

# Preface

Despite significant experimental advances, much promise, and excessive publicity, most cell-based therapies have yet to deliver meaningful impact to patient care. Conspicuous exceptions have been therapies based on amplifying the biological role played by cells in their natural environment. Evident examples are variations of blood transfusions and bone marrow transplantation. These long-established cell-based therapies have had unparalleled impacts in health care, to a large extent due to the fact that the cells involved fulfill the very same roles that they already perform in nature. Therein lies much of the appeal of fetal stem cell-based regenerative medicine, particularly as it applies to the perinatal period, during which the normal biological activities of these cells are regulated within the distinctive environment in which they already operate, aiming at therapeutic benefit. As much as fetal stem cells have shown to possess unique characteristics compared with other stem cells, so do the fetus and neonate when compared with any other age group, converging into a perfect storm that enables unparalleled biomedical discoveries, original therapeutic paradigms, and ultimate translational significance. Although fetal stem cells have been increasingly used in recipients of all ages, this book is focused on their perinatal applications, exploring the exceptionality of their fundamental roles in fetal development, arguably the purest form of regeneration. This relationship lends overt biological validation to the use of these cells in therapeutic strategies within this specific period, confirmed by prolific advances in the field. It also allows for the establishment of select service-based models of on-demand individualized stem cell processing, while validating fetal stem cell banking as clinically relevant.

In light of such tangible biological and therapeutic correlations, it is perhaps surprising that fetal regenerative medicine is still in its infancy, even when compared with its parent field. Therefore, expectedly, much of the nomenclature used has yet to be properly standardized. This is reflected in some of the chapters, which expose terminology overlaps typical of an emerging discipline, while we deliberately avoided attempts to arbitrarily systematize it. Also typical of a burgeoning field is its fluidity. This has led us to favor basic principles and general translational

strategies, as opposed to multiple, as of yet unwarranted fragmented chapters devoted to narrower specific applications, conferring a more universal nature to the book. This should appeal to a broader readership of physicians, scientists, and trainees.

We were fortunate to have attracted contributions from esteemed, highly prominent colleagues in their respective areas of expertise, to whom we are greatly obliged. We are also grateful to Michael Griffin at Springer for his patience and precious assistance throughout the preparation of this volume. Special thanks from MB to the late Andree Gruslin, a kind, passionate, and cheerful clinician-scientist who will be always remembered for her devotion to promoting regenerative medicine. A personal, deep expression of gratitude from DOF goes to Kevin and Kate McCarey for their sustained generous support, without which a number of the developments discussed herein would not have taken place.

Boston, MA, USA  
Ottawa, ON, Canada

Dario O. Fauza, MD, PhD  
Mahmud Bani, PhD

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Fauza, D.O.; Bani, M. (Eds.)

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