



SYLLABUS: MICROBIOLOGY

MICR-2000-01fa10

Fall 2010

CONTACT INFORMATION:

Use this area to provide students with the various means by which they may contact you. Examples of information you might include in this area:

Course/Clerkship Director

Kerstin Höner zu Bentrup, Ph.D.
SOM, Room 5103
Office Hours: by appointment
Office Phone: 988-4609
Email Address:
khonerzu@tulane.edu
Class URL:
<http://tmedweb.tulane.edu/portal/t2/320-microbiology>

Coordinator

Sue Hutto
SOM, Room 5000
Office Phone: 988-5318
Email Address:
shutto@tulane.edu

Department Chair

John D. Clements, Ph.D.

Teaching Faculty: A current list of the phone numbers and email addresses for the Medical Microbiology teaching faculty can be found in the "People" section located on the main page of the Microbiology/Immunology Department Web Site:
(<http://tulane.edu/som/departments/microbiology/index.cfm>)

The following is a list of professors and their initials as designated in the syllabus.

<i>Aline Betancourt, Ph. D.</i>	AB
<i>Lucia Cardenas-Freytag, Ph. D.</i>	LCF
<i>John D. Clements, Ph. D.</i>	JC
<i>Robert F. Garry, Ph. D.</i>	RG
<i>Kerstin Höner zu Bentrup, Ph. D.</i>	KHzB
<i>Susan McLellan, MD/MPH</i>	SM
<i>Lisa Morici, Ph. D.</i>	LM
<i>Cindy A. Morris, Ph. D.</i>	CM
<i>Deborah E. Sullivan, Ph. D.</i>	DS
<i>Thomas G. Voss, Ph. D.</i>	TV
<i>Mark Wiser, Ph.D.</i>	MW

COURSE MATERIALS:

This is a "team taught" course involving about a dozen faculty. Each lecture, team-based learning, lab, or self-study will have a handout and study-guide covering the content of the lecture or exercise, along with a list of learning objectives.

Required Text: The following is a required textbook that contains most of what is covered in the lectures. This text should be considered your authoritative reference that you can rely upon for accurate information. It is an information resource and supplement to the information that is presented to your in lecture, TBL & self study sessions.

- Murray, Rosenthal, Pfaller, Medical Microbiology, 6th Edition, Elsevier Mosby, 2009. Purchase of this book enables online access to its content. (NOTE: If you prefer to purchase a used version of the 5th edition of this text you may do so, but it is your responsibility to make sure that you don't miss important information that is not covered in the equivalent sections of the older edition). Another book that many students like is 'Microbiology Made Ridiculously Simple'. This book is not recommended by the faculty since we found it to contain limited information and several errors.
- Material from published manuscripts and online resources may also be assigned to supplement the lectures, TBLs, dry labs and self studies. These materials will help you understand and be able to apply concepts presented in class and may be used for exam questions.
- Students are responsible for reading all of the assigned material in the textbook, some of which may not have been covered in lecture. This will benefit each student as preparation for the USMLE Step 1 as well as for the course exams.

Recommended textbooks and study guides:

- Medical Microbiology for the New Curriculum – a case based approach” by Roberta Carey, Mindy Schuster, and Karin McGowan. (Wiley) (in library, also available online under: <http://libproxy.tulane.edu:2048/login?url=http://libproxy.tulane.edu:2048/login?url=http://www3.interscience.wiley.com/cgi-bin/bookhome/114133866>)
- “Laboratory Applications in Microbiology – a case study approach” by Barry Chess (McGraw Hill) recommended if you want to get a more in depth knowledge about the Micro Lab, since ours can't and won't go into such depth (library holdings)

Electronic resources: The following are links to sites that might be helpful to you in your studies:

- http://emedicine.medscape.com/infectious_diseases (very comprehensive website listing numerous infectious disease agents, with background, differential diagnoses, treatment and follow up)
- http://www.infdiseseesconsultants.com/case_current.htm (various brief case studies with images; good learning tool)
- <http://www.cdc.gov/DiseasesConditions/> (CDC website with alphabetical index for a multitude of infectious diseases)
- <http://www.fda.gov/Food/FoodSafety/FoodborneIllness/FoodborneIllnessFoodbornePathogensNaturalToxins/BadBugBook/default.htm> (FDA's “Bad Bug Book” on foodborne diseases)
- Other links specific to the various sessions might be posted on Blackboard – please, check often.

