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GENERAL INFORMATION

WHAT IS THE AMERICAN BOARD OF MEDICAL MICROBIOLOGY?
The American Board of Medical Microbiology (ABMM) was established in 1959 under the auspices of the American Academy of Microbiology (AAM) to test the expertise of microbiologists seeking to direct public health or clinical microbiology laboratories. Board-certified Diplomates are adjudged capable to direct public health and clinical microbiology laboratories within their specialty certification.

ABMM certification is recognized by Federal and state governmental agencies as a significant component toward meeting licensure requirements to direct laboratories engaged in the microbiological diagnosis of human disease, and is recognized under the Clinical Laboratory Improvement Amendments of 1988 final rule.

WHAT IS CERTIFICATION?
Certification is the process by which a non-governmental agency or association grants recognition of competence to an individual who has met certain predetermined qualifications as specified by the agency or association.

WHAT AREAS DOES THE ABMM TEST?
The ABMM offers certification in Medical and Public Health Microbiology.

WHEN AND WHERE ARE THE EXAMINATIONS GIVEN?
The examination is administered each spring on-site at the ASM General Meeting.

ABOUT THE EXAMINATION

It is a written examination composed of 200 multiple-choice questions. Applicants who pass the examination are certified as Diplomates in Medical and Public Health Microbiology.

OBJECTIVE
To measure the candidate’s knowledge in the five subject areas considered necessary for the effective practice of clinical or public health microbiology:

- Bacteriology, including mycobacteriology
- Mycology
- Virology
- Parasitology
- Miscellaneous, including microbial genetics, laboratory safety and biohazard management, laboratory operation and management, cost accounting, preparation of dilutions or media, infection control, and serology.
EXAMINATION CONTENT

The content of the examination will be distributed as follows:

<table>
<thead>
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<th>Content area</th>
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<tr>
<td>Bacteriology</td>
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Questions in the content areas of bacteriology, mycology, parasitology, and virology cover five areas: (a) diagnostic systems and interpretation of laboratory data, (b) public health, (c) infection control, (d) infectious disease and pathogenesis, and (f) universal.

EXAMINATION FORMAT

- It is a paper and pencil examination.
- Each question is multiple-choice, with only one correct answer.
- Questions have four possible responses.
- The examination is divided into two sections: a photo question section (comprised of 20 questions) and a non-photo question section (comprised of 180 questions).
- In some cases, questions may require calculations. Examples include assessment of sensitivity, specificity, antimicrobial concentrations, dilution factors, and cost accounting results.
- Approximately 60% of the questions test for basic recall of knowledge, direct interpretation of data, or simple synthesis of information. The remaining 40% of the questions require a higher level of thought process, reasoning skills, or interpretation of data.
- Questions are updated and evaluated every year. Candidates can expect to see questions on technical advances or microbiological issues that occurred during the past year.
- There is no penalty for guessing; only correct answers are graded.
- Questions appear in random order on the exam; questions from the same content area are not grouped together.

SUGGESTED STUDY TOPICS

Suggested study topics are listed below; however, test questions may not be limited to these topics.

**Diagnostic Systems and Interpretation of Laboratory Data**
- Sensitivity, specificity, and predictive value of positive and negative test results. Know the formulas for these characteristics of diagnostic assays and how to interpret them on the basis of actual data.
- The principles and details of performance of commonly used and newly accepted assay systems, including antigen detection, direct fluorescent-antibody stains, enzyme-linked immunosorbent assays (ELISAs), molecular diagnostics, and cultures. Be able to determine which methods are superior in specific circumstances.
- Proper and appropriate specimen collection and transport, tailored for specific disease processes.
- Automated blood culture systems, identification systems, and antimicrobial susceptibility test systems—how they work and the kinds of technical problems associated with their use.
Public Health
- How to handle an outbreak of any communicable disease, including the appropriate specimens to collect and to whom they should be sent.
- Recommended immunizations, when to give them, and populations for which each vaccine is efficacious.
- Serologic tests useful for epidemiological versus diagnostic studies (fungal serologies, for example).
- Centers for Disease Control and Prevention (CDC)-mandated reportable diseases and reportable isolates, including case definitions.

Infection Control
- Proper protocols for handling infected employees, patients with communicable diseases, and laboratory exposures to infectious agents.
- Standard, contact, and airborne precautions, as well as other types of isolation as they pertain to specific infectious disease situations.
- Infection control measures to practice in the case of exotic or new hemorrhagic fevers or other communicable diseases that were previously limited to geographically isolated areas.
- The principles and performance of molecular epidemiological methods.
- Serologic tests recommended for employees, immunocompromised patients, and other groups at risk for acquiring infections.
- Biohazard classifications, waste disposal, and laminar flow hood use.
- Other issues of laboratory and hospital biological safety.

