MCB 5252
SPRING 2015
MICROBIOLOGY, IMMUNOLOGY, AND BASIS of IMMUNOTHERAPEUTICS
Department of Microbiology and Cell Sciences
Office Hours:
Mondays and Wednesdays 9:00-11:30
Microbiology and Cell Science Building, Room 1046
Karim Asghari, PhD

Textbook: (Optional) Medical Microbiology by P. R. Murray et al 7th edition (2012). Selected chapters and pages are assigned for each exam.

Course Objectives: This course will provide a basic understanding of microbial structure and function with regards to their role in pathogenesis and infection. General principles of pathogenesis and infection will be discussed. The course will examine the mechanism of microbial diseases, modes of entry, circumventing host defense system, and transmission. The role of immune system in defending the host against infection, and what happens when it breaks down will be examined. Both specific and non-specific defense mechanisms will be discussed. General therapeutic principles and mechanisms of bacterial resistance to anti-microbial drugs will be covered. The discussion regarding anti-microbial agents will include: class, mode of action of anti-microbial agents. The relationship between structure and function and its role in rise of antibiotic-resistant strains will be discussed. At the end of the term students should have a good understanding of the infectious diseases, their causative agents, available treatments, and the preventive measures against them. The students will also have a feeling for the immune system and its role in preventing and warding off the microbial infections.

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<th>Week</th>
<th>Date</th>
<th>Topic</th>
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<tr>
<td>01</td>
<td>01-05</td>
<td>Prokaryotic Cell Structure and Function</td>
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<tr>
<td>02</td>
<td>01-12</td>
<td>Microbial Genetics, Physiology and Metabolism</td>
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<td>03</td>
<td>01-19</td>
<td>Bacteria and Viruses as Agents of Infectious Diseases</td>
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<td>04</td>
<td>01-26</td>
<td>Epidemiology and Mechanism of Pathogenesis (Quiz ONE due)</td>
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<td>EXAM I Wednesday January 28, 2014</td>
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<tr>
<td>05</td>
<td>02-02</td>
<td>Overview of Immunology; Innate vs. Acquired Immunity</td>
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<td>06</td>
<td>02-09</td>
<td>Host Defense against Bacterial and Viral Pathogens, Vaccines</td>
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<td>07</td>
<td>02-16</td>
<td>Hypersensitivity, Autoimmunity, Immune Deficiency/Disorder,</td>
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<td>08</td>
<td>02-23</td>
<td>Staphylococcal, Streptococcal and Enteric Diseases (Quiz TWO due)</td>
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<td>EXAM II Wednesday February 25, 2014</td>
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<td>10</td>
<td>03-09</td>
<td>Clostridia and Mycobacteria Infections</td>
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<td>03-16</td>
<td>STD’s and other Selected Bacterial Infections</td>
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<td>12</td>
<td>03-23</td>
<td>Rabies, Flu, Polio, and Meningitis Infections</td>
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<td>EXAM III Wednesday March 25, 2015</td>
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<td>13</td>
<td>03-30</td>
<td>Hepatitis, HIV, and Herpes Infections</td>
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<td>14</td>
<td>04-06</td>
<td>Fungal, Parasitic, Emerging Infectious Diseases (Quiz THREE due)</td>
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<td>15</td>
<td>04-13</td>
<td>Antibiotics, Antimicrobial Drugs, and Mechanism of Resistance</td>
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WEBSITE: The class is on E-learning (Sakai). The class syllabus, lecture note, lecture presentations, study guides, practice exams and other materials will be posted on E-Learning throughout the semester. Questions about lecture material should be addressed during live lecture sessions, office hours, via email, and on the regularly Q&A sessions. Details and clarifications about class policy will be posted online on a regular basis, and or will be announced in class presentations. Students should check their emails and announcements on Sakai on a regular basis (once a day).

GRADING/TESTS: The final class grade is based on accumulated points
There are four (4) regularly scheduled non-cumulative exams. The course is based on 400 points. A written (short answer) makeup exam is allowed for a missed exam due to an excused absence.