COURSE DESCRIPTION:

Throughout history microbial pathogens have been a major cause of human disease and mortality. However, with the advent of effective antibiotics it seemed like the era of deadly and debilitating infectious diseases was over. Hence, for several decades health-related research shifted to other important topics like cancer, heart disease, and genetic diseases. While research in microbial pathogenesis slowed, the pathogens demonstrated how efficient evolution can be. Microbial resistance to antibiotics developed faster than new antibiotics could be made available, and antibiotic resistance spread throughout the microbial world. The globalization of food distribution networks has increased the incidence of common microbial pathogens. Simultaneously, emerging microbial pathogens filled new ecological niches, such as indwelling medical devices that provide a surface for biofilms and the growing population of patients who are immunocompromised due to primary infections such as HIV or due to therapies for chronic diseases or organ transplantation.

Furthermore, recent discoveries have demonstrated that some diseases (e.g. ulcers) previously believed to be caused by a genetic predisposition or environmental conditions are actually caused by infectious agents. This microbial assault has triggered a renewed sense of urgency to study novel ways to combat microbial pathogens. Meanwhile a variety of new tools have become available that make it possible to analyze the molecular basis of pathogenesis both from the microbial and host perspectives. Within the last decade the complete DNA sequences of numerous bacterial pathogens have been sequenced which provides valuable insights into how microbial pathogens evolve as well as to what extent gene transfer between pathogens plays a role in pathogenesis. These advances have led to new ways to control infection, including the identification of novel targets for antimicrobials and novel approaches for vaccine development. Even so, many more questions remain unanswered and many pathogens are still poorly understood. The threat of bioterrorism has further emphasized this problem.

Understanding bacterial pathogenesis demands understanding the host response as well as the pathogen itself. Both of these perspectives provide potential strategies for solving important clinical problems. To elucidate these distinct aspects of microbial pathogenesis requires an interdisciplinary approach, integrating the fields of microbiology, eukaryotic cell biology, immunology, and genomics.

Many recent developments have expanded our understanding of microbial pathogenesis and the host response to infection. The insights have important implications for both the treatment of microbial diseases and the development of new treatments for microbial diseases. Because these issues are so pervasive, this course has relevance to medical students as well as graduate students and students planning to work in public health related fields.

COURSE OBJECTIVES:

Course Objectives:

The faculty strive to:

1. provide medical students with a broad-based foundation in the basic concepts of Medical Microbiology.
2. prepare students for entry into the clinical curriculum.
3. provide students with a background in Medical Microbiology that will sustain them throughout their medical careers.

At the end of this course students will be able to:

4. compare and contrast different microbial diseases, including the properties of different types of pathogens and the mechanisms of pathogenesis.
5. summarize the role of the host in infectious disease, including natural barriers to infection, innate and acquired immune responses to infection, and inflammation.
6. compare and contrast laboratory approaches for identifying pathogens and the advantages/disadvantages of each approach for specific infectious agents.
7. compare and contrast therapeutic treatments for microbial infections, and distinguish when a vaccine, antibiotic, or other therapy is likely to be the most appropriate response.
8. specify the role of ecology and evolution in the spread of infectious diseases, comparing the role of transmission, population size and susceptibility, and virulence in endemic disease, epidemic disease, emerging diseases, and bioterrorism.

