2nd Edition

DIAGNOSTIC MICROBIOLOGY OF THE IMMUNOCOMPROMISED HOST
Contents

Contributors ix
Foreword xvii
Preface xix

I. OVERVIEW OF INFECTIONS IN THE IMMUNOCOMPROMISED HOST

1. Overview of Infections in the Immunocompromised Host 3
Lesia K. Dropulic and Howard M. Lederman

II. LABORATORY DIAGNOSIS: APPROACHES, INTERPRETATIONS, AND LIMITATIONS
INFECTIONS BY SPECIFIC ETIOLOGIC AGENTS

2. Human Immunodeficiency Virus 53
Wendy S. Armstrong, Jeannette Guarner, Colleen S. Kraft, and Angela M. Caliendo

3. Chronic Hepatitis B, C, and D 69
Bryan R. Cobb and Alexandra Valsamakis

4. Cytomegalovirus 97
M. Veronica Dioverti and Raymund R. Razonable

5. Epstein-Barr Virus 127
Andrew Nowalk and Michael Green
6. Herpes Simplex Virus and Varicella-Zoster Virus 135
   Myron J. Levin, Adriana Weinberg, and D. Scott Schmid

7. Human Herpesviruses 6A, 6B and 7 157
   Henri Agut, Pascale Bonnafous, and Agnès Gautheret-Dejean

8. Human Papillomavirus 177
   Eileen M. Burd and Christina L. Dean

9. Polyomaviruses 197
   Linda Cook

10. Adenovirus 217
    Michael G. Ison and Randall T. Hayden

11. Respiratory RNA Viruses 233
    Richard L. Hodinka

12. Enteroviruses and Parechoviruses 273
    James J. Dunn

13. Parvovirus B19 297
    Marie Louise Landry

14. Filamentous Fungi 311
    Margaret V. Powers-Fletcher, Brian A. Kendall, Allen T. Griffin,
    and Kimberly E. Hanson

15. Yeasts 343
    Sean X. Zhang and Nathan P. Wiederhold

16. Mycobacteria 367
    Patricia J. Simner, Gail L. Woods, and Nancy L. Wengenack

17. Aerobic Actinomycetes of Clinical Significance 391
    A. Brian Mochon, Den Sussland, and Michael A. Saubolle

18. Parasites 411
    Elitza S. Theel and Bobbi S. Pritt

19. Selected Topics in Aerobic Bacteriology 467
    Geraldine Hall and Karen C. Carroll

20. Selected Topics in Anaerobic Bacteriology 493
    Deirdre L. Church
### III. LABORATORY DIAGNOSIS: APPROACHES, INTERPRETATIONS, AND LIMITATIONS

#### INFECTIONS OF SPECIFIC ORGAN SYSTEMS

<table>
<thead>
<tr>
<th>Section</th>
<th>Title</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>21.</td>
<td>Lower Respiratory Tract Infections</td>
<td>539</td>
</tr>
<tr>
<td></td>
<td>Karen C. Carroll and La'Tonzia L. Adams</td>
<td></td>
</tr>
<tr>
<td>22.</td>
<td>Genitourinary Tract Infections</td>
<td>569</td>
</tr>
<tr>
<td></td>
<td>Odaliz Abreu Lanfranco and George J. Alangaden</td>
<td></td>
</tr>
<tr>
<td>23.</td>
<td>Gastrointestinal Infections</td>
<td>613</td>
</tr>
<tr>
<td></td>
<td>Kevin Alby and Irving Nachamkin</td>
<td></td>
</tr>
<tr>
<td>24.</td>
<td>Central Nervous System Infections</td>
<td>629</td>
</tr>
<tr>
<td></td>
<td>Andrea J. Zimmer, Victoria E. Burke, and Karen C. Bloch</td>
<td></td>
</tr>
<tr>
<td>25.</td>
<td>Bloodstream Infections</td>
<td>653</td>
</tr>
<tr>
<td></td>
<td>Raquel M. Martinez and Donna M. Wolk</td>
<td></td>
</tr>
<tr>
<td>26.</td>
<td>Skin and Soft Tissue Infections</td>
<td>691</td>
</tr>
<tr>
<td></td>
<td>Anne Spichler Moffarah, Mayar Al Mohajer, Bonnie L. Hurwitz, and David G. Armstrong</td>
<td></td>
</tr>
</tbody>
</table>

### IV. SPECIAL TOPICS

<table>
<thead>
<tr>
<th>Section</th>
<th>Title</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>27.</td>
<td>Prosthetic Device Infections</td>
<td>711</td>
</tr>
<tr>
<td></td>
<td>Raquel M. Martinez, Thomas R. Bowen, and Michael A. Foltzer</td>
<td></td>
</tr>
<tr>
<td>28.</td>
<td>Hospital-Associated Infections</td>
<td>735</td>
</tr>
<tr>
<td></td>
<td>N. Esther Babady</td>
<td></td>
</tr>
<tr>
<td>29.</td>
<td>Surgical Pathologic Diagnosis</td>
<td>759</td>
</tr>
<tr>
<td></td>
<td>Mary K. Klassen-Fischer and Ronald C. Neafie</td>
<td></td>
</tr>
</tbody>
</table>

*Index* 781
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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
Index

