Foreword: The Science of Reconstructive Transplantation

Reconstructive transplantation is an emerging area of transplant medicine that has become a viable option for patients with large and devastating tissue defects. Over the past decade, a rapidly growing number of face and upper extremity transplantations have been performed worldwide with highly encouraging outcomes. Advances in microsurgical techniques, transplant immunology, and immunosuppression have enabled such operations.

It has been a pleasure to see the life-changing impact of the hand, face, and other composite allografts. Recipients of these grafts represent a new generation of transplant recipient pioneers. The uniqueness of their grafts, which include donor bone marrow, could help further elucidate the mechanisms by which transplanted organs and tissues are accepted. In turn, novel strategies to facilitate these mechanisms may be developed.

The Science of Reconstructive Transplantation presents a comprehensive overview of the latest advances in basic and translational research in the field. Many of its leaders have contributed their expertise to the inspiring book. Important topics include reconstructive animal models, skin rejection, immune monitoring, stem cell-based immunomodulation strategies, costimulatory blockade, tolerance induction, chronic rejection, ischemia–reperfusion injury, nerve regeneration, and cerebrocortical reintegration.

The textbook should spark the interest of physicians, scientists, and surgeons, while serving as a valuable reference for students and scholars engaged in this novel and emerging area of transplantation.



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Foreword: The Science of Reconstructive Transplantation

Although the outcome of the initial series of hand and face transplantations has been better than any other field of transplantation, fewer than 100 upper extremity and only 29 face transplants have been performed since the first successful hand transplant in Lyon, France, in 1998. Wider application of reconstructive transplantation is hampered to a large extent by the lifelong need for immunosuppression. Minimization of immunosuppression or even induction of a specific immune tolerance has to be considered a prerequisite for further propagation of this most fascinating field.

This book covers the various aspects of reconstructive transplantation with special emphasis on immunology. All chapters are written by top experts in the field.

The Science of Reconstructive Transplantation is a must for every clinician and scientist working in the field, but is also worthwhile for anyone with an interest in new developments in medical science.



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Preface

Reconstructive transplantation of vascularized composite allografts, such as hand, face, and abdominal wall transplants, has become a clinical reality and a viable treatment option for the patients suffering from complex tissue injuries or defects not amenable to conventional reconstruction. Despite the fact that early and intermediate outcomes are highly encouraging, skin rejection, the need for chronic immunosuppressive treatment and the relatively slow pace of nerve regeneration continue to hamper broader clinical application and further expansion of indications. Therefore, a thorough understanding of the unique biological features and basic mechanisms related to immunogenicity and neuroregeneration in this novel and emerging field of transplantation is key to establishing future treatment protocols that allow to favorably balance the risks and benefits for such *non-life-saving* but *life-changing* types of transplants. This was the impetus to embark on this project and create a book entirely devoted to research in reconstructive transplantation.

Written by renowned scientists and leaders and pioneers in the field, *The Science of Reconstructive Transplantation* thus presents a comprehensive overview of the latest advances in basic and translational research in the field of reconstructive transplantation with a particular emphasis on its potential therapeutic implications.

The book has been structured into two parts. Part I gives an overview of the history and development of reconstructive transplantation, discusses what can be learned from the experiences and successes over the past 60 years in solid organ transplantation, and provides insights from a recipient perspective describing the experience and daily life of the first US patient receiving a combined forearm and hand transplant. Part II concentrates on individual research areas, spanning topics such as the use of small and large animal models for reconstructive transplantation research, mechanism and diagnosis of skin rejection, immune monitoring concepts, cell-based immunomodulatory strategies, tolerance induction, chronic rejection, ischemia–reperfusion injury, models and tools to assess nerve regeneration, and cortical reintegration of vascularized composite allografts. While this volume is certainly not inclusive of all areas of transplantation research, it contains topics that are of major current interest and have significant potential for translation and future clinical applications.

Thus, the audience for this book includes biomedical researchers and basic scientists in the field of reconstructive transplantation, transplant immunology, and regenerative medicine, as well as clinicians, surgeons, and multidisciplinary specialists, interested in this novel and exciting field.

I am extremely grateful to Drs. Thomas E. Starzl and Raimund Margreiter for writing forewords of this book. Dr. Starzl has taught me about the fundamental and natural laws of immunology. In addition, by sharing his personal reflections on one of the most exceptional transplant journeys, he taught me that through relentless pursuit of a goal and vision, eventually stunning successes can be achieved in a novel discipline. My surgical teacher and mentor, Dr. Margreiter, has involved me in reconstructive transplantation in the very early days of the field as a young resident and has supported my efforts throughout my entire professional career. He has been and remains to be the ultimate role model of a surgeon-scientist.

Finally, I would like to express my sincere appreciation to all the contributors for sharing their experience and knowledge in this book and for their excellent manuscripts. I would also like to thank Springer for supporting this exciting project and the opportunity to edit this volume.

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http://www.springer.com/978-1-4939-2070-9

The Science of Reconstructive Transplantation
Brandacher, G. (Ed.)
2015, XXI, 401 p. 68 illus., 62 illus. in color., Hardcover
ISBN: 978-1-4939-2070-9
A product of Humana Press