IMMUNOLOGY BICD140
SPRING 2015

Professor Ananda Goldrath
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COURSE WEBSITE AVAILABLE ON TED

OFFICE HOURS: Pacific Hall 3501 every Friday from 11-12. I would be happy to talk with you about the class, Immunology in general, science and your studies. I am a wasted resource if you do not take advantage of my office hours!

TEXT BOOK: The Immune System, Garland publishing, 4rd Edition by Parham. The textbook is mandatory, there will be reading in it associated with every lecture. The lectures will make extensive use of the figures in the text, as well as other material. There are a limited number of texts on reserve at the Biomedical Library along with a somewhat more detailed book, Immunobiology -- by Charles Janeway, Jr. and Paul Travers. Immunobiology is available online and the link is on the class website. I strongly encourage you to read the Parham text before coming to lecture.

LECTURES: Tuesdays and Thursdays. 3:30-4:50 Center Hall 109. Lectures will provide much information not contained in the reading, please come to lecture!

PREREQUISITES: BICD100 (Genetics) and BIMM100 (Molecular Biology), and their prerequisites. If a prerequisite has been waived to allow you to take this class, it is your personal responsibility to make up any deficiencies that you may have.

TEACHING ASSISTANTS:

BING FEI YU GRADUATE STUDENT BIOLOGY
BIY002@UCSD.EDU
OFFICE HOURS: MONDAYS 1-2 MANDEVILLE COFFEE CART

STEPHEN SEARLES GRADUATE STUDENT BIOMEDICAL SCIENCES
STEVESEARLES406@GMAIL.COM
Office hours: 2:15-3:15 Lobby of the Leichtag Biomedical Reasearch Building (LBR), at 2:15pm on Wednesdays.

DISCUSSION SECTIONS:

Monday 3:00 PM - 3:50 PM
CENTR 207 Stephen

Tuesday 5:00 PM - 5:50 PM
YORK 3000A Bingfei

Wednesday 1:00 PM - 1:50 PM
CENTR 220 Stephen

Thursday 5:00 PM - 5:50 PM
YORK 3000A Bingfei

Discussion sections are a valuable part of this course, and although discussion sections are not mandatory, I highly recommend that you take part in them. These sections serve to clarify, emphasize and expand points that have been introduced in lecture. The answers to problem sets will be available during discussion, **but will not be posted**, so attendance will be highly valuable in preparation for exams. The section leaders craft each meeting to include opportunities for problem-solving, discussion, and expansion on particularly timely topics. There will be no sections the first week of class. Sections will begin the second week of class, you may chose to attend any section you like.

PROBLEM SETS AND OLD EXAMS: Old Problem Sets and Old exams are available to guide your study and are posted on the website. Written answers will NOT be provided but will be addressed in the discussion sections.

REVIEW SESSIONS:
The TAs will hold review sessions before the midterm and the final, times and locations to be announced in class and on the website.

EXAMS: Your performance in the course will be evaluated by 2 quizzes, 1 midterm exam and the final exam, and a paper. Exam and grading policies are as follows: The Midterm will consist of fill in the blank, short answer, multiple choice, and short essay questions. Pens, a #2 pencil and an ID card (student ID or driver's license) will be required at every exam. There are no scheduled make-up exams. Failure to take the exam will result in a zero. Extraordinary circumstances preventing you from taking an exam must be discussed in advance with the Student Affairs Office (1128 Pacific Hall) and Dr. Goldrath. IF exceptions are made for these special circumstances, the make-up will be an ORAL exam given by Dr. Goldrath. There will be only one final given, I am sorry but it is impossible to accommodate those with multiple finals on the same day.

Quizzes: 2 announced quizzes will be given, 1 prior to the first exam and one after. Each worth 10% of your grade. If you miss a quiz, your final will be worth 10% more.

Clickers/participation: Starting on lecture 3 there will be questions during class that will be answered with your clicker. You will be allowed 1 absence of participation without penalty. You will be graded for participation, not based on correct answers. This will be treated as extra credit, with up to 10 extra credit points.

Midterm: Worth 30% of your grade. Exam 1, covering all material covered and reading material assigned for lectures 1-7.

Final: 40% of your grade. Covering all lecture and reading material assigned the entire class with emphasis on material and reading assigned for lectures 12-20.