A
Acanthamoeba, 424–425
amebic keratitis, 426
central nervous system infections, 631, 640
clinical presentation, 426
control, 428
cutaneous disease, 426
diagnosis, 426–428
epidemiology, 425
granulomatous amebic encephalitis (GAE), 426
life cycle and transmission, 425
pathophysiology, 425
treatment, 428
Acid-fast bacteria (AFB)
algorithm for testing, 376, 377
smears for, 380
Acinetobacter spp.
aerobic bacteria, 471–472, 474, 477
bloodstream infections, 664
central nervous system infections, 634
hospital-associated infections, 739
lower respiratory tract infection, 540–541, 543
Acquired immunodeficiency disease (AIDS)
Acanthamoeba, 425–426
Babesia, 448
bacterial infections, 479–480
central nervous system infections, 630–633, 640
Clostridium difficile infection, 520
Cryptosporidium, 421
cytomegalovirus (CMV) in patients with, 98, 111–113
gastrointestinal infection, 616–617, 619
genitourinary tract infection, 570–571, 574–575, 578, 580, 583
HIV infection and, 30–31
Leishmania, 434–435
lower respiratory tract infections and, 541, 542–543, 553, 555
microsporidial infection, 422–423
mycobacterial infection, 371–372
Plasmodium, 445
Sarcocystis scabiei, 454
skin and soft tissue infections, 515–517
surgical pathologic diagnosis, 762–763
Toxoplasma gondii, 429–430, 432
Trypanosoma cruzi, 440
Acremonium, 315, 323, 660
Actinobacter spp.
bloodstream infections, 664
central nervous system infections, 634
gram-negative bacteria, 471, 472, 474, 477
hospital-associated infections, 739
Acyclovir, 419
Actinomadura spp.
culture, 402
microscopy and direct visualization, 400
taxonomy and epidemiology, 396
Actinomyces, aerobic, 391–405
culture
Actinomadura spp., 402
Amycolata spp., 402
Dermatophilus spp., 402
Gordonia spp., 402
Nocardia spp., 402
Nocardiosis spp., 402
Rhodococcus spp., 402
Segniliparus spp., 402
Streptomyces spp., 402
Tsukamurella spp., 402
Williamsia spp., 402
description, 391–392
diagnosis, 398–404
antigen testing, 400
culture, 400–402
identification, 402–403
interpretation of data, 403–404
microscopy and direct visualization, 398–400
specimen collection, 398
Actinomycetes, aerobic (Continued)
epidemiology, 392–397
Actinomadura spp., 396
Amycolata spp., 396
Amycolatopsis spp., 396
Dermatophilus spp., 396
Dietzia spp., 396
Gordonia spp., 395
Nocardia spp., 392–394
Nocardiosis spp., 396–397
Pseudonocardia spp., 396
Rhodococcus spp., 394–395
Segniliparus spp., 397
Streptomycetes spp., 397
Tsukamurella spp., 395
Williamsia spp., 397
gram-positive bacteria, 468–469
identification, genotypic, 403
identification, phenotypic, 403
identification, proteomic, 403
laboratory testing goals, 397–398
microscopy and direct visualization, 398–400
Actinomadura spp., 400
Amycolata spp., 400
Amycolatopsis spp., 400
Dermatophilus spp., 400
Gordonia spp., 399
Nocardia spp., 399
Nocardiosis spp., 400
Pseudonocardia spp., 400
Rhodococcus spp., 399
Segniliparus spp., 400
Streptomycetes spp., 400
Tsukamurella spp., 399
Williamsia spp., 400
susceptibility testing, 404–405
therapy, 404–405
Gordonia spp., 405
Nocardia spp., 404
Rhodococcus spp., 405
Segniliparus spp., 405
Tsukamurella spp., 405
Acute bacteremia, 634
Adalimumab, 16
Adaptive immunity, 5–6
Adaptiv fungal immunity, 317–318
antifungal-antibody response, 317–318
T-helper cells, 317
Adaptive immunity, 5–6
adenovirus, 217, 226
diagnosis approach for suspected, 224
diagnostic approaches, 219–222
antigen detection, 219–220
antiviral-susceptibility testing, 223
culture, 220, 224
electron microscopy, 220–221
histopathology, 221
nucleic acid detection, 221–222
typing, 222–223
gastrointestinal infections, 618
genitourinary tract infections, 584–585
hematopoietic stem cell transplant recipients, 218
lower respiratory tract infections, 545, 548, 554
prognosticat, 225
screening approach, 225
solid organ transplant recipients, 218–219
surgical pathologic diagnosis, 767–768
herpetic infections, 637
Antimicrobial agents
Allopurinol, 346–347
Antitumor necrosis factor (NTF) agents, lower respiratory tract infections and, 549–550
Antiviral sensitivity testing
herpes simplex virus (HSV), 143
varicella zoster virus (VZV), 150
Antiviral-susceptibility testing, 223
Aplastic anemia, bacterial infections and, 481
Arboviruses central nervous system infections, 637
Arthropods, 453–455
Ascomycetous yeasts infections by, 343–344
Azithromycin, 182
Bacteria, aerobic
Bacteria, anaerobic
Bacteria, filamentous fungi, 322–324
human herpesviruses (HHV-6 and HHV-7), 164, 165
lower respiratory tract infections, 552–553
parvovirus, 304
respiratory RNA viruses, 241, 245, 248–251
skin and soft tissue infections, 701, 703
yeast infection diagnosis, 348–350
Antigenemia, cytomegalovirus (CMV), 103, 104–105
Antilymphocyte antibody therapies, immunodeficiency associated with, 13, 18
Antimetabolites, allograft rejection after organ transplantation, 18–21
Anti-thymocyte globulin (ATG), immunosuppression by, 14

Babesia spp., 447–450
clinical presentation, 448
control, 450
diagnosis, 448–449
direct detection by microscopy, 448, 449
molecular methods, 449
serology, 449
epidemiology, 447
life cycle and transmission, 447
pathophysiology, 447–448
treatment, 449–450
Bacille Calmette-Guérin (BCG), 770
Bacteria
Bloodstream infections, 657–659
central nervous system infections, 634–635
gastrointestinal infections, 614, 616–617
hospital-associated infections, 736–739
surgical pathologic diagnosis, 768–770
urinary tract infections, 569–570
Bacteria, aerobic
agammaglobulinemia and infections, 481
aging and infections, 481–482
aplastic anemia and infections, 481
chronic diseases and infection, 482–483
chronic granulomatous disease and infections, 480–481
culture methods, 484
epidemiology of, 473

Downloaded from www.asmscience.org by
IP: 54.70.40.11
On: Wed, 24 Jul 2019 02:35:33
gram-negative, classification of, 471–473
gram-positive, classification of, 467–470
HIV-positive individuals, infections in, 479–480
multiple myeloma and infections, 481
nonculture methods, 484
primary immunodeficiencies, infections with, 480–481
solid organ transplant patients, infections in, 477–479
susceptibility testing, 484–487

Beta-D-glucan (BDG) testing, 672

B-cell depletion, bloodstream infections, 665

Basiliximab, immunosuppression by, 14

Basidiomycetous yeasts, infection by, 318–319

Bartonella, 424–425
cancer, 428

cutaneous disease, 426
direct detection by microscopy, 427
epidemiology, 425
granulomatous amebic encephalitis (GAE), 426
life cycle and transmission, 425
pathophysiology, 425–426
treatment, 428

Bartonella
aerobic bacteria, 472–473, 487
bloodstream infections, 660, 668, 673

cancer, 662–663
diagnosis approaches, 666–669
blood culture collection principles, 668–669
blood culture systems, 667–668
histopathology, 666
microbiology procedures, 666–668
radiography, 666
emerging technology, 675–677
hospital-associated infections, 742, 747–748
laboratory methods, 513–514
limitations, 514–515
pathophysiology of, 653–661
coagulation abnormalities and tissue injury, 657, 658
host’s innate immune system, 655
immunosuppression and anti-inflammatory processes, 657
organ dysfunction, 656–657

role of human immune response in sepsis, 653, 656
sepsis, 653–655
systemic inflammatory response syndromes, 655

predisposing factors for, 661–666
age, 663–664
B-cell depletion, 665
cancer, 662–663
critical care and surgery, 662
HIV, 664
hospitalization, 664
intensive care unit, 665
neutropenia, 665
nosocomial, 665–666
nutrition, 665
steroid use, 664–665
transplant, 664
risk factors and outcomes, 661–666
solid tumor patients, 475

B lymphocytes, 3, 5–6
Bone-marrow examination, parvovirus, 301, 303
Bone marrow transplantation, bacterial infections, 476

Bordetella spp., gram-negative bacteria, 471, 473

Brain mass lesions, central nervous system infections, 630–632
Breast prostheses
diagnosis, 715
laboratory diagnostics, 724
management, 715