Grading scale (accumulated points):

- A 360 – 400 points
- A- 356 – 359.9 points
- B+ 348 – 355.9 points
- B 320 – 347.9 points
- B- 316 – 319.9 points
- C+ 308 – 315.9 points
- C 280 – 307.9 points
- C- 275 – 279.9 points
- D 240 – 274.9 points
- E 000 – 239.9 points

EXAMS: Exam materials will come from lectures presentations, lecture notes, and assigned textbook readings. In some cases information presented in class may be in contradiction with information from other sources, especially internet-posted materials. In these cases exam questions will be based only on the information available in the textbook, lecture notes, reading materials, or materials presented during the lecture presentations, and exams will be graded accordingly. To help students prepare and old practice exams/answers will be posted online. Students should use these exams as real assessments of learning rather than study guides.

EXTRA CREDIT POINTS: Extra credit points are provided as online quizzes. Please watch the posted introduction for more details.

ACADEMIC HONESTY: As a result of completing the registration form at the University of Florida, I assume that every student has signed the following statement: “I understand that the University of Florida expects its students to be honest in all their academic work. I agree to adhere to this commitment to academic honesty and understand that my failure to comply with this commitment may result in disciplinary action up to and including expulsion from the University.”

STUDENTS WITH DISABILITIES: Students requesting classroom accommodations should register with the Dean of Students Office. The office will provide documentation
to the student, who can then bring the necessary material to the instructor when requesting accommodation. Students who take exams at the DRC must take them as soon as the DRC opens on exam days. DRC students must present documentation about their accommodations during the first week of class.

**UNIVERSITY SUPPORT SERVICES:** Resources are available on campus for students having personal problems or lacking clear career and academic goals that interfere with their academic performance. These resources include:

- University Counseling Center, 301 Peabody Hall, 392-1575, personal and career counseling.
- Student Mental Health, Student Health Care Center, 392-1171, personal counseling.
- Sexual Assault Recovery Services, 392-1161.
- Student Health Care Center, 392-1161.
- Career Resource Center, Reitz Union, 392-1601, career development assistance and counseling.

**Useful Links:**

- **Center for Disease Control and Prevention:** CDC: [http://www.CDC.gov](http://www.CDC.gov)
- **US Food and Drug Administration:** FDA: [http://www.FDA.gov](http://www.FDA.gov)
- **US Environmental Protection Agency:** EPA [http://www.EPA.gov](http://www.EPA.gov)
- **Microbiology and Cell Science:** MCS: [http://microcell.ufl.edu](http://microcell.ufl.edu)
- **College of Agriculture and Life Sciences:** CALS: [http://www.ifas.ufl.edu](http://www.ifas.ufl.edu)
- **University of Florida Libraries:** UF Libraries: [http://www.iflub.ufl.edu](http://www.iflub.ufl.edu)
- **University of Florida:** UF: [http://www.ufl.edu](http://www.ufl.edu)

**Course Contents:**

**Part I  Microbial Cell Structure, Physiology, Metabolism, and Genetics**

Microbial Cell Structure  
Microbial Genetics, Physiology, and Metabolism  
Host-Parasite Interaction  
Mechanism of Pathogenicity  
Epidemiology and Public Health

**Part II Overview of the Immune System**

Cells and Organs of the Immune System  
- Lymphoid System  
- Immunoglobulins  
- Antigen-Antibody Interaction (Serology)  
- Major Histocompatibility Complex  
- Cells Involved in Immune Response  
- T-cell vs. B-Cells: Activation, Maturation, and Differentiation  

Host Defense and Immune Response: Specific vs. Non-Specific Immune Response  
- Cytokines  
- Humoral Immune Response vs. Cell Mediated Immune Response  
- The Complement System  
- Hypersensitivity, Immunodeficiency Diseases  
- Autoimmunity and Autoimmune Diseases  
- Immune Response to Infectious Diseases

**Part III Microbial Infectious Diseases**

Diseases Caused by Bacteria:  
- Introductions to Infectious Diseases
Gastrointestinal Infection
Respiratory Infection
Skin Infections/STD’s

Viruses and viral diseases
  Structure and Classification
  Host-Parasite Interaction
  Viral Infections
  Measles, Mumps, Rubella, Rabies, Rotaviruses
  Influenza, Polio, Meningitis, Encephalitis
  HSV, HAV, HBV, HIV, HPV

Fungal and Parasitic Diseases
Role of Microbes in Cancer

Part IV. Prevention of Infectious Diseases
Immunization/Types of Vaccines
Control of Hospital-Acquired Infections
Common Sense Prevention

Part V. Concepts in Antimicrobial Therapy (Therapeutics)
Mechanisms of Action/Selective Toxicity
Antimicrobial Agents: Antibacterial, Antiviral, and Antifungal Drugs
Antibiotic Resistance