
Preface

HUMAN FERTILITY DEPENDS ON a highly orchestrated action of hundreds of genes playing together to allow the development of highly complex mechanisms such as gametogenesis and embryogenesis. Abnormal expression of genes involved in these mechanisms has been associated to infertility affecting the assisted reproduction outcome of the affected couples. Alteration of gene expression could be caused by genetic alterations but also by epigenetic causes, which refers to heritable changes in gene expression that occur without modifications at the DNA sequence level. As contemporary medicine increasingly aims to personalize the medical approach to a patient's (epi)genetic profile, the factors that can affect gene expression also increase in importance and relevance to the clinician.

In the field of Reproductive Medicine, there is growing evidence about the influence of epigenetics on the reproductive availability of couples to conceive *in vitro*. The first evidence came from the early 2000s, when it was proved that the risk for imprinting disorders is higher in assisted reproduction technology (ART) couples. Since then, the concern of the clinicians, along with the methodological advances for the study of the epigenome, have increased our knowledge about the causes and the consequences of epigenetic variations of gametes and embryos and their effect in the ART outcome.

This handbook has been organized to provide the reader with the clues to understand the association between epigenetic variations and infertility. The first chapters introduce the main epigenetic mechanisms, followed by an extensive review of how epigenome variations of gametes and embryos are related to human infertility. We have also provided an ethical view of epigenetic variations, and an analysis about where we are and where we go from here in this field. Overall, this text will give the clinician in Reproductive Medicine a reliable grounding in current thinking and research on this fast-moving topic.

We would like to thank the book's contributors for their cooperation in putting together this excellent text. All of them are recognized scientists in their corresponding areas, and have provided valuable responses in a complex, changing, and challenging field.