Bronchoalveolar lavage (BAL), 557–558

Burkholderia spp., 659–660

Campylobacter, gastrointestinal infections, 614, 616

Cancer
toxicology, 719
tumor pathology, 720

Candida spp.
bloodstream infections, 659–660
C. albicans, 343, 346, 350, 351, 352, 353
C. glabrata, 343, 346, 348, 350, 351, 352, 353, 354
C. guilliermondii, 343, 352, 353
C. krusei, 343, 346, 350, 351, 352, 353
C. lusitaniae, 343
C. parapsilosis, 343, 348, 350, 351, 352, 353
C. tropicalis, 343, 346, 350, 351, 352, 353
diagnosis of infections, 346–351
antigen detection, 348–350
beta-D-glucan, 349–350
biochemical methods, 346
Candida spp. (Continued)
cryptococcal polysaccharide-capsule antigen culture-based methods, 346–348
direct microscopic examination, 348 molecular methods, 347–348 morphological examination, 346 non-culture-based methods, 348–351 nuleic acid amplification testing (NAAT), 350–351 nuleic acid-based identification, 347 nuleic acid detection, 350–351
epidemiology, 419–420
gastrointestinal infections, 619
life cycle and transmission, 419
pathophysiology, 419
treatment, 421–422
Cyclosporine, immunosuppression by, 12, 19–21
Cystic fibrosis, bacterial infections with, 482–483
Cystosporidium bellii, 419–422
central nervous system infection, 638
clinical presentation, 420
diagnosis, 420–421
antigen detection, 421
direct detection by microscopy, 420–421
molecular methods, 421
epidemiology, 419–420
life cycle and transmission, 419
pathophysiology, 419
treatment, 421–422
Cytokines, biologic immune response
modulators, 16–17
Cytology genitourinary tract infections, 579, 580
Cytomegalovirus (CMV)
genital infections, 586
in immunocompromised hosts, 593–594
in organ transplant recipients, 593–594, 603
surgical pathologic diagnosis, 774, 775
Enteroviruses and parechoviruses, 273–286
enfermedades inmunocomprometidas, 275–280
HIV/AIDS, 279
malignancy, 277–278
neonates, 278–279
primary B-cell-associated immunodeiciencies, 275–276
transplant recipients, 276–277
vaccine-associated paralytic polio (VAPP), 279–280
treatment, 280–281
Emmmonia parva, 314
Enzyme immunoassays (EIA), yeast infection
diagnosis, 348–349
Enzyme-linked immunosorbent assay (ELISA)
herpes simplex virus (HSV), 138, 140
lower respiratory tract infections, 554, 558
parvovirus, 301, 302, 303
varicella zoster virus (VZV), 146, 148
Epidermophyton, genitourinary tract infections, 679
Epstein-Barr virus (EBV), 31
background and clinical information, 19–21
central nervous system infection, 619
clinical manifestations, 97–100
gastrointestinal infections, 617–618
genitourinary tract infections, 586
in hematopoietic stem cell transplant recipients, 98, 99, 113–114
in immunocompromised hosts, 100
lower respiratory tract infections, 547–550, 552, 556
monitoring treatment response, 111
in newborns and infants, 98, 99–100
in patients with AIDS, 98, 111–113
in gastrointestinal disease, 112–113
in pneumonitis, 113
in polyradiculopathy and ventriculoencephalitis, 112
in retinitis, 111–112
in prophylaxis, 110
in risk assessment, 110
in screening and surveillance, 110
in solid-organ transplant recipients, 98–99, 115–116
surgical pathologic diagnosis, 765
susceptibility testing, 116–117
therapeutic considerations, 100
virology of, 97

D
Dematophilus spp.
culture, 402
microscopy and direct visualization, 400
taxonomy and epidemiology, 396
Diabetes mellitus (DM), 32
filamentous fungi, infection by, 320
mycobacterial infection, 374
Diabetic foot infection, skin and soft tissue infections, 695–696, 697–698
Dietzupa spp.
microscopy and direct visualization, 400
taxonomy and epidemiology, 396
Dimorphic pathogens, 312–314, 324
treatment, 421–422
Dietzia spp.
detection
Diagnosis of infection, 110–111
Drug resistance, molecular testing for, 673
Drug reactions, 759

