

BIMM124: Medical Microbiology, Fall 2012, UCSD (784048)

Drs. Raffi Aroian and Cindy Gustafson-Brown

Class meets at:

Solis 107

MWF 11:00 – 11:50 am

Website: <http://ted.ucsd.edu>**For Dr. Aroian**

Office hours: Fridays 1:30 – 3:00pm Bonner Hall 3146 for the weeks I teach at least one class: Oct. 4, 11, 25, Nov. 1 (in Pacific Hall 3501), Nov. 8, Dec. 6.

(858) (82)2-1396; prof.raffi@gmail.com (only valid email for this class; do not use my UCSD email)**For Dr. Gustafson-Brown**

Office hours: Wednesdays 12:10-1:10 PM (during teaching weeks, Oct 16, Oct 23, Nov 13, Nov 20, Dec 4), HSS 1145L.

(858) (53)4-4242; cgb@ucsd.edu (please put BIMM124 in the subject line)**Class Teaching Assistants (TAs)**

Rachel Sue Bruckman	rbruckma@ucsd.edu	Office hours: Mondays, 12 – 1 pm, Old student center B Room 217A
Christopher Chung	csc013@ucsd.edu	Office hours: Mondays, 9:30 – 10:30 am, Club Med
Amanpreet Kaur	a1kaur@ucsd.edu	Office hours: Fridays, 9:30 – 10:30 am, Perks Coffee House
James Sanford	jasanfor@ucsd.edu	Office hours:

Introduction:

The near doubling in lifespan in the past 1-2 centuries has been due mostly to our control of infectious diseases. They are threatening again to remerge. **The main themes and ideas we will emphasize in Med Micro are:**

1. How infectious agents can cause disease, how our immune system fights back, and how that can develop into full-fledged biological warfare with countermeasures, counter-counter measures...
2. How the scientific method is used to study host-microbe interactions, how this knowledge can be used to cure disease, and how the scientific method can enrich your life outside of Med Micro

The big picture is:

Our interactions with microbes are fascinating and life-altering, and the study of these interaction brings healing and health. The skills I learn here can be applied to improve many areas of my life.

The main questions we are interested in are:

1. how microbes can be beneficial or detrimental and, in the latter case, how they cause disease
2. how the immune system defends us
3. how the scientific method brings knowledge, healing, and success to many aspects of our life even outside of science

This year's theme: VIRULENCE – HOW PATHOGENS ATTACK**Outcomes – At the end of this class YOU will become more skillful in:**

1. knowing how microbes protect us
2. knowing how microbes cause disease
3. knowing how the immune system protects us
4. knowing how the immune system causes disease
5. knowing how microbial disease is diagnosed and treated
6. taking charge of your own learning
7. reading and understanding primary literature; understanding the scientific method; knowing how the scientist thinks, problem solves, and performs research to benefit our lives. These skills will help you solve challenges in your professional and personal lives and learn new things to enrich your life.
8. being confident in tackling new questions and challenges

9. researching and communicating to others about science, disease, and health. YOU can be a light of knowledge to your family and friends in matters of life and death.

This is an active learning class that requires active participation and critical thinking skills and de-emphasizes memorization. *All exams and assignments are open book and notes.* It will require you change the way you think about science and learning. A lot of the knowledge we learn in class will be obsolete in a few years—critical thinking never will be. Memorization is a skill that got you this far. It will not get you much further. Waiting to the last minute to study for an exam may have worked before. It works poorly here because the new critical thinking skills that you need to succeed have to be developed over time; they cannot be crammed. Today is a new day.

Required materials:

Textbook: Schaechter's Mechanism of Microbial Disease, 5th Edition. Note: the final exam is open book but closed computer, so **possession of a hard copy of the book is required**. Copies have been placed on reserved in the Biomedical Library. We encourage you to delve deeper as your time, curiosity, and necessity permits. UCSD has many other textbooks on-line that you can access. *E.g.* if you find something confusing in Schaechter, you can turn to Sherris Medical Microbiology 5th Edition, available free via UCSD campus or vpn.
<http://www.accessmedicine.com/resourceTOC.aspx?resourceID=656>

Clickers (basic iclicker). **Required for this class.** Register your clicker under the tools under the TED website. We cannot look up rubbed-out clicker numbers for you. If you cannot read the clicker number on your clicker, you can either retrieve it from iclicker website (if you've registered it there before) or buy another one.

Computer and printer is required for downloading assignments, relevant on-line chapters, etc... You will need to print out all papers covered in class and bring them with you to class and to your exams.

How we will achieve the aims of this class:

1. **Readings (textbooks and primary literature):** Mandatory before each class.

To success in this class, do the readings for each class before class.