Infectious Disease/Pathogenesis
- Modes of actions of antibiotics, toxicities, and mechanisms of resistance.
- Suitability of antibiotics for specific infectious processes (for example, those that penetrate the cerebrospinal fluid [CSF] and might be useful for treatment of meningitis, those used for treatment of common diseases, and those used as antivirals and antifungals).
- Disease processes and pathogenesis and diagnostic strategies for infectious diseases based on signs and symptoms.
- Specimens appropriate for the diagnosis of infectious disease, based on the disease process.
- General patterns of susceptibilities for microorganisms with predictable patterns.
- Antimicrobial susceptibility testing and interpretations, quality control practices, and NCCLS guidelines.
- The molecular basis for common mechanisms of antimicrobial resistance.
- Serologic responses to common infections for which serology is the main diagnostic tool, such as hepatitis, Epstein-Barr virus (EBV), syphilis, human immunodeficiency virus (HIV) disease, brucellosis, toxoplasmosis, parvovirus, and other viral infections.
- Life cycles of parasites as they pertain to diagnostic testing and infectious stages.
- Staining characteristics of pathogenic microbes.

Universal
- Shipping and mailing etiologic agents.
- Decision-making strategies for choosing a test method.
- Personnel and legal issues associated with directing a laboratory.
- General aspects of laboratory safety (for example, working with radioactive compounds, earthquake-proofing equipment, and electrical precautions).
- Quality control and quality assurance activities.
- Federal regulations governing laboratories, including the Clinical Laboratory Improvement Amendments (CLIA), the U.S. Occupational Safety and Health Administration (OSHA), and the Joint Commission on Accreditation of Healthcare Organizations (JCAHO).

EXAMINATION PREPARATION SUGGESTIONS

A survey was sent to the examinees who passed the 2005 ABMM written-only examination. The survey asked examinees how they prepared for the examination. Their responses are summarized below.

Note: The opinions and suggestions expressed herein are solely those of Diplomates certified in 2005 and do not necessarily represent the opinions of the American Board of Medical Microbiology, the American College of Microbiology, or the American Society for Microbiology. They do not constitute representations concerning the conduct or content of future examinations. The Board does not endorse these opinions and suggestions and this is in no way a statement of the Board's policy. These are strictly the opinions of recently certified Diplomates.

How many hours did you study for the examination?
- Approximately 150 hours.
- About 80 hours.
- Too many to count. I studied for about five months, almost every evening and weekends. I took a week off in May to study as well.
- Around 100 hours.
- Many hours for about six months before the exam I studied every night after work for at least two hours. More on weekends.

- 40 hours.
- Approximately 1,000 hours of studying (3-4 hours per day for approximately one year).
- 300-400 hours.
- I studied for about three months, three hours per night and two more intensive weeks before the exam.
- I started studying almost a full year before I took the exam. I spent one – two hours each evening studying. I also studied three to fours hours on the weekends.

How did you prepare for the examination?
- 60% was reading textbooks/manuals, 20% was going over various multiple choice exams* in microbiology, 10% was reading regulatory documents, and 10% was reviewing micrographs of organisms. *not ABMM exams.
- Reading books, taking notes of critical information, development of a study guide from these notes, case discussions. The key is to study, study, study.
- Read books, review papers (Clinical Microbiology Newsletter as a routine), Morbidity and Mortality Monthly Report (MMWR) (routinely) and some journals (routinely), attend infectious disease conference (routinely).
- I was lucky enough to know three others preparing for the exam. While spread across the country we all took a section (Bacteriology Parasitolgy, etc.) and made study outlines. Between lots of phone calls and one study weekend where we all flew to one house to exchange material and study. We all studied a lot!
- Study buddies were good we kept each other motivated and really learned from each other.
- I read notes microbiology texts, and plate rounds.
- Microbiology rounds, lectures from our lab directors, reading parts of Mandell, MCM, and Koneman.

- I first reviewed the material I felt most comfortable with (bacteriology, mycology, parasitology), leaving the more unfamiliar material for closer to the exam time (molecular biology). I took extensive notes and reviewed the notes several times as well. I read both volumes of the Manual of Clinical Microbiology, the entire Koneman’s Color Atlas textbook, my institution’s infection control manual, and the Biosafety textbook. I also read all 40-plus pages of the Select Agent rule published in the Federal Register, the CDC Bioterrorism guide, and recent (last 3-4 years) Cumitechs.

