Preface

The aim of the two-volume set of *Placenta and Trophoblast: Methods and Protocols* is to offer contemporary approaches for studying the biology of the placenta. The chapters contained herein also address critical features of the female organ within which the embryo is housed, the uterus, and some aspects of the embryo–fetus itself, particularly those of common experimental animal models. In keeping with the organization used effectively in other volumes in this series, each chapter has a brief introduction followed by a list of required items, protocols, and notes designed to help the reader perform the experiments without difficulty. In both volumes, sources of supplies are given and illustrations highlight particular techniques as well as expected outcomes. A key aspect of these volumes is that the contributors are at the forefronts of their disciplines, thus ensuring the accuracy and usefulness of the chapters.

Placenta research has progressed rapidly over the past several decades by taking advantage of the technical advances made in other fields. For example, the reader will note that many techniques, such as reverse transcriptase polymerase chain reaction, northern and western blotting, microarray analyses and *in situ* hybridization experiments, are routinely used for dissecting a wide range of experimental questions. Protein analysis and functional experiments on tissues and cells that comprise the maternal–fetal interface benefit from studies in endocrinology, immunology, and developmental biology. These volumes also present new ideas on investigating gene imprinting and gene transfer via viral vectors.

In developing these volumes we encountered the problem of how to organize the contents so as to be reader-friendly. Our decision was to subdivide in large part by the chronology of pregnancy so that in vivo aspects of implantation come first, followed by in vitro systems of investigation, then protocols for phenotypic analyses of placentas of several species. Special techniques mentioned above conclude Volume I. Volume II continues with protocols for studying trophoblast invasion, followed by dissection of how invading trophoblast cells might be received by uterine immune cells. Returning to the placenta itself, methods for researching trophoblast endocrine and transport functions are followed by a final series of chapters on how placentas adapt to disease. In this latter group, two chapters offer help to investigators interested in animal models of human placental disorders and two address working with the oxygen switches that program gene expression in early pregnancy, a concept entirely unexplored

less than a decade ago. The reader is referred to the Introductions in each of the two volumes for a more detailed description of the contents.

This project would not have been possible without the contributions of many individuals. We wish to express our gratitude to the contributing authors for their time, effort, creativity, and their willingness to share their knowledge and expertise. Our deep appreciation and gratefulness also goes to Stacy McClure for her dedicated efforts in maintaining the organization of the manuscripts and the correspondence between the editors and the authors. During this process the publisher has provided us with helpful guidance and instruction essential for the completion of this effort.

Finally, we hope that these volumes are useful and provide a valuable resource for both trainees and established scientists striving to advance our understanding of this unique, entirely essential organ of reproduction.

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