

Course Title: Immunology
Course Number: Biol-341/541
Semester: Fall 2013
Location: HS 268
Time: 8:00-9:30 AM Tue/Thur
Instructor: Dr. Colleen M. McDermott
Office: Nursing Ed 101 (424-1217)
E-mail*: mcdermot@uwosh.edu

***(I will more rapidly return e-mails, than I will phone calls)**

Office Hours: Tue/Thur 9:30-10:30 AM
Mon, Wed, Fri 11:00 AM-12:00 PM

Required Text: Owen, Judy, Jenni Punt, and Sharon Stranford.
2012. Kuby-Immunology, 7th. Edition. W.H. Freeman and Co.,
New York.

Grading: Examinations (100 pts) X 4 = 400
**Case Study (100 pts) = 100
500

**** See Case Study Instruction Page for details**

A	=	100-94	*Instructor reserves the right to adjust grades of the entire class if necessary (i.e. curve).
A-	=	93-90	
B+	=	89-87	
B	=	86-83	
B-	=	82-80	
C+	=	79-77	
C	=	76-74	
C-	=	73-70	
D+	=	69-67	
D	=	66-64	
D-	=	63-60	
F	=	<60	

There will be extra credit most weeks of the course. Objective Sheets are provided for topics we will cover and consist of a series of questions pertaining to the topic. As we finish a topic, answers to the questions posed on the Objective Sheets will be due the next class period and will be worth up to 1 extra credit point each (15-20/semester). Extra credit points will be added to the nearest exam following submission of the Objective Sheet answers.

Completion of the Objective Sheet questions soon after completion of the topic will allow you to solidify the knowledge you have obtained from that topic. In addition, it will allow you to organize your thought and put them into writing in preparation for exams, forming stronger neural connections in your brain than develop with last minute studying.

Likewise, there will be 3 extra credit points awarded to students who make an appointment to come to my office ([prior to September 28](#)) to discuss the course, their reasons for taking the course, and their overall interests.

There also may be a few extra credit opportunities linked to the Immuno Portal available free with your textbook purchase.

IMMUNOLOGY
Biol-341/541
2013

<u>Period</u>	<u>Date</u>	<u>Topic</u>	<u>Reading</u>
1	Sept. 5	Introduction History Innate vs. adaptive Inflammation Humoral vs. cellular Clonal selection	Ch. 1 p 1-25
2	Sept. 10	Cells & Organs Hematopoiesis Apoptosis Lymphoid cells Myeloid cells Stromal cells Growth factors/cytokines CSF, interleukins leukemia Mononuclear cells Phagocytosis Antigen-processing Secretions Activation Granulocytic cells Neutrophils Eosinophils Basophils Mast cells Dendritic cells Non-lymphoid Lymphoid	Ch. 2 p 27-37
3	Sept. 12	Cells & Organs, cont. Lymphoid Cells Cluster of differentiation B cells Memory cells Plasma cells T cells CD ₄ /T _H cells CD ₈ /T _C /CTL cells MHC restriction	Ch. 2 p 37-40

Lymphokines

T_s

Null cells

NK cells

**AB-dependent cell-mediated
cytotoxicity (ADCC)**

4 Sept. 17

Cells & Organs, cont.

Ch. 2 p 41-63

Ch. 14 p 455-467

Primary Lymphoid Organs

Thymus

Stromal cells

Thymocytes

Apoptosis

Bone marrow

Bursa of Fabricius

Secondary Lymphoid Organs

Lymph Nodes

Spleen

Mucosal-associated lymphoid tissue

Lymphocyte recirculation

High endothelial venules

Cell-adhesion molecules

Integrin receptors

Neutrophil Extravasation

5 Sept. 19

Innate Immunity

Ch. 5 p. 141-168

Barriers

Pattern recognition receptors

Soluble molecules

Toll-like receptors

Inflammatory responses

6 Sept. 24

Antigens

Ch. 5 p 175-176

Immunogenicity

Foreignness

Molecular size

Chemical composition

Degradability

Genotype of host

Dosage and administration

Adjuvants

Epitopes

MHC restriction

B-cell epitopes

T-cell epitopes

7 Sept. 26 Antigenes, cont.
 Haptens Ch. 17 p. 553-565
 Viral antigenes Ch. 4 p. 135, 136
 Bacterial antigenes Ch. 11 p. 366-368
 Mitogenes
 Superantigenes

8 Oct. 1 Immunoglobulins Ch. 3 p 80-85
 Structure
 Heavy chain
 Light chain
 Variable regiones
 Constant regiones
 Hinge region

9 Oct. 3 Immunoglobulins,cont Ch. 3 p 85-95
 Allotypes Ch. 13 p. 415-427
 Idiotype
 Isotype
 IgG
 IgM
 IgA
 IgE
 IgD
 Signal Transduction in B cells

Oct. 2-4

EXAMINATION 1-Testing Center

10 Oct. 8 Ag-Ab Interactions Ch. 20 p. 653-677
 Cross-reactivity
 Precipitation and Agglutination
 Labeled Immunoassays
 Monoclonal Antibodies

11 Oct. 10 Ig Genetics Ch. 7 p 225-247
 Heavy chain multi-gene family
 Variable region gene rearrangement
 V-D-J genes
 Allelic exclusion
 Class switching
 Diversity

