Preface

Infertility is defined as the inability to conceive after having unprotected intercourse for a year. Infertility is increasing worldwide and has various causes both in the male and the female partner. Immune reactions to sperm can contribute up to 2–30% of infertility. The sperm has both autoantigenic as well as isoantigenic potential, and is thus capable of producing antisperm antibodies (ASAs) and sperm-reactive T cells in both infertile men and women. Also, over 75% vasectomized men produce autoantibodies to sperm that can cause a problem in regaining fertility even after successful re-anastomosis in vasovasostomy. Early claims regarding the incidence and involvement of ASAs in involuntary human infertility were probably overemphasized because of unreliable techniques and naivety concerning the complexity of the immune response and antigenic nature of the sperm cell. These factors, the lack of well-designed and controlled experimental studies, and the dearth of effective therapeutic modalities resulted in the confusion of the occurrence and importance of ASAs in human infertility. Consequently, evaluation of infertile couples for ASAs and their possible role in infertility was not considered a significant proposition. The development of more accurate assays and the discovery of mucosal immunity capable of responses independent of systemic immunity have caused inclusion of sperm cells and genital tract secretions in the analysis of ASAs. Furthermore, with progress in assisted reproductive and hybridoma technologies, recent developments in proteomics and genomics have tremendously increased our understanding regarding the induction and role of ASAs in infertility. It is becoming clearer now that any immunoglobulin that binds to sperm cannot be called an "antisperm antibody" unless it is directed against an antigen that is relevant to fertilization and fertility.

Although there are numerous reports on ASAs and their role in immunoinfertility, there is no book comprising various aspects of immunoinfertility under a single comprehensive treatise. This book is unique and the first of its kind in bringing together our current knowledge on immune mechanisms, proteomics, and genomics of sperm structure and function, and diagnosis and treatment of ASA-mediated infertility. Also included are chapters on the application of these immune reactions in the development of novel nonsteroidal immunocontraceptives.

This book has 18 chapters, arranged into four sections, written by well-renowned experts in the field of immune infertility from all over the world. In Part I, various sperm antigens involved in immunoinfertility are enumerated. Chapter 1 describes the protein

structure of spermatozoa, the proteome, followed by a chapter dealing with the methods of analysis. In Chap. 2, the proteins inducing immune reactions that cause an impairment of sperm function are summarized. Section II is dedicated to the different aspects of the nature of ASAs. First, the status of immune privilege of the testis is discussed. The following chapters describe the immune chemistry of ASAs, involvement of sperm-specific T cells, the site and risk factors of ASA production, and the prevalence of ASAs in the different compartments of the body. Two other chapters on the occurrence of ASAs in women and the significance of sperm immobilizing ASAs are included. Section III addresses the clinical impact of ASAs. The chapters in this section discuss autoimmune infertility, tests for detection of sperm antibodies, impact of ASAs on male fertility and the role of assisted reproductive technologies and other methodologies to treat immunoinfertility. Section IV includes three chapters discussing the application of immune reactions to gametes and hormones in the development of novel immunocontraceptives for wildlife and humans.

In conclusion, this book is a unique and novel treatise in offering up-to-date information on ASA-mediated infertility. The authors of this book are expert investigators who are pioneers in their fields. This book will provide a model source of authentic, vital, and viable information on the latest scientific developments in the field of immunoinfertility and immunocontraception to clinicians, scientists, students, residents, and fellows working in the field of reproductive biology, obstetrics and gynecology, and urology.

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