

CONCEPTION OF THIS PUBLICATION

The book you are examining arose from a faint glimmer of opportunity for research funding offered in 2010 by the Governments of Canada and Brazil. Subsequent to the signing of bilateral Trade Agreements, the Ministry of Foreign Affairs and International Trade, Canada (DFAIT), and the Federal Agency for Support and Evaluation of Graduate Education (CAPES) in Brazil developed a competitive grants program. The "Canada-Brazil Awards—Joint Research Program (2011–2012)" offered support for up to 20 PhD student exchanges, each of six months, between paired institutions. One of the application criteria was that a joint publication was a required outcome. At the time of this announcement, the Croy–Yamada collaboration on mouse uterine natural killer cells had been ongoing for more than a decade. After a few short e-mail exchanges, the decision was taken to enter the competition with an application entitled "Wellness promotion prior to conception and during fetal life". An integrated series of studies of mouse models and human subjects was proposed between the laboratories of five Canadian and eight Brazilian faculty mentors located at Queen's University, Kingston ON Canada and UNICAMP, Campinas SP Brazil.

An early topic of discussion during preparation of the application was "what about that requirement for a joint publication?" At that time, the Croy–Yamada collaboration had produced a number of jointly authored peer-reviewed articles, reviews, and book chapters. Thus, the challenge was not production of a joint publication, but what type of publication could we propose that would make our application stronger and more competitive. A *book* seemed appealing and, as we discussed the theme, the huge void in single source, reference information regarding the mouse placenta and many of the physiological approaches for studies of mid-to-late mouse pregnancy and parturition kept surfacing. The usefulness of Matthew Kaufman's detailed "Atlas of Mouse Development,"¹ first published in 1992, is widely appreciated. Similarly and also into multiple editions, is "Manipulating the Mouse Embryo: A Laboratory Manual", first published in 1986.² This book is globally credited with making early embryo manipulations accessible to all interested investigators and it is recognized for its clarity and up-to-date protocols. We envisioned for our grant application a text that would prove of equal value to these "gold standard" reference texts for consolidating information on the mouse placenta and on the mechanisms regulating physiological aspects of mouse pregnancy.

Goals

The goal of this book is to provide a consolidated reference with protocols to enable investigators new to the field of placental study to immediately undertake successful experiments. We hope that these experiments will be important and will advance understanding beyond the current knowledge presented within these pages. We also hope that the range of content will engage and inspire all investigators in the field to ask the new questions that will propel research forward in the understanding of pregnancy complications and their consequences in humans and other animals. The book is also an informative reference for those who hold support or regulatory positions in animal research. Discussions of approaches to questions concerning pregnancy and clear technical protocols should aid in the understanding of investigator's choice of specific techniques. Furthermore, we hope that the book will inspire researchers who are developing pharmaceutical and biological therapies to include pregnant subjects and their fetuses in trials by providing practical and validated protocols useful in evaluation of therapeutic efficacy or toxicity. Thus, the educational goals of the agencies sponsoring The Canada–Brazil Awards—Joint Research Program (2011–2012) competition were aligned with our approach to this project. Well before the grant application was submitted, we had become passionately committed to development of this book.

THE MANY THANK YOUS OVER THE COURSE OF THIS PROJECT

Development

Our first task was to develop a detailed plan for the content of this book. To assist in this task Dr Francesco J. De Mayo, Baylor College of Medicine, Houston TX and Dr S. Lee Adamson, Lunenfeld-Tanenbaum Research Institute, Toronto ON joined the editorial team. Their contributions have been invaluable in balancing topics, identifying, and recruiting leaders in the various subject areas as authors and in preparation of their own chapters. Three publishing houses provided detailed comments on our draft book proposal from external expert reviewers and offered us contracts. This greatly reinforced our commitment to the project since all of the reviewers agreed that the topic was important and that there was no existing comprehensive publication addressing it. When DFAIT and CAPES supported our application with a full training award between Queen's University in Kingston, Ontario Canada and University of Campinas (UNICAMP), Campinas Brazil in 2011, our book project began in earnest.