Do you have any other suggestions for how to prepare?
- If I were to do it again, knowing what I had problems with on the exam, I would suggest reviewing more photos/micrographs. Other than that, reading clinical textbooks and reviewing clinical manuals was helpful, and I would strongly recommend going over other clinical microbiology related multiple-choice exams (i.e., medical technologist type exams, physician board certification type exams.) In addition, reading specific textbooks on subjects that you are least strong in was useful.

- The scope and the number of questions in the study guide need to be expanded. I was also surprised at the number of questions on the exam that required calculations (i.e., sensitivity, specificity, predictive values given high and low disease prevalence, etc.

- Focus on details, not just overall concepts.

- Find others taking the exam and form a study group. I was part of a group of four and we split up the study guides we each prepared then shared them. We also had a three day study weekend together and conference calls almost every week to discuss questions we had or interesting cases from the lab that week.

- Find a study buddy and study! Do not under estimate.

- Candidates should ensure they have sufficient practical experience before attempting the exam.

- Prepare early, get as much clinical experience as possible (ID rounds, discussion and investigation of patients with positive cultures from the micro lab), encourage your lab directors to help you prepare with slide quizzes and lectures; I felt the Koneman color atlas was helpful for me in the visual portion of the test.

Which resources were most beneficial?
(See page 15 for full reference list.)

- The Manual of Clinical Microbiology may provide the most comprehensive data, but it is very detailed and somewhat difficult to read/study from. The Red Book and Control of Communicable Diseases Manual were much easier to review and were therefore probably most helpful.

- Mandell's and Manual of Clinical Microbiology.

- I found all of them (referring to those listed in the references section of the ABMM examination guide) to be beneficial, but especially the Red Book and Control of Communicable Diseases Manual.

- Control of Communicable Diseases Manual, Mandell, Douglas, and Bennett’s Principles and Practice of Infectious Diseases, and Manual of Clinical Microbiology were all very helpful.


- I used the Red Book most, with Microbiology and Parasitology Atlases. Koneman and Mandell. I particularly liked the ASM color atlas of Medical Bacteriology by de la Maza et al.
Do you have any additional suggestions or advice for examinees who will sit for future exams?

- Review Cases Studies in Clinical Microbiology and Parasitology.

- I cannot stress enough to find a study buddy. Not only does this allow for preparation support, but also emotional support and lasting relationships with others also just beginning their careers as Microbiologists.

- I also briefly reviewed the book “Atlas of Human Parasitology” for the image section exam and tried the sample questions of the study guide to get a sense of how I could prepare for the exam.

- Candidates should ensure they have sufficient practical experience before attempting the exam.

- Four to five months of studying, take notes, and review.

EXAMINATION ADMINISTRATION

- The examination will be administered on the day preceding the start of the American Society for Microbiology’s General Meeting.

- Proctors will supervise the examination. Candidates are allowed six hours in which to complete the examination, beginning at 9:00 a.m. and concluding at 4:30 p.m. This time frame allows for two breaks of approximately 20 minutes and 1 hour, respectively. The time allotted is considered to be much greater than that required for answering the questions, but the Board does not wish time constraints to be a factor in performance.

- Bring several #2 lead pencils and a legal document bearing your photograph and signature to the examination. Acceptable legal documents are a driver’s license, government identification card, or passport.

- Reference materials and calculators are not permitted.

SCORING

- The examination answer sheets are scored electronically.

- Scores within two (2) points of the passing score are verified by hand.

- The ABMM uses a criterion-referenced scoring system. This method sets a standard of performance in absolute, not relative, terms. As a result, candidates are not graded on a curve and do not compete against each other. Each question is rated individually by its relative difficulty and scored according to a standard of performance predetermined by a consensus of the examination committee. Thus, if more difficult questions are chosen for a particular examination, the passing score will be lower than that of another examination of equal length but with easier questions, as determined by the committee. Each candidate’s score is based only on the number of correct answers; there is no comparison among candidates.

- After the examination has been scored, the examination committee evaluates the responses. Occasionally, questions fail to perform as expected and are dropped from the scoring and the examinations are rescored.

- Examination results are mailed to candidates within 10 to 12 weeks. Results are not released by telephone.

