This is the first volume to look in depth at the functioning of the vascular endothelium, and at the diseases and tissue injury that arise as a result of inflammation and immunological responses. The vascular endothelium is a metabolically highly active layer of cells lining all blood vessel walls. Through its interactions with leukocytes and other mediators, it is central to the development of inflammatory foci and to lymphocyte trafficking around the body. Tissue injury may arise here as a result of abnormal inflammatory or immune responses. The potential for such injury to contribute to autoimmune disease is discussed in this book, particularly in relation to autoimmune vascular disease of the renal, rheumatological and neurological systems, as well as in organ transplantation.
Immunological aspects of the vascular endothelium
CAMBRIDGE REVIEWS IN CLINICAL IMMUNOLOGY

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Recent advances in immunology, particularly at the molecular level, have led to a much clearer understanding of the causes and consequences of autoimmunity. The aim of this series is to make these developments accessible to clinicians who feel daunted by such advances and require a clear exposition of the scientific and clinical issues. The various clinical specialities will be covered in separate volumes, which will follow a fixed format: a brief introduction to basic immunology followed by a comprehensive review of recent findings in the autoimmune conditions which, in particular, will compare animal models with their human counterparts. Sufficient clinical detail, especially regarding treatment, will also be included to provide basic scientists with a better understanding of these aspects of autoimmunity. Thus each volume will be self-contained and comprehensible to a wide audience. Taken as a whole the series will provide an overview of all the important autoimmune disorders.

Autoimmune endocrine disease    A. P. Weetman
Immunological aspects of renal disease    D. B. G. Oliveira
Gastrointestinal and hepatic immunology    R. V. Heatley
Immunological aspects of the vascular endothelium

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Preface

Endothelial cells form the interface between blood and tissues throughout the body. They are thus the first barrier between cellular or humoral components of the immune system and any challenging extravascular antigen. In recent years it has become apparent that this barrier is far from being metabolically inert, that the properties of endothelial cells contribute critically to the physiological and pathological extravasation of leukocytes, and that these properties can be modulated substantially by inflammatory and immune mediator molecules. In addition, in a subset of autoimmune diseases, vascular damage is prominent, suggesting that immunological effector processes are being targeted inappropriately to the cells of the vessel wall. Similar processes may also underlie rejection of transplanted organs, where donor blood vessels are prominently and primarily affected.

In this volume we have gathered a series of expert authors to describe in more detail the immunological aspects of vascular endothelial cell function summarized above, introduced by a chapter that updates current general concepts of autoimmunity as a framework for what follows. The next three chapters review the ways in which the endothelial phenotype can be modulated by inflammatory and immune cytokines, particularly surveying the recent enormous increase in our understanding of how endothelial cells control leukocyte adhesion and emigration, and of the molecular families implicated in this control. These fall into overlapping but distinct patterns directing the selective emigration of different leukocyte classes in acute or chronic inflammation, and the recirculation of lymphocytes through the lymphoid tissue.

The next five chapters cover what is known (or suspected) of the role of endothelial cells in individual autoimmune diseases where there is a greater or lesser degree of vascular involvement. These include diseases where specific organ involvement is prominent, ranging from the brain or eye to the kidney, joints or skin, and also the primary systemic vasculitic diseases. The final chapter emphasizes the under-appreciated ability of endothelial cells,
when stimulated, to present antigens with the correct co-stimulatory signals to lymphocytes, and hence to trigger the immunological process of graft rejection. Taken together, we hope that the second half of the book provides a persuasive argument as to why understanding normal endothelial cell function and its dysregulation is vital if we are to succeed in designing effective therapies for the treatment of these diseases.

Caroline Savage and Jeremy Pearson
March 1995