Paper: 10% of your grade. 1500 word essay on one of the following topics (or an approved alternative topic):
-The recent measles outbreak and vaccination
-The recent and ongoing Ebola outbreak and potential for a vaccine
-The microbiome and its impact on the immune system.
-Impact of diet, sleep or stress on the immune system.

-Considerations of gluten sensitivity and Celiac disease.
-Exposure or not of young children to peanuts and impact on peanut allergy.

You will be graded on the content and the quality of the writing. Essays will be returned if the writing is not of sufficient quality. I advise getting help with your writing if you are concerned.
UCSD Writing Center: https://writingcenter.ucsd.edu/
Your essay should include references to at least 5 sources, preferably at least 3 of those from the primary literature ie the paper that published the work. Use of review articles is appropriate as well.

Previous year's midterms are posted on the website.

GRADING: The grading is normalized to the high score. 60-70% of that score will be a D, 70-80% will be a C, 80-90% will be a B and 90-100% of that an A. If everyone did well, then it would possible for the whole class to receive A's or at least a high B; however, given the challenging nature of Immunology, this is unlikely. You are not competing with your fellow students. There is no shortage of high grades for those who do well. It is my hope that everyone will study hard enough to demonstrate sufficient knowledge of Immunology to earn an A or B. However, do not rely on your peers doing poorly…it is you against the material. If you have concern about your grade or performance on an exam you must address this with me within one week of the exam, no exceptions. DO WORK THAT YOU WILL BE PROUD OF AND STAND BY YOUR PERFORMANCE.

We count the number of exams handed out, the number of exams turned in…and the number we hand back…and copy the exams.

REGRADE POLICY: Exams must be written in pen ONLY (no pencil) or will not be accepted for regrade. Exams written in pen but having writing masked by any form of white-out or correction tape will not be accepted for regrade. To submit a request for a regrade, you must:

1. Write a cover letter specifying which specific problem should be looked at and fully describe why you think the problem was wrongly graded.
2. Include your email address in your cover letter so that I can

contact you regarding the decision on the regrade.
3. Attach the cover letter to the exam and deliver to Dr. Goldrath. The regrade request must be delivered within 1 week after the graded exams are returned.
4. Please be advised that a random sampling of exams will be photocopied. If exams submitted for regrade are found to be altered, this will be considered a breach in academic honesty and will result in failure of the course.

EMAIL COMMUNICATION: is the appropriate email for all correspondence. Please remember to include your first and last name in the body of the email. I will not respond to any questions regarding the content of the exams by email or answer lengthy questions on course material, or schedule a meeting with you or anything else that can be done in person before/after class or during office hours. I will address questions about the course material during office hours. Email communication that will receive a prompt answer from me will more along the lines of, "I am in the hospital and missed the exam…" Please come talk to me in person.

LECTURE NOTES: The lecture slides will be posted on the website 1-2 days after the lecture. Last year's lecture notes are currently posted for your benefit if you like to have the notes before class. This quarter's class will follow them in general; however, there will be differences and it is your responsibility to keep them straight. Students are required to have access to the internet in order to obtain class information (syllabus, TA sections) and materials (problem sets). Information available on the website will not be handed out in class.

Extra Credit: To enrich your learning experience, I would like to encourage you to attend a research seminar on an important topic in Immunology. For attending ONE of the following lectures you can earn 5 extra points. See class website for directions. There will be a TA or myself at each of the seminars, to receive credit, **please sign in with ONE OF US at the end…credit will not be assigned after the fact…you must sign in with the TA or me.**

Spring Quarter 2015 Seminars

Scripps Seminars are held Thursdays @ 12:00 - 1:00 pm in The Committee Lecture Hall of the Molecular Biology Building at The Scripps Research Institute in California
http://www.scripps.edu/research/ims_affinity/schedule.html

4/30/15
Susan Kaech, PhD
Associate Professor of Immunobiology, Yale School of Medicine
"Fattening up immunological memory"

5/7/15
Ari Melnick, MD
Gebroe Famility Professor of Hemotology/Oncology
Weill Cornell Medical College
"Epigenetic control of the humoral immune response"

5/21/15
Louis J. Picker, MD
Professor of Pathology/Molecular Microbiology and Immunology
Oregon Health and Science University
HIV/SIV Vaccines