E
EBV, see Epstein-Barr virus (EBV)
Encephalitis, central nervous system infections, 634
Empiric antifungal therapy, 330
Enterococcus bieneusi
gastrointestinal infections, 618
human intestinal disease by, 422
lower respiratory tract infections by, 542
microsporidiosis, 423
Enterococcus spp.
aerobic gram-positive cocci, 469
bloodstream infections, 475, 657, 666, 671, 747
central nervous system infection, 634
genitourinary tract infections, 570, 571, 580–583, 586–588
hematopoietic stem cell transplantation (HSCT), 476
hospital-associated infections, 737, 738, 743, 745, 747
lower respiratory tract infections, 543
prosthetic device infections, 715
skin and soft tissue infections, 699, 700
solid organ transplantation, 477–479
Erythema infectiosum (EI), central nervous system infections, 630–632
Endocarditis, 654
Endogenous asymptomatic bacteremia, 654
Epstein-Barr virus (EBV), see Parvovirus B19
Fingolimod, 17
Fifth disease, see Parvovirus B19
Fiber optic bronchoscopy, 556–558
Fluorescence in situ hybridization (FISH), yeast infection diagnosis, 350
Fluorescence microscopy mycobacteria, 376
Free-living amebae (FLA), 424–428
clinical presentation, 426
americ keratitis, 426
cutaneous disease, 426
control, 428
diagnosis, 426–428
culture, 428
direct detection by microscopy, 427–428
epidemiology, 425
life cycle and transmission, 425
pathophysiology, 425–426
treatment, 428
Fungi, see also Fungi, filamentous; Yeasts
bloodstream infections, 659–660
central nervous system infections, 637–639
gastrointestinal infections, 614, 617
hospital-associated infections, 739–740
surgical pathologic diagnosis, 772–774
Fungi, filamentous, 311–313
antifungal prophylaxis, 328
etologic agents, 312–316
lower respiratory tract infections, 542, 544
morphology, 311–312
prevention and management, 328, 330
reproductive structures, 312
susceptibility testing, 326–328
in vitro, 327–328, 329
mold-active antifungal agents, 326–327
terminology and taxonomy, 311–312
therapy, 328, 330
Fusarium spp., 315
G
Galactomannan testing, 322–323
bronchoalveolar lavage (BAL), 558–559
Gastrointestinal infections, 613–623
agents, 616–619
bacteria, 616–617
fungi, 617
parasites, 618–619
viruses, 617–618
algorithm for diagnosis, 622
background, 613–615
diagnostic approaches, 619–622
hospital-associated infections, 741, 743–744, 748–749
microbial agents, 614, 615
GeneXpert, 671–672
Genital tract infections, 569–603
GeneXpert, 672
Genotyping
GenMark eSensor, 672
Glucocorticoids, bloodstream infections, 664–665
Gordonia spp.
culture, 402
gram-positive bacteria, 469
microscopy and direct visualization, 399
susceptibility testing, 405
taxonomy and epidemiology, 395
Graft vs. host disease (GVHD)
central nervous system infections, 633
prevention and treatment of, 21
surgical pathology, 761–762
Granulomatous amebic encephalitis (GAE), 424–428
GVHD, see Graft vs. host disease (CVHD)
H
Haemophilus ducreyi, genital tract infections, 590, 602
Haemophilus influenzae, lower respiratory tract infections, 540, 541, 543, 545, 549
Haemophilus spp., gram-negative bacteria, 471, 472
HBV, see Hepatitis B virus (HBV)
Helicobacter pylori, gastrointestinal infections, 613, 614, 616–617
prosthetic device infections, 712
Helminths, 450–453
Hematologic malignancies
bacterial infections and, 473–475
genitourinary tract infections, 578
Hematopoietic stem cell transplantation, 26–30
adenovirus, 217, 218
bacterial infections, 476
central nervous system infections, 633–634
cytomegalovirus (CMV) in patients with, 98, 99, 113–114
Epstein-Barr virus (EBV), 128, 131–132
filamentous fungi, infection by, 318–319
genitourinary tract infections, 576–577, 578, 587–588
hepatitis B disease risk, 74–77
human herpesviruses (HHV-6 and HHV-7), 161
human papillomavirus (HPV), 179, 180
lower respiratory tract infections and, 546–549
mycobacterial infection, 373
nonmyeloblastic conditioning regimens, 29–30
timeline of infection, 26, 27
Hepatic sinusoidal-obstruction syndrome, 761
Hepatitis, chronic active, 35
Hepatitis B virus (HBV), 69–78
characteristics of, 70
chronic HBV in normal host, 70–78
current treatments for, 74
HIV infection with, 77–78
markers and testing for diagnosis of, 70–71
pharmacologic immunosuppression and reactivation of, 74–77
phases and markers of, 73
prevention of infection, 72–73
therapeutic management of, 73–74
Hepatitis C virus, chronic (CHC), 78–84
assays for testing, 79
characteristics of, 70
HIV coinfection with, 82–83
liver transplantation related to, 83–84
recommended treatment regimens for, 82
screening, diagnosis and prevention, 78–80
therapy advances, 80–81
viral load monitoring, 81–82, 84
Hepatitis D virus (HDV), 84–85
Hematologic malignancies, immunodeficiency
Hepatitis C virus, chronic (CHC), 78–84
lower respiratory tract infections, 544, 545, 552, 558
morbidity and mortality, 137
skin and soft tissue infections, 693, 695, 697, 701
surgical pathologic diagnosis, 765, 771, 773
HIV, see Human immunodeficiency virus (HIV)
Host defenses, 3–7
antiretroviral therapy (HAART)
central nervous system infections, 632–633, 637
gastrointestinal infections, 520
genitourinary tract infections, 574
hospital-associated infections, 741
lower respiratory tract infections, 539, 541–543, 555
parasites, 437
skin and soft tissue infections, 695
Histology/histopathology
adenovirus, 221
bloodstream infections, 666
cytomegalovirus (CMV), 109
Epstein-Barr virus (EBV), 130
lower respiratory tract infections, 579–580, 585
prosthetic device infections, 716–717
Histoplasma capsulatum, 313
bloodstream infection, 668
central nervous system infections, 638
infection, 614, 617
genitourinary tract infections, 570, 571, 583
lower respiratory tract infection, 543
parasitic infection, 424
skin and soft tissue infections, 697, 698
surgical pathologic diagnosis, 765, 771, 773
HIV, see Human immunodeficiency virus (HIV)
Hodgkin’s lymphoma, Epstein-Barr virus (EBV), 128
Hospital-associated infections, 735–751
algorithm for testing Clostridium difficile, 744
bacterial, 736–739
C. difficile infection, 736–737
Legionella spp, pneumonia, 738–739
mitchellin-resistant Staphylococcus aureus (MRSA), 737–738
multidrug-resistant gram-negative bacilli (MDR GNB), 739
vancomycin-resistant enterococci, 738
bloodstream infections, 664
diagnostic methods, 741–751
bloodstream infection, 742, 747–748
molecular methods, 744–750
outbreak investigations, 750–751
traditional, 741–744
fungal, 739–740
isolation precautions, 736
pneumonia, 742–743, 748
screening algorithm, 749–750
viral, 740–741
gastrointestinal viruses, 741
respiratory viruses, 740–741
Hospital environmental monitoring, 330
Host defenses, 3–7
adaptive immunity, 5–6
B lymphocytes, 5–6
complement system, 5
innate immunity, 4–5
natural killer cells, 5
phagocytes, 4–5
physical barriers, 3–4
specific immune defects, 6–7
T lymphocytes, 6
HPV, see Human papillomavirus (HPV)
HIV, see Herpes simplex virus (HSV)
Human enteroviruses, see Enteroviruses and parechoviruses
Human herpesvirus 6 (HHV-6)
algorith for diagnosis of, 166–167
chromosomal integration of HHV-6 DNA, 169
clinical syndromes, 160
diagnostic approaches, 164
epidemiology, 159
immunocompetent host, 159–160
immunocompromised patients, 160–162
laboratory testing, 164–166
antigen detection, 164, 165
nucleic acid detection and quantification, 165–166
serology, 164–165
viral culture, 164, 165
latent infection, 168
lower respiratory tract infections, 547, 548, 549
pathogenesis, 158–159
patients presenting immune dysfunction, 162
primary infection, 167–168
reactivations, 168–169
therapeutic options, 162–163
treatment indications and monitoring, 163–164
virology, 157–158
Human herpesvirus 7 (HHV-7)
diagnostic approaches, 164
epidemiology, 159
immunocompetent hosts, 159–160
immunocompromised patients, 160–162
laboratory testing, 164–166
antigen detection, 164, 165
nucleic acid detection and quantification, 165–166
serology, 164–165
viral culture, 164, 165
latent infection, 168
pathogenesis, 158–159
patients presenting immune dysfunction, 162
primary infection, 167–168
reactivations, 168–169
therapeutic options, 162–163
virology, 157–158
Human herpesvirus 8 (HHV-8), 614, 618, 693
neoplasms related to, 762–763
Human immunodeficiency virus (HIV)
AIDS and, 30–31
bacterial infections for adults with, 479–480
bacterial infections for children with, 480
bloodstream infections, 664
CDC guidelines for diagnosis, 60–62
central nervous system infections, 632–633, 636–637
description of, 53–54
diagnosis of, 56–60
differentiation assays, 60–61
qualitative proviral DNA and RNA assays, 61–62
rapid diagnostic tests (RDTs), 57–60
serologic assays to diagnose infection, 56–57
tropism assay, 66
enteroviruses and parechoviruses, 276, 279
filamentous fungi, infection by, 319–320
genitourinary tract infections, 570–571, 574–575, 578, 580, 583
hepatitis B and HIV coinfection, 77–78
hepatitis C and HIV coinfection, 82–83
human herpesviruses (HHV-6 and HHV-7), 161–162
interferon gamma release assays (IGRA), 375–376
life cycle of, 53–54
lower respiratory tract infections and, 542–543
