

Preface

No field of medicine has engendered greater excitement or enjoyed greater success than the field of transplantation. Organ transplantation allows the “cure” of disease by replacing failing organs with physiologically normal organs. Tissue transplantation and tissue engineering allow not only the replacement of abnormal cells, such as bone marrow cells, but also the possibility of using a transplant to impart novel physiologic functions. The major limitation to applying transplantation for the treatment of disease is a shortage of human donors. This shortage limits transplant procedures to as few as five percent of those that would be carried out if the supply of organs and tissues were unlimited. Because of this shortage and because of recent advances in fundamental knowledge, there has been a crescendo of interest in xenotransplantation, the use of animals in lieu of humans as organ and tissue donors.

For many years, xenotransplantation has seemed only a distant prospect because of the severe immune responses of the host against the graft. Recent studies, however, have revealed the molecular basis of these immune responses and have given rise to novel therapeutic approaches for circumventing them. For example, the generation of transgenic animals expressing human complement regulatory proteins or human glycosyltransferases raises the prospect that the severest type of rejection can be avoided without manipulating the xenograft recipient. Thus, xenotransplantation has quickly moved to center stage in the field of transplantation, engaging the interest of clinicians, basic scientists, and academicians.

Xenotransplantation: Basic Research and Clinical Applications compiles and explains the fundamental molecular and cell biology that has been applied with such advantage in the emerging fields of transplant immunology and xenotransplantation. The contributors to this book are established authorities in transplant immunology and molecular and cell biology. This book provides a base of knowledge for the practitioner, fellow, and student, and those involved in biotechnology and related sciences.

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