Stem Cells in Clinical Applications

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Stem Cell Transplantation for Autoimmune Diseases and Inflammation

Springer

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Preface

Autoimmune diseases and inflammation are the most common health conditions and also are the causes for some chronic diseases as well as cancer. The general cause for both autoimmune diseases and inflammatory diseases is the hyperactivities of the immune system. These conditions appear in two forms: chronic illnesses in which the activity of the immune system increases for a long time and acute illnesses in which the immune system suddenly increases their actions in a short time. These errors of the immune system can be corrected by two different strategies: by stem cell transplantation to replace the new immune system or by modulating the immune system. In the first strategy, the host immune system can be destroyed by chemicals and/or radiations and replaced by the new immune system formed by the source of grafted hematopoietic stem cells. Hematopoietic stem cells (HSCs) can produce all kinds of blood cells including red blood cells, white blood cells, and platelets. HSC transplantation was performed over 50 years, and now, this therapy is used as a routine treatment for some diseases including autoimmune. In the second strategy, the host immune system would be modulated by mesenchymal stem cells (MSCs) which are the most popular cells in human beings. In recent years, these cells were widely used in the treatments. With some particular therapeutic characteristics, MSCs exhibited the treatment efficacy in some different diseases, but the essential characteristic is the immune modulation, which is the capacity of MSCs to control the immune system activity by inhibiting some effector immune cells, such as Th, Tc, B, or dendritic cells, and stimulating the T-regulatory cells. By this characteristic, MSCs can efficiently control the inflammation reactions in the patients.

This book introduces updated sources from technologies to clinical applications of HSC and MSC transplantations to treat autoimmune diseases and inflammatory diseases. The book included two parts: Part I, which introduces some updated techniques and applications of stem cell therapies for autoimmune disease treatment, and Part II, which introduces these technologies used to treat some popular inflammatory diseases, including chronic knee osteoarthritis, chronic obstructive

pulmonary disease, and liver cirrhosis. This book is an essential source for all clinical researchers as well as stem cell scientists.

We are indebted to the authors who graciously accepted their assignments and who have infused the text with their energetic contributions. We are incredibly thankful to the staff at Springer for agreeing to publish the book.

Ho Chi Minh City, Vietnam Phuc Van Pham

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