Preface

THE COMPLETION OF THE HUMAN GENOME PROJECT in 2003 has had an enormous impact on all areas of biology and, increasingly, medicine. At his State of the Union address in 2015, President Obama announced a new initiative in Precision Medicine, which translates basic knowledge of an individual's DNA or RNA sequences into personal and precise approaches to treatment. To date, much of the emphasis in personalized or precision medicine has focused on medical conditions that primarily affect adults, such as cancer and cardiovascular disease. In contrast, herein we focus on the very beginnings of life, from before conception through pregnancy to the newborn, to elucidate the molecular mechanisms that underlie successful reproduction. At the Mother Infant Research Institute at Tufts Medical Center (where we both work) we always say, "Aging begins in the womb." In agreement with the principles articulated by the late David Barker, a healthy pregnancy and normal birth weight play a major role in reducing later-onset disease.

In this volume, our goals as editors were to break down the barriers that typically occur between basic scientists and clinicians, to produce a volume that equally appeals to both constituencies, and to develop a shared language that could lead to collaborations between the two groups, with the ultimate goal of translating basic research advances to improve the care of those beginning their family planning, pregnant women, and their newborns.

The book is organized by the chronological stages that occur from gametogenesis through birth. All sections emphasize both the molecular mechanisms and their clinical implications. Section 1 discusses various aspects of reproductive development in males and females. Section 2 focuses on fertilization and implantation. Section 3 concentrates on placental development. This is particularly important in light of the recent National Institute of Child Health and Human Development initiative on the Human Placenta Project. The chapters in Section 4 discuss molecular aspects of normal pregnancy and delivery. In contrast, Section 5 concentrates on abnormal pregnancy. Section 6 focuses on the rapidly evolving area of prenatal molecular testing. Last, Section 7 discusses research aimed at improving the care of premature and critically ill newborns with single-gene disorders.

It takes many committed people to put together a book such as this one. In addition to the authors of the various chapters, who responded to our suggested edits with good humor, we would like to acknowledge a number of other individuals, including at Cold Spring Harbor Laboratory Press: Richard Sever, for first suggesting this volume, Barbara Acosta, who kept us organized and was our main contact throughout the writing stages of the book, and Joanne McFadden, our production editor. At Tufts, we thank Roanna Forman for her administrative help incorporating our edits into the revised chapters. Most importantly, we thank our families, John, Joshua, and Elliott Curtis and Ann, Nicholas, Gabriella, and Sam Norwitz, for understanding that the time spent away from our own families would hopefully help other families.

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