Tulane's Learning Objectives for medical students completing the second year can be found under:

http://tulane.edu/som/ome/upload/Tulane_SOM_Learning_Objectives_Phase_1_-2.pdf

What you need to know for USMLE Step 1 (according to USMLE website) with respect to Microbiology:

- Microbial biology and infection
 - microbial classification and its basis
 - bacteria and bacterial diseases
 - structure and composition
 - metabolism, physiology, and regulation
 - genetics
 - nature and mechanisms of action of virulence factors
 - pathophysiology of infection
 - epidemiology and ecology
 - principles of cultivation, assay, and laboratory diagnosis
 - viruses and viral diseases
 - physical and chemical properties
 - replication
 - genetics
 - principles of cultivation, assay, and laboratory diagnosis
 - molecular basis of pathogenesis
 - pathophysiology of infection
 - latent and persistent infections
 - epidemiology
 - oncogenic viruses
 - fungi and fungal infections
 - structure, physiology, cultivation, and laboratory diagnosis
 - pathogenesis and epidemiology
 - parasites and parasitic diseases
 - structure, physiology, and laboratory diagnosis
 - pathogenesis and epidemiology
 - principles of sterilization and pure culture technique

Learning Objectives for the individual sessions can be found in the handouts (printed and online).

TEACHING PHILOSOPHY:

Course Organization:

The Department of Microbiology and Immunology faculty present course material generally in four sections: Bacteriology, Mycology, Virology, and Parasitology.

The following teaching methods will be used to enable student mastery of the material:

- Lectures cover the main learning objectives for each section. It is strongly suggested that students read the assigned reading material prior to coming to class, since lectures will stress important but often complex microbiological concepts. In light of pod-casting, students are reminded that confusion in lecture is most efficiently cleared up immediately by questions in lecture rather than at later times.
- Team-based learning sessions (TBLs): TBL sessions are an important component of this course. These exercises are not only designed to allow students the opportunity to apply knowledge of basic microbiology to solve clinical problems, but also to promote interaction with colleagues and encourage integration. New information will be delivered and deeper discernment will be accomplished in these sessions. **Attendance at TBLs is mandatory** and sign-in sheets will be monitored. Topics presented in the TBLs will be covered on the examinations.

Students will be pre-assigned to groups of six for the TBL sessions. Please, check the announcements on Blackboard before your first TBL session to find your group.

- **Labs:** Due to time limitations for critical problem-solving laboratory exercises, we introduced dry laboratories last year. Links to online exercises as well as an online lab manual will be posted on the Blackboard web site for this course. These exercises, as well as online cases with questions, will be part of your Self Studies. Details about the links will be posted on Blackboard and/or TmedWeb. Topics presented in the self-studies may be covered on the examinations.
- **Voluntary wet lab:** on August 10th, from 2.30 pm to 4.30 pm, a voluntary wet lab with hands on exercises will be held. Location: Microbiology student labs, 1430 Tulane Ave., enter through doors marked 2301 or 2555. *Please, email me (khonerzu@tulane.edu) before August 5th to indicate if you are interested in participating in the wet lab session so that we can make sure we have enough material on hand for every student.*
- **Self study sessions:** The Material for self study sessions will be posted on BB/TmedWeb. Topics presented in the self-studies will be covered on the examinations.
- **Review Sessions:** A Q&A review session will be held before each exam. Please, come prepared with any questions you have concerning the relevant material.
- Lectures will be given at the indicated times in the DeBakey Center, 2nd floor, 131 South Robertson (Murphy Bldg.). TBL sessions will be held in the same location. Notice that the class is split into two groups for the TBLs, do be held on two different days. Groups will be pre-assigned.

COURSE POLICIES:

Attendance policy/philosophy:

Professionalism is a major component of our medical curriculum. Students should conduct themselves appropriately in the various educational activities of the curriculum. This includes coming to educational activities on-time; using laptop computers only for course work, avoiding the use of cell phones during the educational activity; and not disrupting the class if late.

