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## Preface

In the last decades, investments in basic research have yielded extensive knowledge about the many and complex processes involved in the development of an organism. Since human pluripotent stem cells were first isolated, research on stem cells has received much public attention, both because of its extraordinary promise and because of relevant legal and ethical issues. Regenerative medicine is classified into cell therapy that does not require a scaffold and tissue engineering that requires a scaffold and bioactive substances such as growth factors; though both need adult stem cells. Bioengineers, life scientists, and physicians across all specialties are synergistically coupling expertise in areas such as cell culture technology, tissue transfer, cell differentiation, angiogenesis, computer modeling, and polymer chemistry to use adipose tissue as a base for regenerative medicine.

On November 2008, during a meeting of Yves-G rard Illouz and Aris Sterodimas in Rio de Janeiro, Brazil, the idea to write a book focusing on adipose stem cells and their role in regenerative medicine was born. This book is the most up-to-date text on regenerative medicine based on adipose stem cells. There are 24 chapters by international experts with the newest techniques explained in detail. Bioengineers, life scientists, and physicians from Brazil, Canada, France, Germany, Greece, Indonesia, Israel, Italy, Korea, Japan, Switzerland, Turkey, United Arab Emirates, UK, and USA joined forces in order to ensure the reader is provided information both about the basic biology of adipose stem cells, and their therapeutic potential. This book contains chapters focused on the applications of adipose stem cells on specific fields, like cardiology, orthopedic surgery, neurology, urology, otolaryngology, plastic and reconstructive surgery, organ transplantation, and dentistry. Also included are chapters on adipose stem cells as therapeutic delivery tools for gene therapy, in the field of pharmacology and obesity. The science represented in this book focuses exclusively on scientific publications, paying extreme attention to the safety and ethics considerations for developing adipose stem cell-based therapies.

The compilation of this book on the latest advances in the field of adipose stem cell research required the participation of many individuals. We wish to sincerely thank all the authors for contributing to this book. We would like to acknowledge, in particular, the contribution of Mrs. Mahalakshmi and the Springer team for the meticulous type-editing of the chapter in this book and Mrs. Ellen Blasig from Springer-Verlag for her continuous support since we embarked on this project in January 2010.

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