



## **MEDICAL MICROBIOLOGY**

Pathology Residents rotate for at least three months in Medical Microbiology. These rotations are designed to introduce the resident to Medical Microbiology and allow them to become familiar with the routine aspects of the microbiology laboratory as well as develop expertise in microbiology diagnostic testing, sensitivity testing and general laboratory administration. The rotations are divided into three separate topic areas.

1. Bacteria, Media, and Susceptibility Testing
2. Mycology and Virology
3. Parasitology and Mycobacteriology

In all microbiology rotations the resident is expected to:

1. Read from appropriate sources as much as possible about the topics that come up daily in the laboratory.
2. Be available to assist the laboratory technicians in interacting with the clinicians to obtain more information on a case or report and discuss results.
3. Be available to read the histoplasm buffy coat slides.
4. Be available to read the blood parasite slides.
5. Work up all unknown specimens assigned to them
6. Attend didactic sessions with the section director.
7. Prepare an interesting case to present at the Clinical Pathology interesting case conference.
8. Attend the weekly infectious disease conference if possible.
9. Attend the monthly Infection Prevention Committee meeting if possible.

### **Medical Microbiology I (1st month)**

Bacteria, Media, and Susceptibility Testing

#### **Reading material:**

#### **Required:**

Koneman EW et al. Koneman's Color Atlas and Textbook of Diagnostic Microbiology, 6<sup>th</sup> ed., 2005.

Chapter 2: Guidelines for Collection, Transport, Processing, Analysis and Reporting of Cultures from Specific Specimen Sources

Chapter 16: Anaerobic Bacteria

Chapter 17: Antimicrobial Susceptibility Testing

Color Plates (for Pathology Board preparation)

#### **Recommended:**

Leber, AL. Clinical Microbiology Procedures Handbook, 4<sup>th</sup> ed., 2016.

- PDF available on common drive

Mais, DD. Quick Compendium of Clinical Pathology, 3<sup>rd</sup> ed., 2014.

- Microbiology Chapter



### **Rotation Components:**

1. Complete the reading material above prior to the corresponding didactic sessions.
2. Didactic sessions will be held approximately daily as arranged for convenience of all concerned.
3. Bench sessions: After didactic sessions, unknown cases will be worked up by the resident. Bench rotations will be arranged if there is time and as there is availability.
4. Each resident will be assigned 1-2 projects during their month long rotation. These may include verifications/validations, quality improvement projects, case studies (ASCP blog write up) and case presentations. These projects are expected to be completed by the end of the month and given to the attending.
5. Laboratory management module: Typically, each month involves one project involving a study of laboratory management and quality improvement.
6. Journal club: We will usually read one paper or group of papers and critique them together, and strive to apply the results to our laboratory setting.
7. Final assessment: At the end of the month, a closed book, fill in the blank exam will be taken by each resident to assess their understanding of the material covered.

### **Objectives:**

#### **Main culture types to be discussed:**

1. Blood cultures
2. Anaerobic cultures
3. Stool cultures
4. Urine cultures
5. Respiratory cultures
6. Wound cultures

#### **For each of the above culture types understand the following:**

1. Epidemiology of infections
2. Laboratory identification, including:
  - a. Specimen collection and transport
  - b. Processing, media and incubation conditions
  - c. Organism characteristics: colony morphology, microscopic Gram stain morphology and biochemical & other ancillary tests
  - d. Molecular methods, as applicable
3. Susceptibility testing

#### **Anti-bacterial therapies**



## **Medical Microbiology II (2nd month)**

### **Mycology and Virology**

#### **Reading material:**

#### **Required:**

Koneman EW et al. Koneman's Color Atlas and Textbook of Diagnostic Microbiology, 6<sup>th</sup> ed., 2005.

Chapter 21 Mycology

Chapter 23 Diagnosis of Infections Caused by Viruses, Chlamydia, Rickettsia and Related Organisms

Color Plates (for Pathology Board preparation)

#### **Recommended:**

1. Mais, DD. Quick Compendium of Clinical Pathology, 3<sup>rd</sup> ed., 2014.
  - a. Microbiology chapter
2. Larone, DH. Medically Important Fungi: A Guide to Identification, 5<sup>th</sup> ed., 2011.

#### **Rotation Components:**

8. Complete the reading material above prior to the corresponding didactic sessions.
9. Didactic sessions will be held approximately daily as arranged for convenience of all concerned.
10. Bench sessions: Omitted for virology month, since much of this testing is no longer performed at UMMC. For mycology and serology, after didactic sessions, unknown cases will be worked up by the resident. Bench rotations will be arranged if there is time and as there is availability.
11. Each resident will be assigned 1-2 projects during their month-long rotation. These may include verifications/validations, quality improvement projects, case studies (ASCP blog write up) and case presentations. These projects are expected to be completed by the end of the month and given to the attending.
12. Laboratory management module: Typically, each month involves one project involving a study of laboratory management and quality improvement.
13. Journal club: We will usually read one paper or group of papers and critique them together, and strive to apply the results to our laboratory setting.
14. Final assessment: at the end of the month, a closed book, fill in the blank exam will be taken by each resident to assess their understanding of the material covered.