- The ABMM does not encourage examinees with scores close to passing to request hand-scoring. Examinations that are close to the passing score are automatically hand-scored. Any hand-scoring requests must be submitted, in writing, within 30 days of notification and be accompanied by a $25.00 fee.
SAMPLE QUESTIONS

The sample questions included in this examination guide are actual questions from previous examinations. They have been removed from the question pool. Do not judge the content as indicative of content in current questions, but use these sample questions as templates for the format.

1. In cases of possible sexual abuse involving children, the identification of oxidase-positive, gram-negative diplococci such as *Neisseria gonorrhoeae* requires which of the following?
   A. Demonstration of acid production from glucose and maltose
   B. A positive direct immunofluorescent reaction with monoclonal antibody against *N. gonorrhoeae* outer membrane protein
   C. A positive particle agglutination using monoclonal antibody to *N. gonorrhoeae*
   D. Identification of *N. gonorrhoeae* by two distinct methodologies

   Question tests Bacteriology: Diagnostic Systems and Interpretation of Laboratory Data.

2. A 6-year old near-drowning victim is admitted to a pediatric hospital’s intensive care unit and placed on a respirator. Seven days after admission, he develops pneumonia. A Gram-stained smear of aspirated tracheal secretions reveals the presence of many polymorphonuclear cells and many intracellular gram-negative diplococci. Which of the following is the most probable identity of this organism?
   A. *Moraxella catarrhalis*
   B. *Aeromonas hydrophila*
   C. *Neisseria meningitidis*
   D. *Chromobacterium violaceum*

   Question tests Bacteriology: Diagnostic Systems and Interpretation of Laboratory Data.

3. Five cases of prosthetic valve endocarditis caused by *Staphylococcus epidermidis* are observed in one hospital. Of the following available methods, which is BEST for determining whether all five isolates were derived from a single source?
   A. Serotyping
   B. Plasmid fingerprinting
   C. Antimicrobial susceptibility testing
   D. Bacteriophage typing

   Question tests Bacteriology: Infection Control.

4. Which of the following organisms is the most common cause of septicemia in patients with sickle cell disease?
   A. *Salmonella enteritidis*
   B. *Streptococcus pneumoniae*
   C. *Streptococcus agalactiae*
   D. *Shigella sonnei*

   Question tests Bacteriology: Infectious Disease/Pathogenesis.

5. F.D. was generally healthy until his impacted wisdom tooth was removed by an oral surgeon. The area where the tooth had been was sore, but what was more alarming was the appearance of eruptions through the skin beneath the area of the jaw where the tooth had been. The exudate draining through the skin eruptions was cultured aerobically, but the results were negative. Which of the following is the most probable etiologic agent of this patient’s condition?
   A. *Actinomyces israelii*
   B. *Histoplasma capsulatum*
   C. *Nocardia asteroides*
   D. *Actinomyces bovis*

   Question tests Bacteriology: Infectious Disease/Pathogenesis.

6. The highly infectious asexual conidia of *Coccidioides immitis* are called which of the following?
   A. Arthroconidia
   B. Blastococonidia
   C. Chlamydospores
   D. Sporangiospores

   Question tests Mycology: Public Health.
7. Which of the following specimens is the most sensitive for the diagnosis of infections with *Naegleria fowleri*?

A. Brain tissue  
B. Corneal scraping  
C. Blood  
D. Urine

Question tests Parasitology: Diagnostic Systems and Interpretation of Laboratory Data.

8. An individual who has received all three doses of hepatitis B vaccine and who has never had hepatitis B virus (HBV) infection would be expected to have which of the following serologic marker(s)?

A. HBcAb  
B. HBsAb  
C. HBeAb  
D. HBeAb and HBsAb

Question tests Virology: Diagnostic Systems and Interpretation of Laboratory Data.

9. Which of the following laboratory tests offers the greatest value for predicting the therapeutic efficacy of nucleoside analogues as an initial treatment for an HIV-infected individual?

A. Enumeration of CD4+ lymphocytes  
B. HIV genotype analysis  
C. Measurement of HIV RNA levels in plasma  
D. Measurement of p24 antigen levels in serum

Question tests Virology: Diagnostic Systems and Interpretation of Laboratory Data.

10. Which one of the following viral diseases has the shortest incubation period?

A. Rubella  
B. Influenza  
C. Hepatitis A  
D. Hepatitis B

Question tests Virology: Public Health.

11. A 56-year-old male is admitted with rapidly progressive dementia and ataxia. A diagnosis of Creutzfeldt-Jakob disease is made. The patient should be placed on which of the following precautions?