Textbook: Your textbook provides foundational information for class, *e.g.* information about the immune system, disease symptoms, mechanisms of pathogenesis and protection. Textbook readings lay the foundation for our classroom interactions. Prior reading of the textbook material before you come to class **is required** in this class and will serve as the starting point for our discussions. Unlike many (all?) other classes you have taken, we will not focus on explaining what was in the textbook readings. Rather they will serve as a starting point of fascinating joint discussions in class on delving into much more interesting and profound topics. Remember, the exams are open book. You do not have to read to memorize, you only need to read to comprehend and get a good background for class. Although you do not have to memorize, you still have to know what is in the readings in order to access the information for exams... "Read before to soar." An opportunity to take charge of your own success. *We highly recommend that you do all your readings in groups.*

Primary literature: The second of two lectures for each pathogen will focus on primary literature relevant to that pathogen (*e.g.* how it causes disease, interactions with the immune system). Virtually everything we know about immunology and microbial pathogenesis is based on published research. So this takes you right to the "fountain of knowledge." Plus, by delving into primary literature, your critical thinking skills will grow like on steroids. This is one of the most important skills we can teach you—a skill you can apply long after UCSD in professions such as medicine, research, pharmacy, industry, law, journalism, politics, economics... It will enrich your life in many ways.

Each week, you will have 1-2 papers to prepare and discuss in class and sections. As with textbook readings, these must be done before class. This preparation is essential for the paper to make sense and for you to learn how to read, think about, and work with research literature. Knowing how to do this influences a significant part of your grade since you will use these tools for your "Final Paper" and on the exams. We want to give you ample opportunity to practice to succeed. "Read before to soar." An opportunity to take charge of your own success. *We urge you emphatically to do all your readings in groups.*

WHY DO WE REQUIRE READINGS BEFOREHAND? AND WHY WILL WE NOT SIMPLY BE LECTURING FROM THE READINGS AS IN MANY OTHER CLASSES? We assume you are here to learn. Learning requires effort. If we lecture strictly on the readings, we will be feeding you the learning and robbing you of that valuable experience and opportunity to improve your learning and critical thinking skills. Did you know that focusing on higher level learning skills results in brain development? Research shows this! This class is a weight lifting class for your brain. We can't do the exercising for you. If you do it, your thinking muscles will grow and so will your success in life. Our goal together: your success.

2. Quizzes. Each class will begin with a 3-4 question multiple choice quiz. The goal of this quiz is to give you added incentive to do the reading ahead of time. The class quiz will be strictly on basic understanding of the readings. Our expectation is that >85% of the class will get the answers right provided they have done the readings. The slides with these questions will be framed by an **orange** box. See below for grading.

3. Interactive classroom sessions with clickers. These form the “meat” of each class. We will pick a few topics from the readings and write multiple-choice questions that require deeper thinking/cognitive analyses. Many of these you may not get right the first time around. You will get to click in and vote on an answer. Then, you will work in assigned groups to discuss the question for a few minutes, followed by re-clicking in with each group selecting one best answer. From here, we will have in-class discussions as to what the right answer is and what's behind it. The goal of these sessions is actively engage and empower you in YOUR learning process. Our goal is to help you develop your mind and thinking capabilities so that you can succeed in a rewarding life. Our goal together: your success. The slides with these questions will be framed by a **green** box. See grading below.

Note for clicker assignments: Our goal with the clickers is not to force attendance. Rather, our goal is to promote participation in class, to promote reading ahead of time, and to promote your success and learning.

4. Sections. Sections are mandatory and play a significant role in reinforcing and strengthening your analytical skills. Sections are where your Section Papers are discussed and graded. You must be present to receive a grade on your Section Papers, which can help your grade. Sections that do not cover Section Papers are used to answer questions from the readings and lecture that require further clarification. Section papers are excellent practice for your exams, for your Final paper, and for classroom discussions ... another opportunity to take charge of your success.

Section sign up. We have just been told the section sign up tool is not functional. To sign up for section, please go to the section of your choice. If too many students show up to one section, we will figure out a solution in class.

Sections are:

A01	Tu	5:00 – 5:50p	CENTR	203
A02	Tu	6:00p - 6:50p	CENTR	203
A03	Tu	7:00p - 7:50p	CENTR	203
A04	W	6:00p - 6:50p	HSS	2321
A05	W	7:00p - 7:50p	HSS	2321
A06	F	3:00p - 3:50p	HSS	2321
A07	F	4:00p - 4:50p	HSS	2321
A08	Th	08:00a - 08:50a	CENTR	205

How you will be evaluated:

1. **Exams.** There are two exams in this class. A Midterm on Saturday, November 2 from 12 – 12:50 in SOLIS 107, and Final Exam on Tuesday, December 10 from 11:30 am – 2:30 pm (location TBA). All exams are cumulative, *open book, and open notes*. No electronic media (cell phones, computers, calculators, etc...) are allowed. Exams emphasize problem-solving skills and being able to think about and extrapolate information from readings.