monitoring HIV-1 infection, 62–63
mycobacterial infection, 371–372
natural history of untreated infection, 54–55
quantitative HIV-1 viral load testing, 62
resistance testing, 63–65
Immunodeficiency (primary), 7–10
Immunity
Immunexpress, 676
Imune system, components of, 4
IgA deficiency
Immunodeficiency (secondary), 10–35
IgG deficiency
IgM deficiency
IgG, IgM, IgA antibodies, 8
Immune reconstitution inflammatory syndrome, 761
Immune system, components of, 4
Immunexpress, 676
Immunity
adaptable, 5–6
innate, 4–5
Immune deficiency (primary), 7–10
antibody disorders, 8–9
bacterial infections associated with, 480–481
cell-mediated immunity, 8–9
common variable immunodeficiency (CVID), 8
complement disorders, 9–10
genitourinary tract infections, 578
innate immunity disorders, 10
natural killer cell disorders, 10
patterns of illness, 7
phagocyte disorders, 9
selective IgA deficiency, 8
X-linked agammaglobulinemia (XLA), 7–8
Immune deficiency (secondary), 10–35
age effects, 33–34
allograft rejection therapies, 18–21
anti-lymphocyte antibody therapies, 13, 18
chronic disease, 34–35
corticosteroid use, 10–11
hematologic malignancies, 31–32
hematopoietic cell transplantation, 21, 26–30
human immunodeficiency virus and acquired immunodeficiency disease (HIV/AIDS), 30–31
measles, 31
metabolic diseases, 32–33
neoplasia therapy, 11–13, 18
rheumatic disease therapy, 21–23
solid organ transplantation, 23–26
surgery trauma, 34
treatment-related, 10–11
Immunodeficiency screening, 35–38
Infections, specific immune defects, 6–7
Infants
cytomegalovirus (CMV), 98, 99–100
human immunodeficiency virus and acquired immunodeficiency disease (HIV/AIDS), 30–31
Influenza virus, 233
Infliximab, 16
Influenza virus, 233, see also Respiratory viruses
clinical significance, 237–239
conventional tube cultures, 244
epidemiology, 236–237
lower respiratory tract infections, 545, 548, 554
rapid antigen detection tests, 249, 250
susceptibility testing, 259
taxonomy and description, 234–235
treatment, 239–240
typing of, 253
Innate immunity, 4–5
disorders of, 10
fungal, 316–317
Intensive care unit (ICU)
bloodstream infections, 665
filamentous fungi, infections by, 320–321
Interferon gamma release assays (IGRA)
HIV-infected populations, 375–376
solid organ transplant patients, 376
Internal-transcribed spacer (ITS) region
analysis, 312–316
Invasive disease, 312–316
Isospora belli, see Cystoisospora belli
JC (John Cunningham) virus
central nervous system infections, 631, 637
polyomavirus, 202–203, 204
Kaposi's sarcoma, 543, 552, 618, 695, 698, 761–762, 769
Klebsiella granulomatis, genitourinary tract infections, 571, 590, 602
Klebsiella pneumoniae
aerobic gram-negative bacilli, 471, 476
genitourinary tract infections, 570, 571, 582
hospital-associated infections, 743, 750–751
lower respiratory tract infections, 540, 543, 548, 551
prosthetic device infections, 715
Lactobacillus spp.
Gram-positive bacteria, 468
medications and infection risk, 477
Legionella spp.
bloodstream infections, 660
gram-negative bacteria, 471, 472
hospital-associated infections, 738–739
L. bozemanii, 540, 660
L. micdadei, 471, 540
L. pneumophila, 471, 472, 484, 487, 540, 550, 552, 693, 736, 743
Leishmaniasis, see Leishmania spp.
Leishmania spp., 432–437
clinical presentation, 434–435
asymptomatic infection, 434
cutaneous leishmaniasis, 434
visceral leishmaniasis, 434–435
culture and animal inoculation, 436
direct detection by microscopy, 435–436
epidemiology, 433
gastrointestinal infections, 619
life cycle and transmission, 433
parasitic infections, 424
pathophysiology, 434
treatment, 437
Light-emitting diode (LED) microscopes, 376
mycobacteria, 376
Line probe assays, mycobacteria, 379
Listeria spp.
aerobic bacteriology, 467–468
central nervous system infections, 632–634
gastrointestinal infections, 614, 616
Gram-positive bacteria, 468
lower respiratory tract infections, 543, 550
parasitic infections, 424
prosthetic device infections, 716
Liver disease, end-stage, bacterial infections with, 483
Liver transplantation, 760–761
chronic hepatitis C, 83–84
Lower respiratory tract infections, 539–562
diagnostic approaches, 551–562
blood cultures, 552
bronchial washings and brushings, 557
bronchoalveolar lavage (BAL), 557–558
...
fibre optic bronchoscopy, 556–558
galactomannan (GM), 558–559
induced sputum, 555–556
radiography, 551–552
respiratory specimens, 554–560
serology, 554
surgical lung biopsy (SLB), 561–562
transbronchial biopsy (TBB), 557–558
urinary antigen studies, 552–553
host factors and subgroups, 541–551
alcoholism, 550
anti-TNF agents, 549–550
cellular immunity defects, 542
collagen vascular diseases, 549
heart transplantation, 545–546
HIV/AIDS, 542–543
human stem cell transplantation, 546–549
humoral immunity impairment, 541
kidney transplantation, 546
liver transplantation, 546
lung transplantation, 544–545
neutropenia, 541–542
noninfectious pulmonary disorders, 550–553
solid organ transplant patients, 543–546
pneumonia, community-acquired, 539–540
pneumonia, nosocomial, 540–541
M
Malakoplakia, surgical pathologic diagnosis, 768
Malaria, see Plasmodium spp.
Malassezia spp., infection by, 345–346
Malignancy, enteroviruses and
Metapneumovirus, 233, 234
Metabolic diseases, 32–33
Merkel cell carcinoma (MCC), 200, 203
Meningitis, central nervous system
Measles, 31, 767
Methicillin-resistant Staphylococcus aureus (MRSA)
Methicillin-susceptible Staphylococcus aureus (MSSA)
Matrix-assisted laser–desorption/ionization
see Plasmodium
Malakoplakia, surgical pathologic diagnosis, 768
Mycoplasma pneumoniae, 347–348, 351
prosthetic device infections, 721–722
bloodstream infections, 677
anaerobes identification, 498, 502
bloodstream infections, 677
mycobacteria, 379, 380
prosthetic device infections, 721–722
cost infection diagnosis, 347–348, 351
Measles, 31, 767
Meningitis, central nervous system infections, 630
Merkel cell carcinoma (MCC), 200, 203
Metabolic diseases, 32–33
Metapneumovirus, 233, see also Respiratory
viruses
epidemiology, 236–237
taxonomy and description, 234, 235
Microarrays, multiplex testing platforms, 252–253
Microscopic examination
actinomycetes, aerobic, 398–400
central nervous system infection, 643
mycobacteria, 376, 377
yeast infection diagnosis, 346, 348
Mycosporidium, 422–424
clinical presentation, 423
control, 424
diagnosis, 423–424
antigen detection, 424
culture, 424
direct detection by microscopy, 423–424
molecular methods, 424
epidemiology, 422–423
gastrointestinal infections, 618
life cycle and transmission, 422
pathophysiology, 422
surgical pathologic diagnosis, 774–776
treatment, 724
Molds, see also Fungi, filamentous
bloodstream infections, 660
Molecular detection
Aspergillus–specific technique, 325
polyomaviruses, 206–207
Molecular methods, commercially available
BioFire Film Array, 672
biomarkers, 674–675
DNA sequencing, 673–674
GeneXpert, Xpert MRSA/SA BC Assay, 671–672
GenMark eSensor, 672
Nanosphere’s Verigene, 672–673
GeneXpert, Xpert MRSA/SA BC Assay, 672
DNA sequencing, 673–674
biomarkers, 674–675
BioFire Film Array, 672
T2Dx, magnetic resonance, 674
Molzyme SepsiTest, 676
Mycobacteria
Mycobacterium avium-intracellulare
Mycobacterial spindle-cell pseudotumor, 769
Mycobacterium abscessus complex, 370
Mycobacterium avium complex (MAC), 368–369
Mycobacterium chelonae, 370
Mycobacterium fortuitum, 371
Mycobacterium genavense, 369–370
Mycobacterium haemophilum, 369
Mycobacterium kansasi, 369
Mycobacterium marinum, 370
Mycobacterium tuberculosis complex (Mycobacterium tuberculosis) (MTBC), 367–368
nontuberculous mycobacteria (NTM), 368
rapidly growing nontuberculous mycobacteria (RGM), 370–371
slowly growing nontuberculous mycobacteria (SGM), 368–370
interpretation of test results, 380–383
M. tuberculosis–positive specimens, 380–381
NTM-positive specimens, 381
smears for acid-fast bacilli, 380
susceptibility testing, 381–383
laboratory diagnostics, 374–380
algorithm for acid-fast bacteria (AFB) testing, 376, 377
conventional vs. new-technology test method, 375
culture, 378
direct detection in clinical specimens, 377–378
genotyping, 379
identification of mycobacteria, 378–379
interferon gamma release assays (IGRA), 375–376
microscopy, 376
serology, 375
turnaround times for tests, 375, 380
lower respiratory tract infections, 544, 547, 548, 551–552, 555, 557–558
spectrum of disease in immunocompromised hosts, 371–374
diabetes mellitus, 374
hematopoietic stem cell transplantation, 373
HIV/AIDS, 371–372
solid organ transplantation, 372–373
TNF-α antagonists, treatment with, 373–374
transplantation, 372–373
urothelial bladder cancer, 373
Mycobacterium tuberculosis complex (MTBC), 367–368
central nervous system infection, 640–641
culture, 378
direct detection in clinical specimens, 377–378
DNA probes, 378
line probe assays, 379
matrix-assisted laser desorption ionization–time of flight (MALDI-TOF), 379
susceptibility testing, 381–383
Mycoplasma, lower respiratory tract infections, 540, 558
Myelitis, central nervous system infections, 632
Index