A. Droplet isolation  
B. Airborne isolation  
C. Standard precautions  
D. No isolation

Question tests Virology: Infection Control.

12. Which of the following respiratory viruses is a nonenveloped virion?

A. Rhinovirus  
B. Parainfluenza virus  
C. Respiratory syncytial virus (RSV)  
D. Coronavirus

Question tests Virology: Infectious Diseases and pathogenesis.

13. To safely work with etiologic agents classified as biosafety level 2 (BSL 2) requires BSL 1 laboratory practices, equipment, and facility recommendations. An additional recommendation includes which of the following?

A. Perform all procedures within a class II biological safety cabinet  
B. Wear gloves and face protection for potential splashes only  
C. Have negative air flow from the hallway to the laboratory  
D. Have self-closing double-door access

Question tests Universal.
14. A patient who recently returned from a camping trip in Montana is hospitalized with high fever and prostration that recurs every 5 to 7 days. Loosely coiled spiral-shaped organisms 10 to 20 mm in length are noted in a Wright-stained smear of the patient’s blood. Which of the following is the most probably etiologic agent?

A. *Leptospira interrogans*
B. *Spirillum minor*
C. *Borrelia parkeri*
D. *Treponema pallidum*

Question tests Bacteriology: Diagnostic Systems and Interpretation of Laboratory Data.

15. At laboratory rounds, the supervisor shows you the following susceptibility results by microbroth dilution of a *Streptococcus mitis* isolate from a patient with endocarditis: penicillin resistant, erythromycin resistant, and vancomycin susceptible. The physician telephones asking for the susceptibility results, including susceptibility to clindamycin. What should you tell the physician?

A. None of the susceptibility results are ready to be reported until confirmed by a second antimicrobial susceptibility test (AST) method, but viridans group streptococci remain predictably susceptible to clindamycin.
B. Report the current results, and advise him that viridans group streptococci remain predictably susceptible to clindamycin.
C. Report the current results, and advise him that in viridans group streptococci, resistance to erythromycin predicts resistance to clindamycin.
D. Report the current results, and tell him the laboratory will also test the isolate for susceptibility to clindamycin.

Question tests Bacteriology: Diagnostic Systems and Interpretation of Laboratory Data.

16. A previously normal, full-term infant developed bilateral conjunctivitis at 2 weeks of age. The conjunctivitis was followed by severe coughing, but the infant remained afebrile. When the infant was 4 weeks old, a chest X ray showed bilateral symmetrical interstitial infiltrates. The white blood cell (WBC) count was 14,000/mm$^3$ with 32% segmented neutrophils, 58% lymphocytes, 2% monocytes, and 4% eosinophils. Serum immunoglobulin G (IgG), IgA, and IgM levels were elevated. Which of the following is the most probable infectious agent?

A. *Chlamydia trachomatis*
B. *Streptococcus agalactiae*
C. *Haemophilus influenzae*
D. Adenovirus

Question tests Bacteriology: Infectious Disease.

17. Two days after a 51-year-old man suffered a puncture wound to his thumb while fishing in the Gulf of Mexico, he experienced the abrupt onset of pain, fever, and rapidly progressing skin lesions on both lower extremities. Subsequent symptoms included tingling in the hand, nausea, vomiting, fever, and chills. On admission to the hospital, he had purpuric skin lesions on both legs. Blood cultures obtained at the time of admission demonstrated growth of gram-negative bacteria. This infection is most probably caused by which of the following?

A. *Vibrio damsela*
B. *Vibrio metschnikovii*
C. *Vibrio vulnificus*
D. *Vibrio parahaemolyticus*

Question tests Bacteriology: Infectious Disease.
18. Two patients were admitted to a major medical center in the southwestern United States. The first patient presented with chronic sinusitis. Hematoxylin and eosin stains of debrided material revealed granulation tissue, chronic inflammation, and noninvasive, brownish septate hyphae. The second patient presented with leukemia and an erythematous cutaneous lesion. Biopsy of the lesion revealed septate hyphae, swollen hyhal elements, and hyphae with bizarre dilatations. What is the most probable etiology for both patients?

A. Aspergillus species
B. Rhizopus species
C. Bipolaris species
D. Drechslera species

Question tests Mycology: Diagnostic Systems and Interpretation of Laboratory Data.

19. A previously healthy, 24-year-old Mexican immigrant is brought to an emergency room in Los Angeles because of seizures. A computerized axial tomography (CAT) scan reveals a solitary calcified lesion, 2 cm in diameter, in the right cerebral hemisphere. What is the most probable diagnosis?

