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Preface to the Series

The mechanisms of disease production by infectious agents are presently the focus of an unprecedented flowering of studies. The field has undoubtedly received impetus from the considerable advances recently made in the understanding of the structure, biochemistry, and biology of viruses, bacteria, fungi, and other parasites. Another contributing factor is our improved knowledge of immune responses and other adaptive or constitutive mechanisms by which hosts react to infection. Furthermore, recombinant DNA technology, monoclonal antibodies, and other newer methodologies have provided the technical tools for examining questions previously considered too complex to be successfully tackled. Probably the most important incentive of all is the regenerated idea that infection might be the initiating event in many clinical entities presently classified as idiopathic or of uncertain origin.

Infectious pathogenesis research holds great promise. As more information is uncovered, it is becoming increasingly apparent that our present knowledge of the pathogenic potential of infectious agents is often limited to the most noticeable effects, which sometimes represent only the tip of the iceberg. For example, it is now well appreciated that pathologic processes caused by infectious agents may emerge clinically after an incubation of decades and may result from genetic, immunologic, and other indirect routes more than from the infecting agents themselves. Thus, there is a general expectation that continued investigation will lead to the isolation of new agents of infection, the identification of hitherto unsuspected etiologic correlations, and, eventually, more effective approaches to prevention and therapy.

Studies on the mechanisms of disease caused by infectious agents demand a breadth of understanding across many specialized areas, as well as much cooperation between clinicians and experimentalists. The series *Infectious Agents and Pathogenesis* is intended not only to document the state of the art in this fascinating and challenging field but also to help lay bridges among diverse areas and people.

M. Bendinelli
H. Friedman

Preface

This volume, *In vivo Models of HIV Disease and Control*, is very appropriate, we believe, for this continuing series on infectious agents and pathogenesis. This book describes accumulated and recent knowledge about animal model systems for studying acquired immunodeficiency caused by viruses, especially retroviruses and lentiviruses. It is widely acknowledged that studies on animal retrovirus infections have been a major contributor to the collective understanding of the biology and mechanisms of the diseases caused by such viruses. In particular, the onset of the acquired immunodeficiency syndrome (AIDS) pandemic in the early 1980s due to infection by the human immunodeficiency virus (HIV) infection resulted in an urgent need to understand mechanisms regarding how the immune system is altered. The resulting collapse of the immune system leading to opportunistic infections has provided a unique perspective on host-microbe interactions. As a result, during the past few decades there has been an explosion of knowledge concerning the nature and function of normal immunity, both humoral and cellular, and especially the role of soluble factors (i.e., cytokines). It was soon recognized that HIV infection preferentially compromises cells of the adaptive as well as innate immune systems and results in marked immunosuppression so an infected individual becomes highly susceptible to opportunistic microbes, including other viruses as well as intracellular opportunistic bacteria and fungi. Studies of animal retroviruses, including lentiviruses, which cause immunodeficiency states in rodents, nonhuman primates, and even cats, and so forth, increased as models. It is widely acknowledged that an understanding of the nature and mechanism whereby animal studies of immunodeficiency virus infection, especially ones concerning the nature and mechanism how such viruses suppress immune resistance, provide important information applicable to the human AIDS pandemic. In this volume chapters concerning the simian AIDS model, feline immunodeficiency virus (FIV), and other animal lentiviral infections are examined as model for AIDS.

The first chapter in the book is a historical perspective by Dr. Murray Gardner, University of California, who pioneered development of the feline retrovirus model, as well as the simian AIDS model. He presents an his-

torical perspective of studies concerning animal retrovirus infection directly related to AIDS. He reviews the early oncogenic virus program at the National Institutes of Health and worldwide of the late 1960s and 1970s, which provided early knowledge concerning how RNA tumor viruses in mice, cats, chickens, cows, and even reptiles, result in malignancy and collapse of the immune system. In particular, studies with murine retroviruses resulted in discovery of reverse transcriptase and thus a better understanding of the molecular biology of how these viruses replicate, resulting in infection of host cells. This chapter spans immunosuppressive retrovirus research in the murine system and in larger animals such as cow, horses, goats, and sheep, as well as the simian models. These studies provided the foundation for understanding the pathogenesis of lentivirus immunodeficiency infection.

Subsequent chapters describe in detail the SIV model, including a chapter concerning anti-AIDS drug studies in SIV infected monkeys. Other chapters describe the FIV model, including pathogenesis of the disease, FIV as a model for HIV treatment with antiviral drugs, protective FIV vaccines in infected cats, and the FIV model for studies of drug abuse. Additional chapters review equine infectious anemia virus as a lentiviral model and caprine arthritis-encephalitis, also as a model for AIDS. Use of animal models for direct infection with the AIDS virus is described in a chapter concerning severe combined immunodeficiency in mice. A chapter concerning newer information about the pathogenesis of HIV infection and the role of chemokines, and a final chapter on future perspectives using animals for research directly applicable to humans, especially pathogenesis, chemotherapeutic treatment, and vaccine development for human diseases follow.

It is widely acknowledged that immunodeficiency virus studies have already and will in the future provide numerous beneficial insights for both basic science and applied medicine. The editors of this volume, as well as the authors of individual chapters, are encouraged by the many recent molecular biologic, immunologic, and pathologic studies, which provide a more thorough understanding of the nature and mechanism whereby immunodeficiency viruses cause disease. We believe continuing interest in animal models of HIV disease and control will contribute significantly to advances in the prevention and treatment for immunodeficiency disease states in humans and domestic animals.

The editors express their gratitude to Ms. Ilona Friedman, who served as an outstanding editorial assistant for this volume, as for all books in this series.

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