#### **Objectives:**

#### **Mycology:**

Stempak  
9/5/2017

1. Learn the following groups of fungi:
  - a. Yeasts (*Candida* spp. and *Cryptococcus* spp.)
  - b. Hyaline septate molds
  - c. Zygomycetes
  - d. Dimorphs
  - e. Dematiaceous molds (pigmented)
  - f. Dermatophytes
2. Understand the following for each group listed above:
  - a. Epidemiology of infections
  - b. Laboratory identification (including processing , media, incubation conditions, colony morphology, microscopic morphology & terminology and biochemical & other ancillary tests)
  - c. Susceptibility testing
  - d. Anti-fungal therapies

### **Virology:**

1. Understand the basic laboratory methods of identification of viruses, including:
  - a. Cell culture
  - b. Direct antigen detection (EIA, DFA, latex agglutination)
  - c. Serology (detection of circulating antibody)
  - d. Histology
  - e. Molecular techniques
2. Classification of viruses
  - a. RNA vs DNA
  - b. Enveloped vs non-enveloped
3. For the following viruses (human herpes viruses, parvovirus, papovavirus, poxviruses, hepatitis viruses, orthomyxoviruses, paramyxoviruses, picornaviruses, arboviruses and the retroviridae family) know:
  - a. Clinical presentation
  - b. Common methods used for identification

Vaccination and treatment options

### **Medical Microbiology III (3rd month)**

#### **Parasitology and Mycobacteriology**

#### **Reading material:**

#### **Required:**

Koneman EW et al. Koneman's Color Atlas and Textbook of Diagnostic Microbiology, 6<sup>th</sup> ed., 2005.

Chapter 19 Mycobacteria

Chapter 22 Parasitology



Appendix 1 Ectoparasites (for Pathology Board preparation)  
Color Plates (for Pathology Board preparation)

**Recommended:**

3. Mais, DD. Quick Compendium of Clinical Pathology, 3<sup>rd</sup> ed., 2014.
  - a. Microbiology chapter
4. Ash, LR and Orihel, TC. Atlas of Human Parasitology, 5<sup>th</sup> ed., 2007.

**Rotation Components:**

15. Complete the reading material above prior to the corresponding didactic sessions.
16. Didactic sessions will be held approximately daily as arranged for convenience of all concerned.
17. Bench sessions: omitted for parasitology month, since much of this testing is no longer performed at UMMC. For mycobacteriology, after didactic sessions, unknown cases will be worked up by the resident. Bench rotations will be arranged if there is time and as there is availability.
18. Each resident will be assigned 1-2 projects during their month-long rotation. These may include verifications/validations, quality improvement projects, case studies (ASCP blog write up) and case presentations. These projects are expected to be completed by the end of the month and given to the attending.
19. Laboratory management module: Typically, each month involves one project involving a study of laboratory management and quality improvement.
20. Journal club: We will usually read one paper or group of papers and critique them together, and strive to apply the results to our laboratory setting.
21. Final assessment: at the end of the month, a closed book, fill in the blank exam will be taken by each resident to assess their understanding of the material covered.

**Objectives:**

**Parasitology:**

1. Learn bloodborne parasites (including *Plasmodium*, *Babesia*, *Trypanosoma*, and microfilaria) and methods of detection and differentiation.
2. Learn the principal tissue and intestinal worms, including nematodes, cestodes and trematodes, diseases, modes of transmission, epidemiology and methods of detection and identification.
3. Learn pathogenic protozoa, including amoeba, ciliates, microsporidia, flagellates and sporozoa. Differentiate tissue invasive and gastrointestinal pathogens, how to identify and differentiate pathogenic from nonpathogenic forms.



4. We will generally not discuss identification of vectors, e.g. mosquitoes, ticks, or ectoparasites (e.g. bedbugs, lice, mites), though you will be asked about these on boards.

**Mycobacteriology:**

1. Learn the following groups of acid fast bacilli and specific examples contained in each group:
  - a. Mycobacterium tuberculosis
  - b. Photochromogens
  - c. Scotochromogens
  - d. Non-chromogens
  - e. Rapid growers
2. Understand the following for each group listed above:
  - a. Epidemiology of infections
  - b. Laboratory identification (including processing , media, incubation conditions, colony morphology, microscopic morphology & terminology and biochemical & other ancillary tests)
  - c. Susceptibility testing
  - d. Therapy options