12 Oct. 15 MHC Ch. 8 p 261-298

**MHC I molecules
MHC II
MHC III
Haplotypes
MHC and antigen presentation
MHC and infectious disease**

- | | | | |
|-----------|----------------|--|---|
| 13 | Oct. 17 | T-cell Receptor
Structure
Genetics
 V-D-J genes
 Diversity
Similarities & Differences with Ig molecules
Accessory molecules
 CD₂, CD₄, CD₈
 TCR-CD₃ complex
 Signal transduction | Ch. 3 p 95-103
Ch. 7 p. 247-259 |
| 14 | Oct. 22 | T-cell Maturation

Thymic maturation of T-cells
T-cell development
Superantigens
T-cell activation
Co-stimulation
Subpopulations | Ch. 9 p. 299-325 |
| 15 | Oct. 24 | Cytokines
Interleukins
Interferons
TNFs
T-cell activation
B-cell activation
Cytokines and inflammation
Cytokines and disease
Chemokines | Ch. 4 p. 105-140 |
| 16 | Oct. 29 | Discussion and Review | |
| 17 | Oct. 31 | Humoral Immune Response
 1° vs. 2° response
Affinity maturation
Class switching
Antigen presentation by B-cells | Ch. 1 p. 17-19
Ch. 12 p. 385-414 |

Oct. 30-Nov. 1

EXAMINATION 2-Testing Center

- 18 Nov. 5 Cell-mediated Immun. Ch. 13 p 427-444
 Direct cytotoxicity
 Sensitization phase
 MLR
 Graft vs. host reactions
 Effector phase
 Mechanisms
 Natural killer cells
- 19 Nov. 7 Cell-mediated Immun. Ch. 15 p. 506-509
 ADCC
 Delayed-type hypersensitivity
 Transplantation Ch. 16 p 536-552
 Graft Rejection
 Transplantation antigens
- 20 Nov. 12 Complement Ch. 6 p. 187-200
 Components
 Activation
 Classical pathway
 Alternate pathway
 Membrane attack complex

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|----|---------|---|------------------|
| 21 | Nov. 14 | Complement, cont.
Regulation
Biological consequences
Cell lysis
Opsonization
Virus neutralization
Complement deficiencies | Ch. 6 p. 200-223 |
| 22 | Nov. 19 | Hypersensitivity
IgE-mediated (Type 1)
Antibody-mediated (Type 2) | Ch.15 p 485-504 |
| 23 | Nov. 21 | Hypersensitivity
Immune complex (Type 3)
T _{DTH} -mediated (Type 4) | Ch. 15 p 504-516 |

Case Study Pre-Reads Due!

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|----|--------------------|---|------------------|
| 24 | Nov. 26
Nov. 28 | Exam 3 In class
Thanksgiving Day | |
| 25 | Dec. 3 | Tolerance & Autoimmunity
Central vs. peripheral tolerance
Diseases
Mechanisms
Therapy | Ch. 16 p 517-536 |
| 26 | Dec. 5 | Immunodeficiency
Phagocyte deficiencies
Humoral deficiencies
Cell-mediated deficiencies
Combined deficiencies | Ch. 18 p 593-626 |

Case Study Due

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|----|---------|------------------------------------|--|
| 27 | Dec. 10 | Review and Discussion | |
| 28 | Dec. 12 | <u>FINAL EXAMINATION- In Class</u> | |

Students needing extra time to complete in class exams must make arrangements with instructor prior to examination period. Students unable to attend in class examinations due to illness or emergency must notify instructor or departmental office (424-1102) prior to the exam.

Exams 1 and 2 will be given at the Testing Center and may be taken at any time the Testing Center is open during the designated three day periods. Photo ID is required to gain entrance to Testing Center.

Examinations will be graded for scientific content, as well as spelling and grammar. Dictionaries and calculators are permitted during any examination period (No Scientific or Medical Dictionaries, please)

Additions to Syllabus for Graduate Students (Bio 541- Immunology)

In order to maintain the necessary rigor of the graduate experience, all dual-listed courses in our department will differ from that taken by an undergraduate. Specifically, the objectives of the course, the activities undertaken during the course and the grading scale will differ between the graduate and undergraduate versions of the course.

1. Objectives for Graduate Students

- a. The graduate students will be expected to evince a greater depth of knowledge than the undergraduates. This will be demonstrated on exams and in the case study.
- b. The graduate students will be expected to evince a higher level of synthesis than the undergraduates. This will be demonstrated in the extra Graduate Question that will accompany each exam (see below).
- c. The graduate students will be expected to evince a more sophisticated level of communication, both oral and written, than the undergraduates. This will be demonstrated through the essay exam format used for most of this course, as well as in class discussions (both small group and whole class).

2. Activities for Graduate Students

Activities not assigned to undergraduates. Graduate students will answer an additional essay question with each exam. This question will present data from recent papers in the field and ask the student to interpret these data or form conclusions from the data. In addition, the student will be asked to apply this information to real world problems in immune function, diagnosis, and immunotherapy.

3. Grading scale for those enrolled for graduate credit is more demanding than that designed for those enrolled for undergraduate credit.

A = 100-94
A- = 93-90
B+ = 89-87
B = 86-83
B- = 82-80
C+ = 79-77
C = 76-74
F = < 74