N
Naegleria fowleri, 424–425, 631, 640
Nanosphere’s Verigene, 672–673
Natalizumab, 17
Necrotizing skin and soft tissue infections (SSTIs), 515–516
Neisseria gonorrhoeae, genitourinary tract infections, 589, 600–601
Neisseria spp., gram-negative bacteria, 471, 473
Neonates, enteroviruses and parechoviruses, 276, 278–279
Neoplasms
Epstein-Barr virus related, 763
human herpesvirus 8 (HHV-8) related, 762–763
papilloma viruses related, 763
Nephrotoxic syndrome, 32
Neuroimaging, central nervous system infection, 641–642
Neutropenia
bloodstream infections, 665
filamentous fungi, infections by, 318, 319, 328
lower respiratory tract infections and, 514–542
surgical pathologic diagnosis, 772
Neutropenic enterocolitis, 761
Newborns, see Infants
NK cells, 4, 5, 131
NK/T-cell lymphomas, Epstein-Barr virus and, 127, 130
Nocardia spp.
antimicrobial susceptibility profiles, 393
central nervous system infections, 632, 633, 635
culture, 402
human infection, 394
lower respiratory tract infections, 547, 548, 550, 551, 558
microscopy and direct visualization, 399
skin and soft tissue infections, 694, 697
susceptibility testing, 404
taxonomy and epidemiology, 392–394
Nocardiosis spp.
culture, 402
microscopy and direct visualization, 400
taxonomy and epidemiology, 396–397
Non-Hodgkin’s lymphoma, Epstein-Barr virus (EBV), 128, 132
Noninfectious pulmonary disorders, lower respiratory tract infections and, 550–551
Nontuberculous mycobacteria (NTM), 367, 368
serology, 367
specimens positive for, 381
susceptibility testing, 383
transplantation infection, 372–373
Noroviruses
gastrointestinal infections, 618
hospital-associated infections, 741, 746
Nosocomial bloodstream infection, 654, 665–666
Nosocomial pneumonia, 540–541
Nucleic acid amplification testing (NAAT)
chronic hepatitis B, 74
chronic hepatitis C, 78–79
filamentous fungi, 328
lower respiratory tract infections, 558–560
mycobacteria, 377–378, 380
yeasts, 350–351
Nucleic acid testing (NAT)
adenovirus, 221–222
cytomegalovirus (CMV), 103, 105–108
exteroviruses and parechoviruses, 281–283
Epstein-Barr virus (EBV), 129–130
filamentous fungi, 324–325
herpes simplex virus (HSV), 139, 141, 142
human herpesviruses (HHV-6 and HHV-7), 165–166
parvovirus, 303, 304
respiratory RNA viruses, 241, 251–252, 260
varicella zoster virus (VZV), 147, 149
yeast infection diagnosis, 350–351
Nutrition, bloodstream infections, 665
O
Oncology patients, skin and soft tissue infections, 693–694, 696
Organ dysfunction, bloodstream infections, 656–657
Organ transplantation, immunosuppressive therapy for prevention and treatment of allograft rejection, 18–21
Oropharyngeal cancer
algorithm for diagnosis of, 182
diagnosis, 181–182
human papillomavirus (HPV), 180
screening, 181
Paracoccidioides, 315, 322, 327, 660
Parapoxvirus
infections in immunocompetent and immunocompromised hosts, 141–142
Parvovirus B19, 297–305
description, 297
diagnosis, 301–304
antigen detection, 304
bone-marrow examination, 301, 303
culture, 304
interpretation of data, 304
nucleic acid detection, 303, 304
serology, 301, 302, 303
epidemiology and clinical disease, 298–300
immune-competent patients, 298–299
immunocompromised patients, 299–300
morbidty and mortality, 300
laboratory testing goals, 300–301
diagnosis and prognostication, 301
screening and prevention, 300–301
treatment and monitoring, 301
pathophysiology of infection, 297–298
surgical pathologic diagnosis, 765–766
therapy, 304–305
monitoring response, 305
options, 304–305
PCR (polymerase chain reaction)
adenovirus, 219, 221–222, 224
bloodstream infections, 676
central nervous system infection, 644
cytomegalovirus (CMV), 101, 103, 105–107, 116
diagnosis and serology, 281–283
Epstein-Barr virus (EBV), 129
fungi, filamentous, 323–325
hepatitis B virus (HBV), 72
hepatitis C virus (HCV), 75, 80, 83
herpes simplex virus (HSV), 138–139, 141, 142
HIV, 62, 65
human herpesvirus 6 (HHV-6), 164, 165–166
human herpesvirus 7 (HHV-7), 164, 165–166
human papillomavirus (HPV), 181–183
lower respiratory tract infections, 355–356, 559–560
mycobacteria, 377, 379, 382
parvovirus, 299, 301–305
polyomaviruses, 199, 206–207
prosthetic device infections, 725–726, 727–728
respiratory RNA viruses, 251–261
varicella zoster virus (VZV), 143–147, 149
yeast infection diagnosis, 350–351
Pelvic inflammatory disease (PID), 276, 278–279
Peripheral blood smear, evaluation of, 36
Peripheral blood smear, evaluation of, 36
Persistant bacteremia, 655
Phagocytes, 4–5
disorders of, 9
evaluation of cells, 37–38
Phenotypic identification, actinomycetes, aerobic, 403
Phenytoin, IgA deficiency from, 23
Phenotypic identification, actinomycetes, aerobic, 403
clinical presentation, 444–445
case control, 446–447
diagnosis, 445–446
antigen detection, 446
direct detection by microscopy, 445
molecular methods, 445–446
serology, 446
epidemiology, 442
life cycle and transmission, 442–444
pathophysiology, 444
treatment, 446
Plesiomonas shigelloides, gastrointestinal infection, 614, 616, 619
Pneumocystis jirovecii
Lower respiratory tract infections, 540, 556, 558
surgical pathologic diagnosis, 771–772
Pneumonia, see also Lower respiratory tract infections
community-acquired, 539–540
hospital-associated infections, 742–743, 748
nosocomial, 540–541
ventilator-associated, 712, 736–737, 743
Polyenes, mold-active antifungal agents, 326
Polyomaviruses, 197–199
BK virus, 201–202, 204
cancer and, 205
epidemiology, 199–200
genotypes and mutations, 204
human diseases by, in
immunocompromised hosts, 201–204
in immunocompetent individuals, 200–201
JC virus, 202–203, 204
KIPyV and WUPyV, 203–204
laboratory diagnosis of infections, 205–207
culture, 205
detoxification, 206–207
serology, 205
Merkel cell carcinoma (MCC), 203
modulation immunosuppression vs. antiviral compounds for therapy, 207–209
phylogenetic tree, 198
seroprevalence, 199–200
surgical pathologic diagnosis, 763–765
trichodysplasia spinulosa-associated virus, 203
Posterior reversible leukoencephalopathy (PRES), central nervous system infections, 629, 633
Posttransplant lymphoproliferative disorder (PTLD), Epstein-Barr virus (EBV), 128, 129, 130, 131–132
Preemptive antifungal therapy, 328, 330
Primary antifungal prophylaxis, fungal disease prevention/management, 328
Primary immunodeficiencies, filamentous fungi, infection by, 320
Procalcitonin (PCT), bloodstream infections, 675
Prophylactic vaccination, cervical cancer, 188–189
Prosthetic device infections, 711–728
biofilms and small-colony variants, 711–713
laboratory methods, 719–728
biofilm disruption, 720–721
culture, 719–720
molecular methods, 722, 722–723
SCV recognition, 721–722
stains, 719
specific devices, 723–728
breast prostheses, 714–715
central venous catheters, 713–714, 723–724
prosthetic joints, 715–719, 724–728
Prosthetic joints, 715–719
diagnosis, 716