The midterm is worth **10%** of your grade but that 10% will be replaced with your final exam score if you do better on the final (most students do). The midterm is a low pressure opportunity to practice the final.

The final exam is worth **varying %** of your grade **depending on optional factors below**. Both exams will be graded on a standard scale (not on a curve) so that everyone has the opportunity to achieve a high grade. The scale is as follows: 100% on final exam will be normalized to the average of the top 15 grades in the class. There is no re-grading of the exams except for incorrect addition of points.

We realize you may have many finals. Please look at your finals' week schedule now. If the timing of this final conflicts with other finals, then you need to either drop the conflicting class or this class. Writing a fair exam for this class takes a lot of effort. We can therefore write only one version of the exam. To be fair to everyone, we regret we can only offer the final at the time scheduled except under extraordinary documented circumstances (*e.g.*, documented illness that requires hospitalization), and we must be notified of that extraordinary circumstance *prior* to the final.

2. Final Paper on a piece of primary literature due on the final week of class and worth **30%** of your grade. The format of this paper and what will be expected from the students will be made explicitly clear when the paper is assigned on Nov 13. *You are to work on this individually*, not in groups, and are expected to do your own thinking and writing. We can detect plagiarism and it will be treated as a breach of academic integrity. The Final Paper is due in class on Dec 4 (3 weeks later) and will be graded (standard letter grade, not curved) according to the handout that will accompany the assignment (similar to your section paper assignments leading up to this). To get full credit you must hand in your assignment on time. If you submit it late, there will be several unavoidable consequences. One is, we may not be able to find time to grade it (which would result in a zero), because we have scheduled limited time to grade these. The second is your peers will justly complain that it is unfair you got more time. The third is your peace of mind will probably suffer since you will be piling on your workload before/during finals week. If, for whatever reason, you cannot meet this deadline please email your section TA and both instructors before the due date. There is no re-grading of the Final Paper.

3. Clickers, 10% of your grade: Pre-lecture orange box quiz questions = 5% of your grade. Get 75% of these questions correct to get full credit for the quarter. Get 50% of these questions correct to get half credit for the quarter. Green box questions = 5% of your grade. It does not matter whether you get these right or wrong. Participating in 75% of these questions gives you full credit for the quarter. No partial credit.

4. Section Papers, optionally 8% of your grade: There are three optional write-ups on primary literature due in Section. These will be written up according to instructions given with each paper and are to be no longer than 1 page in length. You can work on reading and discussing these assignments in groups and then write up your own answers individually. You are to bring your write-ups to section, where they will be discussed and graded. You must be present in section to get credit for your Section Paper. For each Section Paper, you will receive either an "S" (satisfactory), "I" (improvement recommended), or "N" (not done). The questions for these papers will mirror those in the exams and Final Paper and are *good low stress practice for both*. For each S, you receive 1 full point. For each "I", you will receive ½ point. If your Section Paper total is ≥ 2 points, then 8% of your final grade is an automatic A. If your Section Paper total is < 2 but ≥ 1 point, then 4% of your final grade is an automatic A. The remainder of the 8% is assigned to your final exam score.

5. Seminars, optionally 2% of your grade: To encourage active learning, we may announce a relevant seminar or two in the quarter that we recommend you attend. 2% of your grade will be assigned an A if you go one seminar (sign in with faculty or TA at the beginning and end of seminar), write and hand in a one page assessment (format to be announced).

Grades

Course grades will be assigned as follows:

A: 85-100%; B: 75-85%; C: 60-75%; D: 45-60%.

Academic Integrity: Academic dishonesty undermines the hard work of all students in the class who are engaged in learning and who take responsibility for their learning. Academic dishonesty is incompatible with science and search for the truth. We do not tolerate it. Out of respect and appreciation for your own efforts, nor should you. We encourage you to talk with any of the BIMM124 staff if you learn of any incidents of academic dishonesty. If we suspect dishonesty, we will

meet with you to discuss my concerns, and we will report the incident to the Office of Academic Integrity, who will contact your college dean. Academic dishonesty includes clicking in for another student, copying another student's paper, cheating on an exam. The following is an excerpt from the UCSD General Catalog on Academic Dishonesty: *"Each student is responsible for knowing and abiding by UCSD's policies on Academic Dishonesty and on Student Conduct. Any student violating UCSD's Academic Dishonesty or UCSD's Student Conduct policies will earn an 'F' in the course and will be reported to their college Dean for administrative processing. Committing acts that violate Student Conduct policies that result in course disruption are cause for suspension or dismissal from UCSD."* Use of two or more clickers in the class (*i.e.* clicking in for someone else) will be treated as a violation Student Conduct Policies.