Attendance at formal lectures & end-of-block review sessions is not mandatory, but is highly encouraged. Attendance at TBL sessions is mandatory (since group learning will be compromised if team members do not attend). Lack of attendance at TBL sessions will therefore negatively affect a student's grade as indicated below.

Excused Absence Policy

If a student has a legitimate reason for missing a required event (TBL, Exam), they should request an excused absence from the Dean For Academic Affairs (Dr. Marc Kahn) as soon as possible. If an excused absence is granted, lack of participation in the small group activity will not negatively affect their grade. It is the student's responsibility to request & obtain the excused absence in a timely manner, and to consult with classmates & the course director for any questions on the missed activity. Students should also notify the course director concerning their excused absence ASAP since records are kept regarding absences at TBLs & Exams. Exams missed with an excused absence will be made up in a timely manner.

Copy Statement

Some of the materials in this course are possibly copyrighted. They are intended for use only by students registered and enrolled in this course and only for instructional activities associated with and for the duration of the course. They may not be retained in another medium or disseminated further. They are provided in compliance with the provisions of the Teach Act (Section 110(1) of the Copyright Act)
<http://www.copyright.gov/docs/regstat031301.html>.

All exam questions, TBL IRAT/GRAT and Application of Knowledge questions, used to assess knowledge in this course are copyrighted and owned by Tulane University School of Medicine and the department of Microbiology and Immunology. **The reproduction of these questions by any means and distribution of these resources is strictly prohibited, and will be considered a violation of the Tulane University Honor Code.**

GRADING/EVALUATION:

Examinations:

- There will be two block examinations during the course. The dates for these examinations are shown on the schedule and are as follows:
 - Friday, August 13 9:00am-1:00pm
 - Friday, September 3 8:00am-12:15pm

(dates/times are subject to change!)

The first exam will cover the material through August 12th (lectures and self study). The second exam will focus primarily on material covered since the first exam.

- Exam questions may come from **any** of the materials presented during the course, including material from lectures, self studies, TBLs or dry labs.
- The grades for the class will not be curved or adjusted. Overall grades are calculated as follows:
 - Exam 1 30% (of total grade)
 - Exam 2 50% (of total grade)
 - TBLs 18% (of total grade)
 - Per TBL: IRAT: 30%
 - GRAT: 30%
 - GAE: 40%
 - Peer Eval.: 2% (of total grade)
- The department adheres to the following grading policy:
 - Pass (P) 70-100
 - Condition (C)* 65-69
 - Failure (F) <65

*This grade constitutes an academic deficiency requiring remedial work.

- A zero will be given for an unexcused absence from an exam. A letter is required from Dr. Marc Kahn, Associate Dean of Student Affairs, to obtain an excused absence from an exam. Students with valid excuses will typically be required to take the exam within a week of the original date.

COURSE CONTENT AND OUTLINE: (subject to change)

<u>Day</u>	<u>Time</u>	<u>Instructor</u>	<u>Topic</u>
Mon, 8/2	9:00-9:15		T2 introduction: Dr. Krane & Course Directors
Mon, 8/2	9:15-10:15am	JC	Introduction I (Bacteriology)
Mon, 8/2	10:30-11:30am	LM	Introduction II (Bacteriology)
Mon, 8/3	1:00-2:00pm	JC	<i>Neisseria, Chlamydia</i>
Tues, 8/3	8:30-9:30am	KHzB	<i>Staphylococcus</i>
Tues, 8/3	9:45-10:45am	KHzB	<i>Streptococcus, Enterococcus</i>
Tues, 8/3	11:00am-12:00pm	LCF	Bacterial Toxins: <i>Corynebacterium, Bordetella</i>
Tues, 8/4			Self-Study: <i>Haemophilus</i>

