

Immunology (Bio 310) / Winter 2011

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Office hours: Fridays 1:30 PM to 2:30 PM *or by appointment.*

Text & Resources: *Kuby Immunology, 6th Ed.*, Kindt, Goldsby, & Osborne. W. H. Freeman, 2007.

We will use Moodle to communicate. You will be able to access copies of the syllabus, assignments, PDFs for papers or case studies, and links to animation and other online resources through Moodle.

The immune system is complex and fascinating. The cells of our immune system are encountering and destroying various bacteria and viruses daily, most often without our even being aware of their presence. (Even if you felt like you were sick all during fall term!) You may, however, be very aware of the power of the immune system if you happen to have hayfever or some other common allergy. We will begin the course by covering the basic components of the vertebrate immune system, and then move on to look at how cells interact with one another to produce an immune response. We will put it all together by looking at the role of the immune system in infectious disease, allergy and asthma, transplantation, and vaccination.

Exams: Each section of the course builds on your previous knowledge, and it is important that you keep up with the readings and material covered in class on a daily basis. There will be *three exams* throughout the term designed to check your understanding of the concepts that we have covered. The first two exams will each be worth 20% of your final grade. The final exam will be cumulative, taken self-scheduled during finals week, and will be worth 25% of your final grade.

Case studies and journal articles: Throughout the term we will read and discuss two journal articles and two case studies to gain a better understanding of immunological methods and to read about current, interesting topics not covered in detail by the text. Both the journal articles and the case studies will be posted on Moodle and the dates for discussion are listed below under the Assigned Readings. Read the article or case study before class and be prepared to discuss the methods, results, and implications of the paper or to answer questions or solve a problem related to the case study. There will be a small graded assignment/quiz for each journal article or case study activity and these assignments will count 5% toward your final grade.

Civic Engagement Project: Each of you will select one of the following topics to research throughout the term: 1) asthma and environment, 2) type 2 diabetes and the immune system or 3) exercise and immunity. Each topic represents an active area of immunological research, and a public health issue that can be explored in our local community. Two small groups will work on each topic. Each group will write a compendium of short research papers relating to their topic. The group will jointly decide upon the subtopics to be included in the compendium and each member of the group will use the primary literature and information covered in the course to write a research paper that requires synthesis of material and analysis of experimental evidence. Your rough draft will be peer reviewed, and you, in turn, will have the opportunity to peer review a rough draft and give constructive feedback. We'll exchange rough drafts of the papers in class on Wednesday, February 16th, and return them to the authors on Friday, February 18th. You will receive an *individual grade* for your independent work on the research paper.

Simultaneously, you will be working as a group to interview relevant community partners, and to gather and analyze information from the community to gain practical information related to your topic. Your group will generate a finished product that will be used by the broader Northfield

community; your product may take the form of newsletters, formal or informal oral presentations with handouts/visuals, or the development of curricular materials. You will receive a *group grade* for this part of the project. The success of each group depends upon everyone being a responsible group member and you will have the opportunity to give me feedback on the role played by the other members of your group. Although I will try to set aside some time in class to meet on occasion, *you will need to meet outside the scheduled class time* throughout the term. (For example, you may decide that your final product is an oral presentation to a group in the community - this will need to happen outside of scheduled class time.) If you cannot make a group meeting, it is your responsibility to contact the others in your group and find out what you missed-don't wait for them to take the initiative in filling you in.

We will discuss the projects in more detail, but here is a brief overview of each topic:

Exercise and Immunity This group will research what is known about the impact of exercise on immune function. We have a small grant from the MN Department of Health to purchase pedometers and heart monitors to be used to increase activity levels - although the equipment could be used by multiple community partners, we will begin by partnering with the 7th grade Life Sciences courses at the Northfield Middle School. Regular activity both prevents the onset of type 2 diabetes and helps control weight, and is also correlated with higher academic achievement. The 7th grade students design independent research projects during the 4th quarter, and one option for them this spring will be to design an exercise program using the pedometers/monitors. Your project will involve providing the students with background information on the role of exercise on immune function based on current studies and creating curricular materials for them to use when designing their projects.

Asthma and Environment Your project will be to research what is known about asthma, and in particular, the link between asthma and the environment. This project builds on the work done by previous students enrolled in Immunology and in the fall CHEM 100 FOCUS seminar course. We are attempting to assess the level of asthma in residents living in homes in Northfield that have many of the asthma associated risk factors, and to increase education about the signs and symptoms of asthma and the simple steps one can take to reduce the risk. Gathering this information is essential as a first step in providing funding for affordable housing. This past fall the students enrolled in the CHEM 100 course explored the link between air pollution and human disease; they used a handheld DustTrak DRX instrument to collect data about particulates linked to human health and disease by studying five local families. You will work with the FOCUS students to explain the mechanism of asthma and the link between the environment and asthma, and to present the information to the residents whose homes were tested. In addition, you and the FOCUS students will design a newsletter for your community partner, *Growing Up Healthy*, that will be shared with many in the Northfield community.