histology, 716–717
laboratory diagnostics, 724–728
management, 718
small-colony variants (SCV), 718–719
sonicate-fluid culture, 726–727
sonicate-fluid PCR, 727–728
surrogate markers, 717–718
synovial fluid culture, 724–725
tissue culture, 725
tissue PCR, 725–726
Protein-losing enteropathy, 32
Proteomic methods
actinomycetes, aerobic, 403
bloodstream infections, 674
fungi, filamentous, 325–326
yeast infection diagnosis, 347–348, 351
Protozoa, see Parasites
Protozoan pathogens, central nervous system infection, 639–640
Pseudomonas aeruginosa
gastrointestinal infections, 621
genitourinary tract infections, 570, 571, 576, 580, 581–582, 586
gram-negative bacteria, 471–472
hospital-associated infections, 742–743
lower respiratory tract infections, 540–543, 546, 548, 551–552
prosthetic device infections, 712
Pseudomocardiia spp.
microscopy and direct visualization, 400
taxonomy and epidemiology, 396
Pure red-cell aplasia (PRCA), parvovirus, 299, 302
Pyogenic polymicrobial infections
gastrointestinal complications, 516–518
laboratory methods, 518
limitations, 518
necrotizing skin and soft-tissue infections (SSTIs), 515–516
peritonitis infections, 516
Q
Q-linea, 676–677
Qualitative proviral DNA and RNA assays, HIV detection, 61–62
Quantitative DNAemia, varicella-zoster virus (VZV), 147, 149, 150
Quantitative HIV-1 viral load testing, 62
Quantitative PCR
central nervous system infections, 644
gastrointestinal infections, 621
genitourinary tract infections, 579, 585
lower respiratory tract infections, 559
skin and soft tissue infections, 703
R
Radiography
bloodstream infections, 666
Epstein-Barr virus (EBV), 130
genitourinary tract infections, 577–579
lower respiratory tract infections, 551–552
Radiologic techniques, fungi, filamentous, 326
Rapamycin, immunosuppression by, 12
Rapid antibiotic therapy, bloodstream infection, 670
Rapid diagnostic tests (RDTs) HIV detection, 57–60
Real time reverse transcription-PCR (RT-PCR)
to enteroviruses and parechoviruses, 277, 281–286
respiratory RNA viruses, 251–255, 259, 260–261
Renal disease, end-stage, 35
Resistance testing
cytomegalovirus (CMV), 108–109
HIV-1, 63–65
Respiratory pathogens, hospital-associated infections, 746
Respiratory RNA viruses, 233–234
antigenic and genetic typing/subtyping systems, 253, 259
antiviral susceptibility testing, 259
clinical significance, 236, 237–239
collection, transport and storage of specimens, 240–243
nasal swab, 243
nasal wash, 242–243
nasopharyngeal and oropharyngeal swabs, 243
nasopharyngeal aspirate, 242
direct examination, 245–253
antigen detection, 241, 245, 248–251
immunofluorescence, 241, 248
molecular methods, 241, 251–253
multiplex testing platforms, 252–253, 254–257
rapid antigen detection tests, 249–251
rapid sample-to-result molecular tests, 253, 258
solid-phase immunoassays, 241, 248–251
epidemiology, 236–237
evaluation, interpretation and reporting of results, 259–261
laboratory methods for diagnosis, 240, 241
pathogenesis, 237
screening algorithm, 749–750
serologic tests, 241, 253
taxonomy and description of agents, 234–236
transmission, 237
treatment, prevention and control, 239–240
Respiratory RNA viruses (Continued)
virus isolation in cell culture, 241, 243–245
centrifugation-assisted rapid cultures, 244–245
central tube cultures, 244
mixed cell cultures, 245
Respiratory specimens, lower respiratory tract infections, 534–560
Respiratory syncytial virus (RSV), 233, see also Respiratory RNA viruses
epidemiology, 236–237
hospital-associated infections, 740–741
lower respiratory tract infections, 540, 541, 545, 548, 552, 554
surgical pathologic diagnosis, 767
taxonomy and description, 234
Rheumatic diseases, agents for treatment of, 21–23
Rheumatoid arthritis bacterial infections
with, 483
Rhinoviruses, 233, see also Respiratory RNA viruses
epidemiology, 236–237
taxonomy and description, 234, 235
Rhodococcus spp.
culture, 402
gram-positive bacteria, 469
microscopy and direct visualization, 399
susceptibility testing, 405
taxonomy and epidemiology, 394–395
Rhodotorula spp., infection by, 346
Rituximab
bacterial infections, 477
immunodeficiency associated with, 13, 14
Salmonella
aerobic bacteriology, 467, 471, 479–480, 581
central nervous system infections, 634
gastrointestinal infection, 614, 616, 619
genitourinary tract infections, 570
gram-negative bacteria, 471
lower respiratory tract infections, 540
prosthetic device infections, 716
Saprophytaceae spp., infection by, 344
Sarcotyphus scabiei
Scedosporium spp., 316
Segniliparus spp.
culture, 402
microscopy and direct visualization, 400
susceptibility testing, 405
taxonomy and epidemiology, 397
Selective IgA deficiency, 9
Sepsis
human immune response in, 655, 656
pathophysiology of, 635–655
systemic inflammatory response syndromes and, 655
SepsiTyper, 674
Serratia spp., infection by, 344
Septic shock
bacterial infection, 541
bloodstream infections, 663–664
Gram-negative bacteria, 471
Gram-positive bacteria, 467, 469, 470
human immunodeficiency virus (HIV), 179, 180
interferon gamma release assay (IGRA), 376
kidney transplant and UTIs, 575, 576, 586–587
lower respiratory tract infections and, 543–546
heart, 545–546
kidney, 546
liver, 546
lung, 544–545
mycobacterial infection, 372–373
timeline of infections, 24
Sporothrix schenckii, 314
Sputum, lower respiratory tract infections, 555–556
Staphylococcus
gram-positive bacteria, 467, 469, 470
S. aureus
bloodstream infections, 653, 657, 663–664, 671–672, 675–676
central nervous system infection, 634
genitourinary tract infections, 570–572, 582
hospital-associated infections, 736–737, 742, 745, 747
lower respiratory tract infections, 540, 541, 543, 545, 548, 550–552, 556, 559
prosthetic device infections, 712–718, 721–722, 727
skin and soft tissue infections, 692–693, 695–696, 700–701, 703
Stenotrophomonas maltophilia
aerobic bacteriology, 471–472, 474–475, 477, 479, 481–482, 486
hospital-associated infections, 737
lower respiratory tract infection, 540–541, 545
prosthetic device infections, 718
skin and soft tissue infections, 693–694
Steroid use, bloodstream infections, 663–664
Streptococcus spp., gram-positive bacteria, 469–470
Streptococcus pneumoniae, lower respiratory tract infections, 539–541, 543, 546, 549–550, 552, 553, 5
Streptomyces spp.
culture, 402
microscopy and direct visualization, 400
taxonomy and epidemiology, 397
Strongyloides stercoralis, 450–453
bloodstream infections, 661
central nervous system infection, 640
clinical presentation, 451
center control, 453
diagnosis, 451–453
antigen detection, 453
direct detection by microscopy, 452
molecular methods, 452
epidemiology, 450
life cycle and transmission, 450–451
lower respiratory tract infection, 542
parasitic infection, 412
pathophysiology, 451
surgical pathologic diagnosis, 776–777