Wed, 8/4	8:30-9:30am	JC	Secretory Diarrhea: <i>V. cholerae</i> , ETEC
Wed, 8/4	9:45-10:45am	JC	Invasive and Tissue Damaging Enteric Bacterial Pathogens: <i>Shigella</i> , EHEC O157:H7, <i>Salmonella</i> , <i>Campylobacter</i>
Wed, 8/5 Wed, 8/4	11:00am-12:00pm	LM	<i>Pseudomonas</i> and related organisms Self-Study: <i>Legionella</i> , <i>Listeria</i>
Thurs, 8/6 Thurs, 8/5	8:30-9:30am 2:15-4:30pm	JC KHZB/Faculty	<i>Clostridium</i> , other anaerobes <u>TBL</u> : "Laboratory Methods" (Group B)
Fri, 8/6 Fri, 8/6	8:30-9:30am 2:15-4:30pm	LM KHZB/Faculty	<i>Mycobacteria</i> , <i>Nocardia</i> <u>TBL</u> : "Laboratory Methods" (Group A)
Mon, 8/9	8:30-9:30am	KHZB	<i>Mycoplasma</i> , <i>Ureaplasma</i> , zoonotic diseases
Mon, 8/9	2:15-4:30pm	AB/Faculty	<u>TBL</u> : "Infectious Agents associated with Cancer" (Group B)
Tues, 8/10 Tues, 8/10	8:30-9:30am 9:45-10:45am	LM LCF	Spirochetes Introduction (Mycology) - Overt Pathogens
Tues, 8/10	2:30-4:30	Faculty	Voluntary wet lab (location: 1430 Tulane Ave, enter through doors marked 2301 or 2555); Note: please, contact course director before 8/5/10 if interested in participating!
Tues, 8/10			Self-Study: Online case studies
Wed, 8/11 Wed, 8/11	8:30-9:30am 9:45-10:45am	LCF LCF	Mycology: Opportunistic Pathogens Mycology: Superficial, cutaneous and subcutaneous infections
Wed, 8/11	2:15-4:30pm	AB/Faculty	<u>TBL</u> : "Infectious Agents associated with Cancer" (Group A)
Thurs, 8/12	8:30-9:30	Faculty	Q&A Review Session (Block 1, Microbiology)
Fri, 8/13	9:00am-1:00pm		Block Exam #1- 30% Final Grade
Mon, 8/16 Mon, 8/16 Mon, 8/16 Mon, 8/16	8:30-9:30am 9:45-10:45am 11:00am-12:00pm	TV AB RB	Introduction (Virology) Prions Picornavirus Self-Study: online case studies
Tues, 8/17 Tues, 8/17 Tues, 8/17	8:30-9:30am 9:45-10:45am 2:15-4:30pm	DS DS CM/Faculty	Hepatitis viruses, part A Hepatitis viruses, part B <u>TBL</u> : "Human Herpes Viruses" (Group B)
Wed, 8/18 Wed, 8/18 Wed, 8/18 Wed, 8/18	8:30-9:30am 9:45-10:45am 11:00am-12:00pm	TV TV RG	Paramyxoviruses, part A Paramyxoviruses, part B Vectorborne viruses: Flavi-, Togaviruses Self-Study: online case studies