A. Central nervous system (CNS) coccidioidomycosis
B. Cerebral cysticercosis
C. Cerebral echinococcosis
D. Extraintestinal amebiasis

Question tests Parasitology: Infectious Disease.

20. A 17-year-old male presented to an emergency room with a genital lesion. A swab taken from the lesion produced herpes-like cytopathic effect in primary human amnion cells. However, attempts to pass the virus or confirm the presence of herpes antigens by direct fluorescent-antibody techniques were unsuccessful. Electron photomicrographs of the original specimen subsequently revealed the presence of poxviruses.

Based on this information, the patient most probably has which of the following?

A. Shingles
B. Orf disease
C. Molluscum contagiosum
D. Whitepox

Question tests Virology: Diagnostic Systems and Interpretation of Laboratory Data.

21. A patient develops a new respiratory infiltrate and becomes febrile. After primary routine culture of expectorated sputum has been evaluated and results have not been helpful, what is the next test likely to yield the most diagnostic information with the least patient risk?

A. Bronchoalveolar lavage
B. Fine-needle aspiration
C. Thoracentesis
D. Open-lung biopsy

Question tests Universal.

22. Which of the following would be of most practical value in controlling the spread of Eastern equine encephalitis virus infections to man?

A. Mosquito control
B. Eradication of house flies
C. Quarantine of infected horses
D. Effective flea and tick control

Question tests Virology: Public Health.
23. Acute infantile diarrhea is most commonly due to infection with which of the following?

A. Enteroviruses  
B. Rotaviruses  
C. Noroviruses  
D. Enteric adenoviruses

Question tests Virology: Diagnostic Systems and Interpretation of Laboratory Data.

24. Food and Drug Administration-approved antiviral drugs are currently available for treatment of which of the following diseases?

A. Adult mumps and yellow fever  
B. Rubella and measles  
C. Influenza and disseminated herpes  
D. Hantavirus pulmonary syndrome and zoster

Question tests Virology: Infection Control.

25. Several laboratory tests were researched for their usefulness in evaluating suspected histoplasmosis in patients who reside in an area where this disease is endemic. If the prevalence of histoplasmosis is 25%, which of the following sensitivity and specificity combinations would you choose as the most useful confirmatory test for diagnosing the disease?

A. Sensitivity of 50%, specificity of 98%  
B. Sensitivity of 90%, specificity of 80%  
C. Sensitivity of 92%, specificity of 70%  
D. Sensitivity of 99%, specificity of 90%

Question tests Universal.

26. Of the following methods that have been used to investigate the epidemiology of *Staphylococcus aureus*, which best discriminates between strains?

A. Bacteriocin typing  
B. Phage typing  
C. Antibiotic susceptibility patterns  
D. Pulsed field gel electrophoresis

Question tests Bacteriology: Diagnostic systems and interpretation of laboratory data.

27. A 16-year-old male from Los Angeles with end-stage renal disease is admitted to the hospital for evaluation of a febrile episode. Laboratory studies showed that the boy was hypogammaglobulinemic. A blood culture obtained on admission was positive for faintly staining, curved, gram-negative rods from the aerobic bottle only. An oxidase-positive, catalase-negative, motile, helical, gram-negative rod was recovered on chocolate agar after 3 days of incubation at both 37°C and 42°C. This organism did not grow on *Campylobacter* blood agar. What is the most probable etiologic agent?

A. *Campylobacter coli*  
B. *Campylobacter upsaliensis*  
C. *Helicobacter pylori*  
D. *Vibrio metschnikovii*

Question tests Bacteriology: Infectious Disease.

28. According to the Centers for Disease Control and Prevention *Infection Control Guidelines*, routine microbiologic sampling is indicated for which of the following?

A. Respiratory therapy equipment  
B. Dialysis fluid  
C. Sterile disposable equipment  
D. Operating room surfaces

Question tests Bacteriology: Infection Control.
29. Which of the following methods is best for establishing strain relatedness among the isolates of *S. maltophilia*?

A. Biochemical profiling  
B. Isoelectric focusing  
C. Restriction fragment length polymorphism  
D. Antibiogram  

Question tests Bacteriology: Diagnostic systems and interpretation of laboratory data.

30. Which of the following are associated with *Histoplasma capsulatum*?

A. Tuberculate macroconidia  
B. Spherules  
C. Sclerotic bodies  
D. Arthroconidia  

Question tests Mycology: Diagnostic systems and interpretation of laboratory data.