5/28/15
Luanne Peters, PhD
Professor, The Jackson Laboratory
Hematopoiesis

La Jolla Institute of Allergy & Immunology
http://www.liai.org/pages/seminars-lectures
Held in the auditorium at LJIC otherwise known as La Jolla Institute

4/15/15 – 12pm
Steve Jameson
Professor, University of Minnesota
T cell Immunity

4/22/15 – 12pm
Jim McKerrow
Professor and Dean UCSD School of Pharmacy
Discovery and development of new drugs for neglected tropical diseases

4/27/15 – 12pm
Sammy Bedoui
Professor, University of Melbourne
Inflammasomes, Dendritic Cells and T Cell Immunity

4/29/15 – 12pm
Susan Kaech
Assoc. Professor of Immunobiology, Yale School of Medicine
T cell Memory

5/6/15 – 12pm
Joshua D. Milner
Chief, Genetics and Pathogenesis of Allergy Section, NIH
Allergy and Immunity

5/20/15 – 12pm
Bali Pulendran
Professor, Emory Vaccine Center
Immunity to infectious diseases and vaccine design

6/3/15 – 12pm
Max Cooper
Professor, Emory Vaccine Center
Origins of Adaptive Immunity

Division of Biological Sciences, Immunobiology Seminar Series
9:30am in 1205 NSB unless otherwise noted

4/6/15
Jayne Danska, Ph.D.
Senior Scientist, Hospital for Sick Children Research Institute
Professor, Faculty of Medicine, University of Toronto
"Ménage à trois in autoimmunity: genes, sex and the microbiome"
Location: Marilyn G. Farquhar Seminar Room in the Center for Neural Circuits and Behavior (CMG Large Conference Room)

4/13/15
Dario Vignali, Ph.D.
Professor, Dept. of Immunology
University of Pittsburgh School of Medicine
"Targeting Tregs in Tumors"

6/1/15
Parkash S. Gill, MD
Professor of Medicine, University of Southern California
Signalling in Cancer

More Extra Credit:
I will also give you the opportunity to use any (almost, with in reason, please) creative outlet to illustrate a concept in immunology for 5 extra credit points. Judging of merit in these cases is entirely subjective and will be primarily used to help decide grades on the borderline. Examples of videos, puppet shows, games, books, illustrations, poems etc. will be available on the website. USE YOUR IMAGINATION and budding understanding of immunology!

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GOALS OF THE COURSE:

Immunology is the study of the physiological mechanisms that organisms use to defend their bodies from invasion by other organisms. The origins of the subject lie in the practice of medicine and in historical observations that people who survived the ravages of epidemic disease were untouched when faced with the same disease again—they had become immune to infection. Infectious diseases are caused by microorganisms which have the advantage of reproducing and evolving much more rapidly than do their human hosts. During the course of an infection, the microorganism can pit enormous populations of its species against an individual. In response, the human body invests heavily in cells dedicated to defense, which collectively form the immune system. Parham 3rd Edition.

During this quarter, we will explore the complex biology of the many cell types that defend the human body from infectious agents with the final goal of understanding how the immune system unites molecular, cellular, evolutionary and genetic principles to fight the war against pathogens.

ACHIEVING THE COURSE GOALS:

Learning Immunology: Immunology is not a linear discipline. You have to bring together several concepts simultaneously in order to understand each aspect of immunity. As you read and review, you will find that you have to look up terms and definitions, and it is an iterative process. You learn subjects 1, 2, and 3, and then you can go back and understand subject 1 with more clarity. **You cannot learn immunology in one pass and you cannot learn it quickly before the exam.** Start studying from the first week, and do not fall behind.

Lecture: Lectures are held twice a week and cover the major concepts indicated on the schedule. Please note that the indicated schedule and readings may be modified somewhat during the quarter, and any changes will be announced in lecture. While lecture slides will be posted on the class website 1-2 days after class, these notes are **not** intended to replace lecture, and there will be material presented in class that does not appear in the lecture slides. You will be responsible for information provided in lecture in addition to the material assigned in the text.