Thurs, 8/19	8:30-9:30am	TV	Coronaviruses, part A
Thurs, 8/19	9:45-10:45am	TV	Coronaviruses, part B
Thurs, 8/19	2:15-4:30pm	CM/Faculty	<u>TBL</u> : "Human Herpes Viruses" (Group A)
Fri, 8/20	8:30-9:30am	TV	Viral Hemorrhagic Fever viruses, (part A)
Fri, 8/20	9:45-10:45am	TV	Viral Hemorrhagic Fever viruses, (part B)
Mon, 8/23	8:30-9:30am	TV	Gastroenteritis viruses
Mon, 8/23	9:45-10:45am	RG	Rhabdovirus
Tues, 8/24	8:30-9:30am	RG	Retroviruses ("HIV and AIDS")
Tues, 8/24	9:45-10:45am	RG	Oncoretroviruses
Tues, 8/24	2:15-4:30pm	TV/Faculty	<u>TBL</u> : "Influenza" (Group B)
Wed, 8/25	8:30-9:30am	SM	Introduction (Parasitology)
Wed, 8/25	9:45-10:45am	MW	Intestinal and Luminal Protozoa: <i>Amoebae, Giardia, Trichomonas</i>
Thurs, 8/26	8:30-9:30am	SM	Intestinal Nematodes I: Roundworm, Pinworm, Hookworm, Whipworm
Thurs, 8/26	9:45-10:45am	SM	Intestinal Nematodes II: Larva migrans, Strongyloidiasis
Thurs, 8/26	2:15-4:30pm	TV/Faculty	<u>TBL</u> : "Influenza" (Group A)
Fri, 8/27	8:30-9:30am	MW	Malaria and Babesiosis: <i>Plasmodium, Babesia</i>
Fri, 8/27	9:45-10:45am	MW	Kinetoplastids: <i>Trypanosoma,</i> <i>Leishmania</i>
Mon, 8/30	8:30-9:30am	MW	Coccidia and AIDS: <i>Cryptosporidium, Toxoplasma</i>
Mon, 8/30	9:45-10:45am	SM	Cestodes: Hydatid Disease, <i>Taenia</i> and Neurocycticercosis
Mon, 8/30			Self-Study: online case studies
Tues, 8/31	8:30-9:30am	SM	Trematodes: Liver Flukes, Schistosomiasis
Tues, 8/31	9:45-10:45am	SM	Filaria
Wed, 9/1	8:30-9:30am	JC	Bioterrorism: Bacterial
Wed, 9/1	9:45-10:45am	TV	Bioterrorism: Viral
Wed, 9/1	11:00am-12:00pm	Faculty	Q&A Review Session (Block 2, Microbiology)
Thurs, 9/2	No Class		No Class
Fri, 9/3	8:00am-12:15pm		Block Exam #2- 50% Final Grade

TULANE SCHOOL OF MEDICINE HONOR POLICY:

The Tulane University School of Medicine Honor Policy outlines the School of Medicine expectations for the integrity of students' academic work, the procedures for resolving alleged violations of those expectations, and the rights and responsibilities of students and faculty members throughout the process. Students are responsible for reading the Honor Policy and for living up to their pledge **not** to violate the Honor Code.

- I. It shall be a violation of this Honor Code for a student to cheat.
- II. It shall be a violation of this Honor Code for a student to knowingly circumvent any course requirement.
- III. It shall be a violation of this Honor Code for a student to steal.
- IV. It shall be a violation of this Honor Code for a student to purposely impair another student's educational opportunity.
- V. It shall be a violation to act in a manner which is detrimental to the moral and ethical standards of the medical profession.
- VI. It shall be a violation for a student to knowingly deceive another student, faculty member, or professional associate with the intent to gain advantage, academic or otherwise, for said student or for any other student.
- VII. It shall be a violation for any student to fail to report any infraction of the Honor System to an appropriate representative.

Tulane University School of Medicine Honor Policy can be found at:

<http://www.som.tulane.edu/student/honorcode/new.htm>

AMERICANS WITH DISABILITIES ACT:

Students with disabilities needing academic accommodation should: (1) register with and provide documentation to the Student Disability Resource Center; (2) bring a letter to the Office of Student Affairs indicating the need for accommodation and what type. This information will then be forwarded to the course director. The request should be done before class starts. This syllabus and other class materials are available in alternative format upon request. More information: <http://erc.tulane.edu/AccomDefs.html>

For more information about services available to TUSOM student with disabilities, contact:

The Goldman Office of Disability Services
Center for Educational Resources and Counseling
1st floor Mechanical Engineering Building
Tulane University
New Orleans, LA 70118-5698
(504) 862-8433
(504) 862-8435

SYLLABUS CHANGE POLICY:

Except for changes that substantially affect implementation of the evaluation (grading) statement, this syllabus is a guide for the course and is subject to change with advanced notice.