI, USA

Nirlipta Swain, MPhil School of Life Sciences, Redox Biology Laboratory, Department of Zoology, Ravenshaw University, Cuttack, India

Cigdem Tanrikut, MD MGH Fertility Center, Massachusetts General Hospital, Harvard Medical School, Boston, MA, USA

Marziyeh Tavalaee, PhD Department of Reproductive Biotechnology, Reproductive Biomedicine Research Center, Royan Institute for Biotechnology, ACECR, Isfahan, Iran

Ksenija Zubkova, MD Riga Stradins University, Riga, Latvia