
Preface

The plight of infertile couples has been greatly alleviated over the past three decades. Assisted Reproductive Technologies have facilitated the birth of over five million children and counting. Such a wonderful outcome has only been made possible through the tireless work of numerous physicians, nurses, and scientists all around the world. Advances in ovarian stimulation, and laboratory conditions and procedures, have facilitated greater success rates and safer outcomes. Concomitantly, high-order multiple gestations, once a common complication, are now being retired to the archives of human IVF. Nonetheless, the incidence of twins remains high in several communities, culminating in IVF being responsible for a disproportionate percentage of multiple births. The once elusive goal of routine single embryo transfer is finally becoming a reality in some countries. However, in order for single embryo transfer to become the standard of care for all, it is imperative that accurate, rapid, and economical methods of quantifying embryo viability are developed to ensure that the most viable euploid embryo is selected for transfer. Ideally, such tests would be noninvasive, lessening the risks to the embryo and reducing costs and workload in the embryology laboratory.

It was with the goal of single embryo transfer for all patients that we set out to review the established and developing methods for embryo selection, outline promising new technologies, and speculate about the future of embryo selection. The scope of this project covers the analysis of embryo morphological characteristics, both as static observations (conventional scoring) or with time as a continuous variable (morphokinetics), the capability of novel genetic screening approaches for the analysis of embryo ploidy and gene defects, and finally the analysis of both proteome and metabolome of gametes and embryos. The rapid advancement in several technologies described in this book will not only ensure that we are able to obtain highly valuable and novel insights into events during the first week of human life, but will facilitate the creation of assays to identify the most suitable embryo for transfer (and cryopreservation).

It has been our privilege to have worked with the many distinguished contributors for this volume. We dedicate this book to the millions of infertile couples worldwide. It is our collective goal in the IVF community to make their journey to parenthood short in duration and successful.

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Human Gametes and Preimplantation Embryos

Assessment and Diagnosis

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