

Preface

The first edition of this book was published in 2005. Over the past five years, tremendous progress has taken place in the field of stem cell biology both in the basic and applied aspects of the science. These advances have included the entire myriad of stem cell types isolated from embryos, extra-embryonic membranes, fetal and adult organs. A major breakthrough has been the customization of tissues to individuals by reprogramming their somatic cells to the embryonic state (human induced pluripotent stem cells, hiPSCs) using transfection with pluripotent genes to help overcome the problems of immunorejection and thus bypassing the ethical issues involved in the destruction of human embryos for embryonic stem cell derivation. Several laboratories are now deriving customized tissues for various diseases using hiPSC technology. Although the basic research aspects of stem cells has been aggressive with many novel reports being documented in the literature, the clinical applications this science has promised to offer for the treatment of various diseases has still a long way to go. The delay has been due to several clinical hurdles that have to be overcome, such as the ability to scale-up large numbers of clinical grade stem cell-derived tissues for transplantation, the development of methods to eliminate potential tumorigenesis and the manufacture of cGMP tissues for FDA approval for clinical trials. We remain cautiously optimistic that these hurdles will be overcome.

This second edition provides the reader up-to-date state-of-the-art chapters covering the whole spectrum of pluripotent and multipotent stem cells. The basic and applied aspects of the stem cell types and their differentiated tissues are presented with additional chapters on ethics, large-scale cell expansion and tissue engineering. The authors are all giants in their fields and have contributed comprehensive views of their subjects. We hope the reader will enjoy reading the contents of the various chapters and we believe that this book will be an attractive resource for

undergraduate and postgraduate students, scientists, doctors and perhaps even the lay reader.

We are very grateful to all the authors who provided such excellent chapters. We also thank Ms Lim Sook Cheng and Ms Azouri Bongso from World Scientific Publishing Ltd for their kind assistance on editorial and cover design work, respectively.

Ariff Bongso
Eng Hin Lee