

## Preface

The fields of stem cells and regenerative medicine are in the process of rapid transformation thus bringing much more hope than hype for the patients. Although it would be a daunting task to cover all aspects of the fields, in this edition the editors have sought to get experts from around the world to cover a number of topics encompassing from the use of stem cells as *in vitro* platform to conduct early potential therapy testing to their various applications in regenerative medicine.

The book is a compilation of topics of interest for the audience who aspire to discover more about the multifaceted applications of this promising approach to treat/cure diseases. Chapter-1 describes the advent of induced pluripotent stem cells (iPSCs) derived cardiomyocyte platforms to perform early phase diagnostic and therapy assessment in patient specific manner. While chapter compares different platforms and charters pathway for improving iPSC derived cardiomyocyte engineered hearty tissues for patient specific theranostics, chapter-2 provides an overview of large experimental animal models for translational assessment of cell-based therapies with a focus on the hurdles that need to be overcome for their clinical use. Chapter-3 provides an in-depth overview of the newly emerging concept of cell-free therapy based on the paracrine activity of stem cells. The authors have also provided mechanistic insight into how the cytokine and growth factor rich conditioned medium from stem cells can be beneficially support the intrinsic repair process. Chapter-4 describes the multifarious applications of skeletal muscle stem cells. Headed by a leading expert in myoblast therapy, the group of authors describes the clinical significance of myoblast implantation with focus on muscle regeneration in muscular dystrophy patients, ischemic cardiomyopathy and for the treatment of diabetes and cancer. Chapters-5 and -6 describe the novel emerging use of stem cells in ophthalmology, an area wherein safety and feasibility of stem cells has already assessed in the clinical settings. Chapter-7 addresses the conventional therapies used to treat prevalent liver diseases along with their limitations and further discusses the potential of various cell types such as hepatocytes, hepatic progenitor cells, mesenchymal stem cells, and embryonic stem cells for liver regeneration. It also reviews the studies related to liver bioengineering and scaffolds assisted liver regeneration. Chapter-8 highlights the importance of patient specific iPSC-derived cardiomyocytes as *in vitro* platforms to study channelopathies and cardiac arrhythmias and their potential application in the clinical perspective. The book is concluded with an interesting hypothesis regarding the role of stem cells in evolutionary process.

