

BIOL 584 (Medical Microbiology) – Syllabus

Spring 2009

This course will focus on mechanisms of microbial pathogenesis and the host response, and the scientific approaches that are used to investigate these processes. How do microbes adhere to host cells? How do environmental cues direct the response of microbial pathogens? How do microbial pathogens modulate host cells to expedite virulence? How do host cells respond to microbial pathogens? How does the host immune system react to microbial pathogens? What does genomics tell us about how microbial pathogens evolve? How do emerging pathogens take advantage of new ecological niches? How can microbial pathogens be thwarted? Although there are numerous microbial pathogens, the answers to these questions indicate that many pathogens use similar approaches to solve common problems.

Student Learning Outcomes:

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

- compare and contrast different microbial diseases, including the properties of different types of pathogens, and the mechanisms of pathogenesis.
- summarize the role of the host in infectious disease, including natural barriers to infection, innate and acquired immune responses to infection, and inflammation.
- compare and contrast experimental approaches for identifying virulence genes and the advantages/disadvantages of each approach for specific pathogens.
- 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.
- 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.

Time and Place:

Tuesday / Thursday from 2:00 - 3:15 PM, Life Sciences, Room 248

Instructors:

Kelly Doran
Office = North LS 317A
Email = kdoran@sciences.sdsu.edu

Ralph Feuer
Office = South LS 358
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Office hours:

By appointment: [please write BIOL 584 in the subject line of messages]

Prerequisites:

This course requires that you have taken the following courses (or equivalent) in biology and molecular biology (BIOL 350 and BIOL 366), and you have completed the lower division writing competency requirement. This course will assume that you have a basic knowledge of Molecular Biology and Microbiology. Prerequisites will be enforced!

Required Textbooks:

“Schaechter's Mechanisms of Microbial Disease” by N. Cary Engleberg, Terry Dermody, and Victor DiRita. 4th Edition. Readings from published manuscripts and online resources may also be assigned to supplement the lecture. The readings will help you understand and be able to apply concepts presented in class but, except when specifically noted, you will not be tested on details of assigned readings that

are not discussed in class.

Website:

Notices and supplemental materials will be posted on the BlackBoard website, <<https://blackboard.sdsu.edu/webapps/login>>. Check this site regularly for updates.

Exams:

There will be 4 exams worth 100 points each. Note there will **NOT** be a cumulative final exam. No make-up exams will be given – if you must miss an exam you will need official documentation and permission of the instructor. If you believe a question on your exam was incorrectly graded, you must contact the instructor within two weeks of the day the exam was returned – no grade changes will be made after this two week window. Use of books, notes, or calculators will not be allowed during exams. The exams will concentrate on the material covered in lectures, assigned readings, and assigned papers. The exams will be short answer format, given during the regularly scheduled class times. Answers for the exams will be posted on the course website after the exams are graded.

Pathogen Project:

Each student will be assigned a bacterial pathogen in the first part of the semester. Students will be expected to research their assigned pathogen outside of class using textbooks, web resources, and current literature. You will be expected to prepare written responses to specific questions about your pathogen. Your instructor will discuss further information regarding these projects will be given during class. You may also be asked to describe certain aspects of your pathogen in class. This assignment will be worth 50 points.

News and Views Article:

Each student will pick an original research article on the pathogen/disease of choice and write a “News and Views” article on the topic. The assignment will be two double-spaced pages (references may be separate) plus a basic figure similar to Science or Nature “News and Views” and will be worth 50 points. Further information regarding these projects will be given during class.

One-minute Writes:

"One-minute writes" are short written responses to questions occasionally posed during class. Each one-minute write that you turn in will receive 1 point, whether or not the answer is correct. The important point is that you think about the question and try to answer it. However, to receive credit the 1 minute write response must be turned in before leaving class on the day the question is asked. The answers to one-minute write questions will be discussed in class, but the answers will not be returned. These points will be used as extra credit.

Course grades:

Course grades will be based upon a total of 500 points for exams, Pathogen Project, and New and Views project plus any extra credit from One-minute writes. Your course grade will be based upon a percentage of total points obtained using the following scale:

Scale:	B+: 88-89.9%	C+: 78-79.9%	D+: 68-69.9%	F: <59.9%
A: 93-100%	B: 83-87.9%	C: 73-77.9%	D: 63-67.9%	
A-: 90-92.9%	B-: 80-82.9%	C-: 70-72.9%	D-: 60-62.9%	

Graduate Students:

Graduate students will be graded on a separate scale that will include additional or more extensive assignments determined by the instructors.

Class Etiquette:

Cell phones must be turned off during class. If you must be available via cell phone for potential emergencies, set your phone to vibrate mode. Please be considerate of your neighbors and avoid distractions such as carrying on conversations or entering and exiting during lectures.