Reading: Reading assignments are noted on the schedule. Any additional reading will be announced in lecture and on the web site. **You are**

strongly encouraged to read text material *before* lectures. You will note that at the end of each chapter, problems and lists of key concepts are given. You are encouraged to try solving these problems and make use of supplementary material before lecture.

Problem Solving: In addition to problems given at the end of the chapter, three problem sets will be assigned. They will be posted on the website and announced in class. You are encouraged to work these problems before section and to be prepared to discuss the answers during section. The answers will **not** be posted, but they will be discussed during discussion sections. The exam questions will directly reflect the homework assignments.

Group studying: You are encouraged to study with other students in the course. However, work on exams must be solely your own. See "Academic Integrity" statement below.

The Learning Environment: Participation in class (e.g. questions or responses to questions by the instructor) is strongly encouraged and contributes to a rich, interactive learning environment. Please refrain from eating, reading newspapers, scanning the web, and engaging in conversations during lectures and sections. Cell phones, pagers, and messaging devices should be turned off. If you must leave class early, please sit in the back in an aisle seat so that you do not disturb others. Following these guidelines will help you, your colleagues, and instructors to stay focused on the material.

Academic integrity: Cheating will not be tolerated and will result in an F in the course, as well as any additional disciplinary actions as indicated by the policy to maintain academic honesty. Please review UCSD's Policy on Academic Integrity: http://www-senate.ucsd.e du/manual/appendices/app2.htm#AP14

On each of your midterms I will ask you to sign an honor code stating:

I pledge not to cheat, plagiarize, steal, or lie in matters related to academic work.

Please note, letting someone cheat off of your exam is cheating!!

Bringing a clicker for a classmate is cheating.

There will be NO written material allowed for reference during any of the exams.

There will be no cheating tolerated in this class.

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Lecture 1: March 31st. Overview of the Immune System, Adaptive vs. Innate Immunity read Chapter 1.

Lecture 2: April 2nd. Innate Immunity. Read Chapter 2

Lecture 3: April 7th. Innate Immunity continued, Read Chapter 3

Lecture 4: April 9th. Intro to Adaptive Immunity (read chapter 11 page 295-307). Antibodies: What are they, what do they do and how do they come to be? Read chapter 4.

Lecture 5: April 14th. Rearrangement of Antibody genes to generate diverse antigen binding—somatic recombination. Read chapter 4.

Lecture 6: April 16th. B cell development. Read chapter 6.

Lecture 7: April 21st. Antibody Isotypes, Antibody function. Read chapter 9 (pages 245-265). **Quiz #1.**

Lecture 8: April 23rd. T cell recognition of antigen: T Cell Receptor. Read Chapter 5.

Lecture 9: April 28th. T cell recognition of antigen: Antigen presentation by the Major Histocompatibility Complex molecules. Chapter 5.

Lecture 10: April 30th. The genetics of MHC/Intro to lymphocyte development. Read chapter 5.

Lecture 11: May 5th. Exam 1 covering all material in lectures 1-10.

Lecture 12: May 7th. T cell development cont. Chapter 7.

Lecture 13: May 12th. T cell development cont. Guest Lecture Dr. Kyla Omilusik, UCSD. Chapter 7.

Lecture 14: May 14th. T cell activation. Read chapter 8.
Paper is Due!

Lecture 15: May 19th. **Quiz #2.** T cell activation cont. B and T cell collaboration. Read chapter 8 and 9.

Lecture 16: May 21st. B cell activation and antibody mediated immunity. Read chapter 9.

Lecture 17: May 26th. Vaccines and infectious disease. Response to infection, failures of the immune system. Guest Lecture, Dr. Shane Crotty, LIAI. Read Chapters 11 and 13.

Lecture 18: May 28th. Hypersensitivity. Chapter 14.

Lecture 19: June 2nd. Transplantation. Chapter 15. Guest Lecture. Dr. Michael Cooke, Head of Immunology Program Genomics Institute of the Novartis Research Foundation.

Lecture 20: June 4th. Autoimmunity. Chapter 16

FINAL: June 8th Monday 3-6pm. Covering all lecture and reading material assigned the entire class with emphasis on material and reading assigned for lectures 12-20.

Link to Janeway text. A bit out of date but helpful.

http://www.ncbi.nlm.nih.gov/books/bv.fcgi?call=bv.View..ShowTOC&rid=imm.TOC&depth=2