Type 2 Diabetes and the Immune System Your group will research the role of the immune system in type 2 diabetes, a disease reaching epidemic proportions in our country and a significant health problem here in Northfield and Rice county. Your community partner will be HealthFinders, an agency that provides quality, accessible, and culturally sensitive healthcare services at no cost, to low-income and uninsured residents of greater Rice County who have chronic diseases. You will work with the director of HealthFinders both to understand the magnitude of diabetes in Northfield and to design a product that informs HealthFinders and their clients about links between the immune system and type 2 diabetes. Your project also connects to exercise and immunity, and your group will be able to contribute background information to the Exercise and Immunity group as they work to increase the fitness levels of local 7th graders.

I'd like to keep the group sizes manageable, so turn in your first and second choice of a project to me by the end of the first week of the term. The project (research paper and community product) is worth 30% of your final course grade and details on the grade breakdown for the project will follow. The individual research paper is due **February 21st** in class, and the product for your community partner is due by **March 4th**.

Grading

I encourage you to see me early in the term to discuss class or testing accommodations.

The grading scale used to determine your final grade for the course is the following:

A 93-100, A- 90-92, B+ 88-89, B 83-87, B- 80-82, C+ 78-79, C 73-77, C- 70-72

A reminder about academic honesty:

"All assignments, quizzes, and exams must be done on your own. Note that academic dishonesty includes not only cheating, fabrication, and plagiarism, but also includes helping other students commit acts of academic dishonesty by allowing them to obtain copies of your work. You are allowed to use the Web for reference purposes, but you may not copy material from any website or any other source without proper citations. In short, all submitted work must be your own. Cases of academic dishonesty will be dealt with strictly. Each such case will be referred to the Academic Standing Committee via the Associate Dean of Students or the Associate Dean of the College. A formal finding of responsibility can result in disciplinary sanctions ranging from a censure and a warning to permanent dismissal in the case of repeated and serious offenses. The academic penalty for a finding of responsibility can range from a grade of zero in the specific assignment to a F in this course."

Immunology Winter 2011

Date	Topic	Readings
January 3	Overview of immune system	Ch.1
January 5-10	Organization of the immune system Innate immunity: Inflammation Extravasation Complement TLR	Ch. 2, 3, 7 & p 332-334
January 12	Antibody: Structure & Function	Ch. 4
January 14	Immunoglobulin gene rearrangement	Ch. 5
January 17	Discussion of <i>Too many B cells... chronic lymphocytic leukemia and the role of flow cytometry</i> Case Study	Read Case Study Posted on Moodle
January 19-26	B cells: Development, activation & memory Monoclonal antibodies	Ch. 11 <i>1st reflection due JAN 21st</i>
January 28	EXAM #1	
January 31	<i>Paper Discussion: Human intestinal macrophages display</i>	Read Smythies paper posted on Moodle
February 2	TH1/2 and Interferon antiviral response	Ch. 12 and 14
February 4	TH1/2 and Hypersensitivity/asthma	Ch. 15

Date	Topic	Readings
February 7	Mid-term Break	
February 9	MHC: Structure and function	Ch. 8 <i>2nd reflection due Feb 11th</i>
February 11-16	Antigen processing & presentation NK cells	<i>Exchange rough drafts the 16th</i> Ch. 8
February 18-21	Thymic selection & MHC restriction	Ch. 10 <i>Return corrected rough drafts the 18th</i> <i>Paper due Feb 21st</i>
February 23	EXAM #2	
February 25	T cell activation	Ch. 10
February 28	Transplantation	
March 2	Vaccine case study	Read Vaccine Case study posted on Moodle Ch. 19
March 4	Regulation of immune responses Apoptosis and T regulatory cells	<i>Project completed by March 4th</i>
March 7	<i>Paper Discussion-Cancer vaccine</i>	Read melanoma vaccine paper posted on Moodle
March 9	Discussions of projects/wrapping up	<i>Notes for Final Exam Due</i>

Due Dates:

Exam #1: January 28th

Exam #2: February 23rd

Exam #3: Self-scheduled during final exam days

Research Paper: February 21st

Project: March 4th