Studying:

How should you study for this course? Go over your notes after each lecture while the material is still fresh on your mind. Although some memorization is invariably necessary when learning a new "language", the goal of learning is to understand the information, not to simply memorize a bunch of disconnected "facts". A major purpose of studying is to discover what you don't understand so that you can do something about it. Don't just passively read the notes, think about them and ask yourself questions about them. Do you understand what was said? Does it make sense and why? Compare and contrast the new information with things that you have already learned. Some people find study groups very helpful for the learning process. Keep up regularly. You can't cram all of the information into your brain the night before an exam, and we may not be available to answer your questions at the last minute. As a rule of thumb you should spend a minimum of 2 hours studying outside of class each week for every credit hour.

Taking notes:

We could post our lecture notes online or you could photocopy a friend's notes, but people remember better if they listen attentively and actively write down what they hear. Therefore, attending class regularly and keeping good notes is essential for success in this course. Good note taking is an acquired skill. Don't try to write full sentences -- you will be so busy writing that you may miss the next point and your notes will be harder to study. Instead of writing down every word during lecture, write down key phrases and use short abbreviations.

Special accommodations:

To request disability accommodations, please make an appointment to speak with the instructor early in the semester.

Make-up Policy:

Assignments are due on the day and time specified unless prior arrangements are made. Only exceptional circumstances or a medical condition accompanied by a doctor's excuse will be accepted for a make-up exam.

Cheating:

Cheating will not be tolerated. Students who cheat will receive no points for the exam or assignment and will be reported to the Judicial Procedures Office. Plagiarism in any form will not be tolerated. No credit will be given for plagiarized work and students who plagiarize will be reported to the Judicial Procedures Office. If you are unclear of the definition of plagiarism, see an instructor or the University Catalog.

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Lecture	Date	Topic	Instructor	Chapter	Pages
1	Thurs 1/22	Overview, Impact of infectious diseases, Koch's postulates	Doran	1-2	
2	Tues 1/27	Host Response: Innate immunity	Feuer	6	66-89
3	Thurs 1/29	Host Response: Acquired Immunity (B cells)	Feuer	7	90-115
4	Tues 2/3	Host Response: Acquired Immunity (T cells)	Feuer	7	90-115
5	Thurs 2/5	The Parasite's Way of Life	Doran	3 8	
6	Tues 2/10	Microbial Toxins Enteric Pathogens –Cholera	Doran	9 20 16	232-235
7	Thurs 2/12	Enteric pathogens – Salmonella, Shigella, E. coli	Doran	17	
	Tues 2/17	Exam #1			
8	Thurs 2/19	Extracellular pathogens – Staphylococcus, Streptococcus	Doran	11 12 13	
9	Tues 2/24	Facultative intracellular pathogens – Mycobacterium	Doran	23	
10	Thurs 2/26	Obligate intracellular pathogens – Chlamydia, Rickettsia	Doran	27 28	
11	Tues 3/3	Accidental pathogens – Pseudomonas, Chronic pathogens – Helicobacter pylori	Doran	18 22	

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12	Thurs 3/5	Sexually transmitted diseases – Gonorrhea, Syphilis	Doran	14 24	
13	Tues 3/10	Zoonoses – Borrelia burgdorferi Bioterrorism - Anthrax	Doran	25	
	Thurs 3/12	Exam #2	Doran		
14	Tues 3/17	Antibiotics and antibiotic resistance	Doran	5	
15	Thurs 3/19	Assays for virulence, Molecular Koch's postulates, Identification of virulence genes Due Date for "Pathogen Project"	Doran	4	
16	Tues 3/24	Biology of viruses; Viruses transmitted via air: Influenza, Rhinovirus, SARS	Feuer	31 32 36	312-329 337-339 363-369
17	Thurs 3/26	Viral diseases of childhood: Measles, Mumps	Feuer	34	347-354
	Tues 3/31	Holiday – Cesar Chavez Day			
	Thurs 4/2	Spring Break			
18	Tues 4/7	Viruses transmitted via food or water: Rotavirus, Polio, Hepatitis A, Coxsackievirus	Feuer	32 37 43	330-337 370-374 433-434
19	Thurs 4/9	Oncogenic viruses: Human Papillomavirus, KSHV, HTLV	Feuer	40 38 69 71	399-405 376-388 671 683
20	Tues 4/14	Latent viruses: HSV	Feuer	41	406-414
	Thurs 4/16	Exam #3			

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21	Tues 4/21	Viruses transmitted via sex, needles, or blood: Hepatitis C and HIV	Wolkowicz	38 43 71	376-388 432-433 679-690
22	Thurs 4/23	Emerging Viruses, Zoonoses	Feuer	73	697-706
23	Tues 4/28	Bioterrorism; Unconventional and Miscellaneous Pathogens: Prions, Infectious Cancers	Feuer	56 57	534-540 541-552
24	Thurs 4/30	Parasitic infections Due Date for "News and Views" Assignment	Feuer	51-55	480-533
25	Tues 5/5	Fungal pathogens	Schaechter	46-50	451-479
26	Thurs 5/7	Vaccines	Feuer	45	445-450
27	Tues 5/12	Antiviral and anti-parasitic drugs	Feuer	44	435-444
	Thurs 5/21	Exam #4 1:00 PM – 3:00 PM			