Gestation

The mentors and trainees involved in the Queen's University-UNICAMP—Joint Research Program made major contributions to the preparation of this book. They undertook experiments, wrote chapters, and reviewed manuscripts. We appreciate the similar generous assistance received from current and former research trainees and faculty members of the Queen's University Group for Research on the Reproductive and Developmental Origins of Health, Disability and Disease, who were not participants in the training exchange program. Each chapter received at least two reviews, one of which was provided by a graduate student or postdoctoral research fellow to ensure that communication with entry-level investigators was successful. The editors thank all of the reviewers for their help in improvement of the book through the review process.

Gestational Complications-The ATLAS

We seriously underestimated the time and effort that would be required to assemble the ATLAS component of this book. The ATLAS was prepared in Croy's Canadian and Yamada's Brazilian laboratories and, for more than a year, involved faculty, staff, and trainees who were not initially part of the training exchange program. A "book team" developed at Queen's University that involved volunteers ranging from undergraduates to family relatives who each brought unique skills to our ATLAS preparation task. Dr Anne Croy dissected all of the gross anatomical specimens, which were from NIH Swiss (Harlan Sprague Dawley) and from CD1 (Charles River Canada) mice, two related randombred strains. The specimens were positioned for gross anatomical and microscopic photography by Dr Stephen Pang, a former head of the Department of Anatomy and Cell Biology, Queen's University. Thousands of photographs of these specimens were taken by Ms Judith Janzen-Pang and Dr Yat Tse. After image selection by the team, Dr Pang and Ms Janzen-Pang provided photo editing, Ms Denise Tse provided illustrations, including the cover drawing based on our gestation day 13.5 dissections and Dr Yat Tse provided invaluable computer support.

The paraffin-embedded immunohistological series was prepared by Mr Andrew Edwards and Ms Amanda Carniato in the Yamada Laboratory using NIH Swiss mice. ATLAS plates were prepared from images of these slides scanned at the Queen's Laboratory for Molecular Pathology by Mr Shakeel Virk using an Aperio CS digital slide scanner. Ms Janzen-Pang, Ms Annie Peng, and Ms Denise Tse provided photo editing and illustrations of the histological specimens. Whole mount stains of viable CD1 and C57BL/6 (Charles River Canada) implant sites, their photography, and editing were conducted by Mr Alexander Hofmann, Mr Matthew Rätsep, and Ms Janzen-Pang at Queen's University. Dr Patricia D. A. Lima and Ms Ashley Martin, Queen's University assisted in numerous ways, particularly in the preparation of timed animal matings and in ATLAS image labeling and figure legends. MRI images were prepared by Dr Petra Arck and Dr Chressen Remus Universitätsklinikum Hamburg-Eppendorf Hamburg Germany.

The Product of Conception

The ATLAS chapters (Part I. Atlas) are followed by a series of discussion papers (Part II. Basic Biology) on placental research topics currently considered to be important. This is followed by detailed methodology protocols (Part III. Protocols). On behalf of all of the editors, I thank each of the lead and supporting authors of these chapters for their enthusiasm for the project and for their efforts in the preparation of their materials. In many cases, detailed new images were collected or drawn to support text descriptions of methodologies to ensure the reader's clear understanding. These details are rarely found in primary publications and the authors and editors hope these illustrations will be highly instructive.

We thank Mary Preap and Janice Audet at Academic Press/Elsevier, NJ for embracing our original idea, for encouraging us, and for their enthusiastic and constant support of this project. We particularly thank Academic Press/Elsevier for proposing the large number of figure plates you will find in this book and for making them all available as color plates. We are of course most grateful to DFAIT (Canada) and CAPES (Brazil) for their support, which permitted development of this guidebook.

The placenta is the platform upon which mammals build their lives and set the thresholds that will determine lifelong postnatal health. Everyone contributing to this project is enthusiastic that much more will be learned from studies of the placenta. We hope that you as readers find this publication a valuable reference and training tool and that you will build from it for many years.

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References

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2. Nagy A, Gertsenstein M, Vintersten K, Behringer R. *Manipulating the mouse embryo. A laboratory manual*. 3rd ed. Cold Spring Harbor, (NY): Cold Spring Harbor Laboratory Press; 2003.