2nd Edition

DIAGNOSTIC MICROBIOLOGY OF THE IMMUNOCOMPROMISED HOST
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Over the past two decades, molecular diagnostics have revolutionized management of the immunocompromised host, with more diagnostic information available than ever before. Infectious diseases are particularly dangerous to immunocompromised hosts who are less competent to control primary infection and more susceptible to developing prolonged and protracted clinical courses that propagate unique and often life-threatening presentations. Infections in the immunocompromised hosts are often caused by pathogens that rarely cause serious disease in the general population, such as respiratory viruses and fungal pathogens. The immunocompromised patient population is increasing throughout the world. Major advances in transplantation techniques both for solid organs and hematopoietic cells, have not only expanded access to these life-saving therapies, but have also improved outcomes in these high-risk populations. Autologous and allogeneic hematopoietic cell transplants have continued to increase worldwide as a result of wider utilization of this treatment for new disease, extension to older and higher risk recipients, the development of reduced intensity and haploidentical donor protocols as well as the use of novel graft sources. Cancers and numerous immunologic disorders may also be linked to more specific or limited forms of an immunocompromised state, either due to immunosuppression caused directly by underlying disease or through the use of additional immunosuppressive treatments. The increased use and development of biologic agents for autoimmune mediated diseases also represent a major risk of infectious complications. In addition, there are a large number of people receiving corticosteroids at various doses for a broad range of diseases. Finally, as the population ages, there are those patients who are immunosuppressed based on their biologic stage in life. Indeed, all these conditions require sensitive and specific diagnosis of infectious organisms. Additionally, an understanding of the biology of these infections, host
conditions, and the limitations of technologies used to detect and quantify such pathogens is critical to optimal care.

The 2nd Edition of *Diagnostic Microbiology of the Immunocompromised Host* uniquely covers all aspects of state-of-the-art diagnostics for infectious complications in the immunocompromised patient. Preeminent authors cover a broad range of relevant topics. Section I reviews relevant aspects of host biology, antineoplastic, and transplantation techniques as well as the basis of immunosuppressive conditions ranging from diabetes to age-related immunosuppression. Section II covers approaches, interpretations, and limitations of laboratory diagnosis of infections by a wide range of specific etiologic agents. Section III reviews the laboratory diagnosis of infections of specific organ systems, such as respiratory tract infections, gastrointestinal tract infections, and central nervous system infections. Finally, Section IV includes a diverse selection of diagnostic aspects for special topics that are of particular interest, including prosthetic devices and catheters, healthcare acquired infections, and morphologic considerations (anatomic pathology). The book includes outlooks on future diagnostic technologies and their potential impact on the field.

As technologic innovations continue to transform laboratory diagnosis of infectious diseases, the 2nd Edition of *Diagnostic Microbiology of the Immunocompromised Host* will be an invaluable resource for a wide range of users, including laboratory medicine specialists, pathologists, technologists, students, and clinical care professionals who are involved or interested in the care of the immunocompromised host.

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Over the past quarter century, health care of immunocompromised patients has grown progressively in importance. These individuals require high-intensity services and specialized care, often for a prolonged period of time. They are susceptible to a wide range of infectious diseases, which may manifest quite differently from those in an immunocompetent host. There are marked differences in how health care is delivered to such high-risk patients. Proper care depends on the etiology and degree of immune suppression as well as on underlying patient characteristics, such as demographics, nutritional status, and ongoing disease processes. Differences in clinical care include aspects of infection control practices, infectious disease prophylaxis, immune modulation, and pharmacologic therapy. In addition, the use and interpretation of laboratory tests, particularly tests for microorganisms, must be tailored carefully to fit these patients. Evidence-based diagnostic algorithms for the immunocompromised are evolving; however, many clinicians and laboratory professionals are challenged to best utilize the growing array of diagnostic tools at their disposal. Certainly there are books containing information on clinical testing; however, no standard laboratory reference focuses heavily on issues unique to the immunocompromised population. It is the goal of the authors to consolidate such discussions in a single, easily referenced text that can be used by clinical health care providers, laboratory professionals, and trainees alike.

As in the first edition, this newly updated second edition takes a multiphasic approach to the topic. The stage is set in Section I, wherein the essence of the problem is defined. That is, what are the causes of immune suppression, who are the populations at risk for infections, and to which infections are they prone? In Section II, the application of laboratory diagnostic methods is discussed, primarily in an organism-by-organism fashion, while in Section III, discussions are based on the organ system involved. Finally, Section IV includes selected topics of
particular interest to caregivers, including chapters on prosthetic devices, health care acquired infections, and tissue morphology of infections in this population. New to this edition is the just mentioned discussion of tissue pathology, together with chapters on HIV, hepatitis viruses, papilloma and polyoma viruses, and aerobic and anaerobic bacteriology.

The different sections of the book are designed to provide complementary views of these often complex diagnostic challenges. While in many cases the clinician may be more comfortable with an organ systems approach, a focus on individual pathogens may be more useful in deciding upon screening strategies or follow-up of a known infection. Although laboratory professionals may turn most frequently to chapters on individual infectious agents, the systemic perspective will bring added value in making decisions on which new diagnostic methods to introduce in the laboratory. These sections will also be useful for a review of specimen-specific culture workup and exceptions to the rules, which may apply to immunocompromised patient units or clinics. In addition, many chapters include flow charts suggesting diagnostic pathways. We hope that these sections will provide a way to help to synthesize the material presented in the text into practical algorithms that can be applied to realistic case scenarios.

This book is intended to have broad appeal to laboratory professionals, infectious disease physicians, oncologists, other clinical care providers, and trainees, all of whom participate in the health care of immunocompromised patients. The editorial board, as well as the contributors, comprise a diverse group of both clinical infectious disease practitioners, and laboratory-based diagnosticians. We hope that this book will build in a meaningful way on the first edition, continuing its contribution to the care of these complex and often critically ill patients.

We extend our heartfelt thanks to all of the chapter authors, who devoted so much of their time and expertise to this project. Working with such a fine group of professionals has been a privilege. We are also grateful for the support and patience of our families while we immersed ourselves in this project. We dedicate this work to all of them and to the immunocompromised patients whom we hope this book will continue to serve. In addition, we would like to add a special word of dedication and remembrance to Dr. Gerri Hall. Through her extraordinary years of devotion to patient care and teaching, she touched countless lives and made a lasting imprint on the care of our patients and on her many students and colleagues. We all miss her and thank her for her tremendous contributions to the field and to this book.

RANDALL T. HAYDEN, DONNA M. WOLK, KAREN C. CARROLL, AND YI-WEI TANG
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