31. Which medium is useful for the isolation of *Malassezia furfur*?

A. Charcoal yeast extract agar  
B. Egg yolk agar  
C. Brain heart infusion agar containing glycerol  
D. Sheep blood agar with olive oil overlay  

Question tests Mycology: Diagnostic Systems and Interpretation of Laboratory Data.

32. Which of the following viruses is closely associated with exanthem subitum (roseola infantum)?

A. Parvovirus B19  
B. Human herpesvirus 6  
C. Rubella virus  
D. Rubeola virus  

Question tests Virology: Infectious disease

33. Which of the following is the best method to diagnose arboviral encephalitis?

A. Virus culture of buffy coat  
B. Acute and convalescent serologic testing on serum  
C. IgM serologic testing on cerebrospinal fluid  
D. Viral surveillance cultures on area birds  

Question tests Virology: Diagnostic Systems and Interpretation of Laboratory Data.

34. Of the following viruses, which is the most common nosocomial pathogen in pediatric wards?

A. Respiratory syncytial virus  
B. Adenovirus  
C. Herpes simplex virus  
D. Cytomegalovirus  

Question tests Virology: Infection Control.
35. The picture shown is an auramine-rhodamine stain of an organism recovered from an infected finger wound that was slowly progressive in spite of topical antibiotic treatment. The organism grew optimally at 30°C on Middlebrook 7H11 medium and formed deep yellow pigment when exposed to light. The organism was negative for nitrates and heat-stable catalase, but hydrolyzed Tween and produced urease and pyrazinamidase. What is the most probable identification of this organism?

A. *Mycobacterium ulcerans*
B. *Mycobacterium simiae*
C. *Mycobacterium kansasii*
D. *Mycobacterium marinum*

Question tests Bacteriology: Diagnostic Systems and Interpretation of Laboratory Data.

### Answers


### Suggested References


### About the References

The resources listed are NOT meant to be comprehensive guides to the examination. They are merely suggestions.
**ELIGIBILITY**

ABMM candidates must demonstrate appropriate education, postdoctoral training, and/or work experience. Each candidate must apply under one of two plans.

- **Plan I:** Applicants must possess an earned doctorate and complete a minimum of three (3) years of experience. Experience is defined as postdoctoral training, teaching, and/or laboratory experience directly relevant to the practice of clinical or public health microbiology and its subspecialties. Appropriate experience requires an ongoing relationship (as a consultant is acceptable) with a clinical, public health, or other microbiology laboratory that includes a diagnostic service component such that the candidate has devoted at least 50% of his/her time to management, technical, and administrative activities during the three years of experience. The final assessment of acceptable postdoctoral training and experience will be made by the Vice-Chair of the ABMM.

- **Plan II:** Applicants must possess an earned doctorate and complete two (2) years of postgraduate training in a CPEP-approved program. CPEP-approved programs are two-year training programs accredited by the American College of Microbiology’s Committee on Postgraduate Educational Programs (CPEP).

  All training and experience requirements must be met after the doctoral degree has been awarded. Applicants who will complete the requisite experience within 60 days following the examination date are eligible to apply.

Eligibility is determined on a case-by-case basis by the Vice-Chair of the ABMM. Once notified of their approval, eligible candidates have two examination periods in which to begin the examination process.

**Education:** Applicants must possess an earned Doctorate of Philosophy or Doctorate of Science in microbiology or an equivalent degree in one of the related sciences acceptable to the Board. Other degrees (such as Doctor of Medicine, Doctor of Osteopathy, Doctor of Veterinary Medicine, Doctor of Public Health, Doctor of Dental Medicine, or Doctor of Dental Surgery) may be accepted if the additional special training and experience of the candidate is approved by the Vice-Chair of the ABMM. All educational requirements must be met through institutions accredited by a regulatory agency recognized by the U.S. Department of Education. Degrees gained by applicants educated outside of the United States must be evaluated by an approved foreign credential evaluation agency and deemed equivalent to those earned at an accredited institution in the United States.

**HOW TO APPLY**

Applications and all supporting documents must be received no later than February 1.

Submit the following to be evaluated for examination eligibility:

1. **ABMM Application Form:** The application form must be completed and notarized. It is available online at www.asm.org/college.

2. **Official Graduate Transcripts:** Transcripts must be mailed directly to the ABMM from issuing institutions within the United States. Photocopies will not be accepted. All educational requirements must be met through institutions accredited by a regulatory agency.
recognized by the U.S. Department of Education. Note: If the name on your transcript(s) does not match the name on your application form and reference letters, you must submit a notarized copy of your marriage license or name change certificate with your application.