Sequence, see also DNA sequencing
mycobacteria, 378–379
yeast infection diagnosis, 347
Serology
central nervous system infection, 644
cytomegalovirus (CMV), 101, 102, 104
enteroviruses and parechoviruses, 284
Epstein-Barr virus (EBV), 128–129
fungi, filamentous, 322
genitourinary tract infections, 584
herpes simplex virus (HSV), 138, 140
HIV-1 and HIV-2 infection, 56–57
human herpesviruses (HHV-6 and HHV-7), 164–165
lower respiratory tract infections, 554
mycobacteria, 375
parvovirus, 301, 302, 303
polyomaviruses, 205
respiratory RNA viruses, 241, 243
varicella zoster virus (VZV), 145–146, 148
Sexually transmitted infections,
genitourinary tract, 571, 574, 578,
588–593, 601–603
Skin and soft tissue infections (SSTIs), 691–704
antigen and antibody detection, 701, 703
antimicrobial susceptibility testing, 701
bacteria, 697, 698
culture, 701
diagnostic approach, 696–698
diabetic food infection, 697–698
HHV-1–704
infections, 696–697
transplant and oncology patients, 696
epidemiology and disease spectrum, 692–696
diabetic foot infection, 695–696
HHV patients, 694–695
immunocompetent patients, 692
immunocompromised patients, 692–696
transplant and oncology patients, 693–694
fungi, 697, 698, 701
microbiological methods, 699–701
molecular biological techniques for diagnosing, 703
mycobacteria, 697, 701
necroizing, 515–516
non-molecular laboratory methods, 698–703
pathology and staining, 701
pathophysiologic of, 691–692
skin microbiome, 691–692
spirochetes, 698
viruses, 697, 698, 701
yeasts, 702
Skin microbiome, 691–692
SLE, see Systemic lupus erythematosus (SLE)
SmartCycler, 672
Solid organ transplantation, 23–26
adenovirus, 217, 218–219
bacterial infections, 477–479
central nervous system infections, 633–634
cytomegalovirus (CMV) in patients with, 98–99, 115–116
filamentous fungi, infection by, 319
genitourinary tract infections, 575–576, 578
human herpesviruses (HHV-6 and HHV-7), 161
human papillomavirus (HPV), 179, 180
interferon gamma release assays (IGRA), 376
kidney transplant and UTIs, 575, 576, 586–587
lower respiratory tract infections and, 543–546
heart, 545–546
kidney, 546
liver, 546
lung, 544–545
mycobacterial infection, 372–373
timeline of infections, 24
Vaccinations, cervical cancer, 188–190
Vaccine-associated paralytic poliomyelitis (VAPP), enteroviruses and parechoviruses, 279–280
Vancomycin-resistant enterococci (VRE), hospital-associated infections, 736, 738, 745
Varicella zoster virus (VZV), 143–150
antiviral sensitivity testing, 150
description of agent and pathophysiology, 143–144
epidemiology, 145
goals of laboratory testing, 145
herpes zoster (HZ) disease spectrum, 144
host factors and subgroups, 144
infection in immunocompromised patients, 144
laboratory methods for diagnosis, 145–150
antigen-based assays, 146–147, 148
culture, 146, 148
morphological tests, 146, 148
nucleic acid-based assays, 147, 149
quantitative DNAemia, 147, 149, 150
serology, 145–146, 148
morbidity and mortality, 144
skin and soft tissue infections, 697, 698
surgical pathologic diagnosis, 767
therapy, 150
Ventilator-associated pneumonia (VAP), 712, 736–737, 743
Vibrio spp., 424
bloodstream infections, 657
gastrointestinal infections, 619
gram-negative bacteria, 471, 472, 473
skin and soft tissue infections, 692, 700
Viral culture
adenovirus, 220, 224
cytomegalovirus (CMV), 101, 102
enteroviruses and parechoviruses, 283–284
herpes simplex virus (HSV), 138–139, 140
human herpesviruses (HHV-6 and HHV-7), 164, 165
parvovirus, 304
polyomaviruses, 205
respiratory RNA viruses, 241, 243–245
varicella zoster virus (VZV), 146, 148
Viruses
bloodstream infections, 660, 661
central nervous system infections, 635–637
gastrointestinal infections, 614, 617–618
hospital-associated infections, 740–741
surgical pathologic diagnosis, 763–768
VitekMS, 674
VZV, see Varicella zoster virus (VZV)
Western blot, for HIV, 56, 58
Williamsia spp.
culture, 402
microscopy and direct visualization, 400
taxonomy and epidemiology, 397
X-linked agammaglobulinemia (X-LA), 7–8, 13
X-linked lymphoproliferative syndrome, 31, 128
Xpert MRSA/SA BC Assay, 671–672
Yeasts
antifungal susceptibility testing, 351–354
bloodstream infections, 659–660
description and diagnosis, 702
diagnosis of infections, 346–351
antigen detection, 348–350
beta-D-glucan, 349–350
biochemical methods, 346
cryptococcal polysaccharide-capsule antigen, 348–349
culture-based methods, 346–348
direct microscopic examination, 348
molecular methods, 347–348
morphological examination, 346
non-culture-based methods, 348–351
nucleic acid amplification testing (NAAT), 350–351
nucleic acid-based identification, 347
nucleic acid detection, 350–351
PNA-FISH (peptide nucleic acid-fluorescence in situ hybridization), 350
Proteomic-based identification, 347–348
proteomic method, 351
infectious agents
ascomycetous yeasts, 343–344
basidiomycetous yeasts, 344–346
Candida spp., 343
Cryptococcus spp., 344–345
Geotrichum spp., 343–344
Malassezia spp., 345–346
Rhodotorula spp., 346
Saccharomyces spp., 344
Saprochaete spp., 344
Trichosporon spp., 345
taxonomy, 343–346
therapeutic options, 351–354
Zielhl-Neelsen stain, 376
Zygomycosis (mucormycosis)
central nervous system infection, 631, 633, 639
gastrointestinal infection, 614
hospital-associated infections, 740
lower respiratory tract infection, 552
skin and soft tissue infections, 693–694