

A Clinician's Guide to Sperm DNA and Chromatin Damage

Armand Zini • Ashok Agarwal
Editors

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 Springer

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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.

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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.

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