

Preface

Stem cells represent an exciting new technology for regenerative medicine and repair of the human body in disease and aging. The study of stem cells in laboratory animals has a long and rich history. This field of study was greatly accelerated by the work of James Thomson and his colleagues in their isolation and characterization of human embryonic stem cells. Several chapters in this book are devoted to recent advances in human embryonic stem cells in relation to the development of the immune system, as a model for the development of islet cells in the pancreas, and in the identification of nuclear reprogramming factors to achieve an embryonic stem cell state.

Other chapters in this book focus on the isolation and characterization of stem cells derived from adult and neonatal tissue. These include stem cells derived from bone marrow, umbilical cord blood, brain, muscle, and other organ systems of the body. The use of these stem cells to produce differentiated cells such as heart cells, skeletal muscle cells, kidney, liver, and cells of the nervous system is discussed in the chapters.

The application of stem cells for regenerative medicine is critically dependent on the ability to generate sufficient quantities of clinically relevant cells. These issues are discussed in the chapters that focus on the maintenance and large scale manufacturing of stem cells.

The compilation of this book on the latest advances in the field of stem cell research required the participation of many individuals. However, we would like to acknowledge, in particular, the contribution of Elizabeth Hedin for her careful and meticulous editing of the chapters in this book.

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