If you were educated outside the United States, your graduate transcripts must be evaluated by a foreign educational evaluation agency, a process which may take several months. Transcripts received directly from a foreign institution or translation of transcripts from such institutions will not be accepted by the ABMM. For applicants to be considered eligible to sit for the ABMM examination, their degrees earned outside the United States must be deemed equivalent to those earned at an accredited institution in the United States.

Evaluations will be accepted from the following agencies:

**International Transcripts.** Evaluations of transcripts from institutions outside the United States will be accepted from the following agencies:

- **Center for Applied Research, Evaluation and Education, Inc.**
  P.O. Box 20348
  Long Beach, CA 90801
  Telephone: 562-430-1105
  Fax: 562-430-8215
  E-mail: evalcaree@earthlink.net
  [www.evalcaree@earthlink.net](mailto:evalcaree@earthlink.net)

- **Josef Silny & Associates, Inc.**
  7101 SW 102 Avenue
  Miami, FL 33173
  Telephone: 305-273-1616
  Fax: 305-273-1338
  E-mail: info@jsilny.com
  [www.jsilny.com](http://www.jsilny.com)

- **International Educational Research Foundation, Inc.**
  P.O. Box 3665
  Culver City, California 90231-3665
  Telephone: 310-258-9451
  Fax: 310-342-7086
  E-mail: info@ierf.org
  [www.ierf.org](http://www.ierf.org)

- **World Education Services, Inc.**
  P.O. Box 745
  Old Chelsea Station
  New York, New York 10113-0745
  Telephone: 212-966-6311
  Fax: 212-966-6395
  E-mail: info@wes.org
  [www.wes.org](http://www.wes.org)

3. **Letters of Reference:** Two letters of reference must be submitted, one from an immediate supervisor and one from a person (not related to you) who has definite knowledge of your training and experience in medical microbiology. A minimum of two letters is required, unless you have completed a CPEP-approved training program, in which case one letter from the program director will be sufficient. The letters must specifically address the time you spent and your experience in the following areas:

- Responsibilities and skills in the clinical laboratory (i.e., bench work and interaction with technologists, quality assurance/quality control, and technical troubleshooting and problem solving)
- Interaction and consultation with clinicians
- Management and administrative skills (interaction with institutional and laboratory administration and personnel)
The letters provide reviewers with an adequate understanding of the depth of your training and experience. If necessary, a call may be made by the Vice-Chair to clarify information.

4. **Examination Fee:** ASM members are eligible for discounts on all examination and reexamination fees. The fee for ASM members is $600, and the fee for non-members is $657. This fee must be submitted with the application. Cash will not be accepted.

Remember that a complete application consists of the following:

- Completed, notarized application form
- Official graduate transcripts or transcript evaluation, if educated outside the United States
- Notarized copy of your marriage license or name change certificate, if applicable
- Letters of reference
- Application fee

Supporting documents will not be returned to applicants. Incomplete or ineligible applications will be withdrawn after the deadline and returned with a partial refund (application fee minus a 25% processing fee).

**WHEN WILL I BE NOTIFIED OF THE RESULTS?**
Examination results are mailed within 10 to 12 weeks. Results are not released by telephone.

**WHAT IF I FAIL THE EXAMINATION?**
Candidates have five years from their approval date in which to successfully complete the examination process; subsequent reexamination requires a new application and fee. The reexamination fee is $400 for ASM members and $457 for non-members.

**APPEALS**
If you wish to appeal any part of the application or examination process, you must submit your concerns, in writing, to the ABMM. Your concerns will be addressed; you will not be permitted to review any portion of your examination.

The ABMM does not release or disclose the content or answers for specific test items. Incorrect responses will not be reported when requesting a review.
A NOTE TO CANDIDATES

The ABMM does not discriminate on the basis of race, religion, national origin, sex, mental or physical disability, or age. The ABMM complies with the policies set forth by the Americans with Disabilities Act.

The ABMM is prepared to assist you in applying for Board certification. Questions or comments about the ABMM and its certification programs are welcome and may be directed to the ABMM at the following address:

American College of Microbiology
American Society for Microbiology
1752 N Street, NW
Washington, DC 20036-2904
Telephone: (202) 942-9281
Fax: (202) 942-9353
E-mail: CERTIFICATION@ASMUSA.ORG