

Biology 416	Dr. Charles Toth
Immunology	Office: Sowa 236
Spring Semester 2012	Office Hours: MR 10:30- 12:00
Lecture: TWF 10:30-11:20 AM- AM135	Phone: 865-2015
Lab: T 1:30-4:30 PM AM 212	E-mail: ctoth@providence.edu

Textbook:

Janeway, Charles et al., *Immunobiology*, 8th Edition. Garland, 2011

There will also be assigned readings from primary literature sources that will be available on the course Angel site.

Course Content:

This course is designed for science majors who have previously taken Biology 200 or Chemistry 309/312. Those students who do not possess the proper prerequisites will only be allowed to enroll if there is available space and have obtained approval from the instructor. The subject matter covered in this course will include the fundamental aspects of innate, humoral and cell-mediated immunity, hypersensitivities, immunodeficiencies (including HIV), autoimmunity, and transplantation biology. Emphasis is on the molecular and cellular aspects of immunology. Experiments that are germane to the main topics outlined below will be discussed during the lectures. Therefore, attendance is very important to obtain the fullest amount of information from the course.

Grading:

Evaluation of performance will be based on two midterm exams and a final clinical exam. The final exam will cover only new material from the third section of lectures. Students will be required to integrate the material and apply their knowledge. The exams will mainly cover lecture material, but students will also be responsible for their reading assignments. The exams will be a take-home format that will be open book/open notes. Students may work in groups for the exams but MUST submit their original work for evaluation. There will also be two lab reports to turn in for 15% of your grade.

Internet information:

An Angel site has been set up for the course. Outlines for each lecture can be accessed the day before the lecture date. Supplemental material, including movies, images, and databases will also be made available for each lecture. Primary research papers presented in class, required reading for the course, will be available as .pdf documents. All lectures will be located in a 416 folder on the N: drive.

LECTURE OUTLINE:

Lecture block	Subject	Reading assignment
1	Introduction	Ch. 1 (pages 1-17, 25-36)
2	Hematopoiesis/Organ structure	Ch. 1 (pages 17-22)
3	Innate immunity	Ch. 2 (pages 37-48; Ch. 3 75-112)
4	Antibody (Ab) structure/Antigens	Ch. 4 (pages 127-138)
5	Immunoglobulin gene expression	Ch. 5 (pages 157-169, 173-187)
6	T cell receptor (TCR), MHC	Ch. 4 (pages 138-153, 155-160); Ch. 5 (pages 169-173)
7	Antigen presentation	Ch. 6
	<u>EXAM 1</u>	
8	B cell development	Ch. 7 (pages 239-247, 258-264); Ch. 8 (275-290)
9	T cell development	Chap. 7 (pages 247-258); Ch. 8 (290-316)
10	Cell-mediated response	Ch. 9
11	Humoral response	Ch. 10
12	Big picture	Ch. 11
	<u>EXAM 2</u>	
13	Hypersensitivities	Ch. 14
14	Autoimmunity	Chap. 15 (pages 611-652); Ch. 16 (pages-669-682)
15	Transplantation biology	Chap 15 (pages 652-664)
16	Immunodeficiency	Chap. 13 (pages 509-543)
17	HIV	Ch.12 (pages 465-486); Ch. 13 (pages 543-562)
18	Cancer	Ch 16 (pages 682-697)

FINAL EXAM-Due on Thursday May 10th

Biology 416 Lab

Lab Content:

This lab course is designed for advanced students who have fulfilled the course requirements as listed in the Bio 416 description. Labs may occasionally run past 4:30PM and some labs will require time outside of scheduled lab hours. Modern molecular experiments follow a defined protocol and time schedule. Therefore, if you cannot commit to this extra time, please do not take this course. There are no makeup labs.

Grading:

Evaluation of performance will be on assignments to turn in for designated labs. The assignments will be worth 30 points each.

Lab date	Description	Reading assignment
Jan. 24	LAB1: FACS analysis	Lab 1
Jan. 31	LAB2: Differential blood counts; blood typing	Lab 2
Feb. 7	LAB3: Pregnancy test	Lab 3
Feb. 14, 28	LAB4: LPS activation of NF-kB activity: EMSA	
Mar. 6, 20, 27	LAB5: Ig class switching	Lab 4 Report due
Feb. 28, Mar. 6, 20, 27	LAB6: iPSC hematopoiesis lab	Lab 5
April 3, 10	LAB7: TCR activation: ELISA	Lab 6 Report due
April 17, 24	LABS8-9: Disease diagnosis labs	Lab 7

	Make-ups	TCR-ELISA	Disease case studies	iPSC qPCR lab	Ig class switching	LPS-NF- κ B EMSA Lab	Pregnancy test	Differential blood counts- blood smears	FACS lab	
1-24									X	
1-31								X		
2-7							X			
2-14						X				
2-28				X		X				
3-6				X	X					
3-20				X	X					
3-27				X	X					
4-3		X								
4-10		X								
4-17			X							
4-24			X							