How to succeed in Med Micro:

1. Spend the 8-10 hours outside of class time expected for a four-unit class.
2. Come prepared, with readings done prior to the relevant class. "Read before to soar." Students who do the work and come prepared to class do better. Period.
3. Participate in lectures and sections. We have run the statistics. Students that come both to class and to section statistically do better than those that do not.
4. Ask questions whenever something is not clear, before/during/after class, during our office hours (please come!), during TA office hours, and in sections.
5. Click in and do all the assignments, including Section Papers. Whether you get "S" or not, you will learn a lot in the process.
6. Talk with the instructors and/or your TA's about any challenges you are having with assignments, with understanding the material, with reading primary literature, with problem solving techniques. We know this is not easy. Let us know as soon as you are able how we can help you learn.
7. **Study in groups.** Read the textbook in groups. Read the papers in groups. Reading primary literature by yourself is challenging to say the least. It is better in groups. Be a groupie. You learn more from your peers than from instructors. To help, we set up groups in section.
8. Class etiquette: Come on time. If you come late, please sit in the back so as to not disturb others. Be present. That means cell phones off and focus your computer work on class. Texting, surfing, etc... is disruptive to other students.

Class Schedule, Fall 2013; all readings and assignments subject to change (MoMD = textbook)

Date/Lecture topic/Instructor	Readings	Section topic for week	Assignment--available on website by Thursday pm
September 27 (F) logistics, class intro; RVA & CGB	MoMD: pp. 21-24 (bacterial cell wall)	N/A	N/A
Sep 30 (M) Innate immunity I; RVA Oct 2 (W) Innate immunity II; RVA Oct 4 (F) Adaptive immunity I; RVA	MoMD: Chapter 6 MoMD: Chapter 6 continued select figure from Brinkmann et al., 2004 MoMD: Chapter 7	Set up groups (important!)	Section Paper 1 Brinkmann et al., 2004; due in Sections next week
Oct 7 (M) Adaptive immunity II; RVA Oct 9 (W) Microbiota: RVA Oct 11 (F) Microbiota IV; RVA	MoMD: Chapter 7 continued MoMD: Chapter 2 Paper TBD	Review/grade Section Paper 1	None
Oct 14 (M) Intro to Bacteria; CGB Oct 16 (W) Secretory diarrhea (clinical) CGB Oct 18 (F) Secretory diarrhea (1° literature) CGB	Reading TBD MoMD: Chapter 16 Paper TBD	Class review	Section Paper 2 assigned; due in Sections next week
Oct 21 (M) Chlamydia (clinical) CGB Oct 23 (W) Chlamydia (1° literature)	MoMD: Chapter 27 Paper TBD	Review/grade Section Paper 2	none

CGB			
Oct 25 (F) Staphylococcus (clinical) RVA	MoMD: Chapter 11		
Oct 28 (M) Staphylococcus (1° literature) Dr. Anand Sitaram	Paper TBD	Class review	Midterm review session (likely Oct. 31) Midterm on Sat, Nov. 2
Oct 30 (W) Dr. Mark Surber, President & CSO Genoa Pharmaceuticals “Drug development: applications in anti- microbial therapy”	TBD		
Nov 1 (F) TBA; Guest lecturer	TBD		
Nov 4 (M); Helminths (clinical) RVA	MoMD: Chapter 54	Review midterms	None
Nov 6 (W) Helminths as disease agents (1° literature) RVA	Paper TBD		
Nov 8 (F) Hygiene hypothesis: Helminths as cures for autoimmune diseases; RVA	Paper TBD		
Nov 11 (M) No class	----	Class review	Section Paper 3 assigned; due in Sections next week; Final Paper announced.
Nov 13 (W) Introduction to viruses; CGB	MoMD: Chapter 31		
Nov 15 (F) Herpes (Clinical) CGB	MoMD: Chapter 41		
Nov 18 (M) Herpes (1° literature) CGB	Paper TBD	Review/grade Section Paper 3	None
Nov 20 (W) HIV (clinical) CGB	MoMD: Chapter 38		
Nov 22 (F) HIV (1° literature) CGB	Paper TBD		
Nov 25 (M) Rotavirus (clinical) RVA	MoMD: Chapter 37	Class review	None
Nov 27 (W) Rotavirus (1° literature) RVA	Paper TBD		
Nov 29 (F) No class			
Dec 2 (M) Blood & tissue protozoa; CGB	MoMD: pp. 506-515	Class review	Final Paper due in class December 4.
Dec 4 (W) Vaccines; CGB	MoMD: Chapter 45		
Dec 6 (F) Call to Africa; S. Niyonzima, head UNAIDS, Burkina Faso.			