

BIOLOGY 670  
IMMUNOLOGY  
Spring Semester 2017

Sherry D Fleming, Assoc. Professor (36B Chalmers Hall; 532-6130 or [sdflemin@ksu.edu](mailto:sdflemin@ksu.edu))

**Required Text Book:** Kuby Immunology, J.A. Owen, J. Punt, S.A. Stranford and P.P. Jones; W.H. Freeman & Co., 7<sup>th</sup> ed. 2013.

iClickers are required beginning on the first day of class.

**Students are responsible for completing reading assignments before coming to class on the day they are assigned. (Red indicates required reading)** Note that dates of subject coverage are subject to change based on course progress.

The course will be taught in 4 blocks. Supplemental reading, handouts and problems sets are available at K-State Online (Please see the user information below). Any student with a disability who needs an accommodation or other assistance in this course should make an appointment to speak with me as soon as possible.

**The detailed objectives of each topic area are outlined in the “summary” section of the assigned chapter of the text book.**

**Block 1: The goal is for you to understand where the immune system comes from, the different components of the immune system and what induces the activation of the immune system. We will also begin to cover the control and regulation of the humoral response.**

Jan 17; Introduction

Jan 19 History and Overview of the Immune System

*Chapter 1*

*Chapter 1 Supplement*

*History of Immunology-Cellular vs. Humoral Immunity; Determinants and Consequences of an*

*Epic 19<sup>th</sup> Century Battle, Silverstein.*

*David's Story and The Bubble Boy, pt. II*

*Life, Death and the Immune Response, G.J.V. Nossal*

*The Smallpox Story: Historical perspective*

*Two hundred years on: Jenner and the discovery of vaccination, Robert Brines*

Jan 20; Overview of the Immune system/Hematopoiesis

*Chapter 2*

*How the Immune System Develops, I.L. Weissman and M.D. Cooper*

Jan 23; Hematopoiesis/Cells of the Immune System

*Chapter 2, Chapter 5, Appendix 1*

*Life, Death and the Immune Response, G.J.V. Nossal*

Jan 24; Cells of the immune system and Innate Immunity

*Chapter 2 and Chapter 5*

*Immunity's Early Warning System, O'Neil*

*How Breast Milk Protects Newborns, J. Newman*

*Bacterial Endotoxins, E.T Rietschel and H. Brade*

*Immunity and Invertebrates, G. Beck and G.S. Habicht*

*Sharks and the Origins of Immunity, G.W. Litman*

Jan 26; Lymphoid organs

*Chapter 2*

Jan 27; Antigens-Immunogenicity

*Chapter 3 (65-68)*

*Antigens and Antibodies Supplement*

Jan 30; Antigens

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Jan 31; Immunoglobulins; Basic Structure

**Chapter 3 (80-90), Chapter 20 (653-655)**

*Nanobodies*, W. W. Gibbs

*How the Immune System Recognizes Invaders*, C.A. Janeway

*The Clonal Selection Theory*, G.L. Ada and G. Nossal

Feb 2; Immunoglobulins; Function, Hybridomas and Monoclonal Antibodies

***Monoclonal Antibodies*, C. Milstein**

*Magic Bullets Fly Again*, C. Ezzell

*Magic Bullets Hit the Target*, T. Gura

Feb 3; Antigen-Antibody Interactions

**Chapter 3 (65-68, 80-90), Chapter 20**

*The Clonal Selection Theory*, G.L. Ada and G. Nossal

Feb 6; Antigen-Antibody Interactions

Feb 7; Organization and Expression of Immunoglobulin Genes

Feb 9; Review (10:30 a.m.)/Exam 1 (7:00 p.m.)

**Block 2: The goal is for you to understand the genetics that control the immune system, the development of T and B cells and the differences and similarities between B- and T-cell immune responses.**

Feb 10; Immunoglobulin Genes

**Chapter 7**

Feb 13; Class switching/affinity maturation

**Chapter 7**

Feb 14; B Cell Maturation and Activation

**Chapter 10, Chapter 12, Chapter 14, Chapter 20 (678-679)**

Feb 16; Cytokines

**Chapter 4, Appendix 2 and 3**

*Interleukin-2*, K. Smith

*Tumor Necrosis Factor*, L. Old

*How Interferons Fight Disease*, H.M. Johnson, F.W. Bazer, B.E. Szente and M.A. Jarpe

*Vessels of Death or Life*, R. Jain

Feb 17; Cytokines

Feb 20; Cytokines

Feb 21; B Cell Maturation and Activation/Cytokines

Feb 23; Major Histocompatibility Complex

**Chapter 8 and Chapter 20 (682-689)**

Feb 24; Major Histocompatibility Complex

Feb 27; MHC/Antigen Processing and Presentation

**Chapter 8**

*How cells process antigens*, V. H. Engelhard

*Intrigue at the immune synapse*, D. M. Davis

Feb 28; Antigen Processing and Presentation

**Chapter 8**

March 2; The T-cell receptor-Protein and gene organization

**Chapter 7 (247-253)**

March 3; The T-cell receptor-Protein and gene organization

March 6; T cell accessory molecules and development (research paper choice and reason due)

**Chapter 3 (95-101), Chapter 9 and Chapter 20 (679-682)**

*How the Immune System Learns about Self*, H. von Boehmer and P. Kieselow

*Cell Communication: The Inside Story*, J. D. Scott and T. Pawson

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March 7; T cell response to antigen

Chapter 3 (95-101), Chapter 11, Chapter 13 and Chapter 14 (467-480)

*Integrins and Health*, A. F. Horwitz

*T Cell Anergy* R.H. Schwartz

March 9; Review (a.m.)/Exam 2 (p.m.)

**Block 3: The goal is for you to understand effector cell responses by T cells, NK cells, NKT cells, and ADCC effectors. You will understand the sequential systems that are involved in innate host responses and how they contribute to host protection and pathogenesis. You need to understand how the immune system contributes to host pathology and immunity to infectious organisms.**

March 10; T cell effector responses (**Report Titles Due**)

Chapter 11 and Chapter 13

March 13; Other cytotoxic effector mechanisms

Chapter 11 and Chapter 13

March 14; Complement and Related Systems

Chapter 5 (166-180) and Chapter 6

*How the Immune System Recognizes Invaders*, C. A. Janeway

*A Complementary Pathway*, I. Ganguli

March 16; Complement and Related Systems

March 17; Complement and Related Systems/Hypersensitivity Reactions

Chapter 15

*Allergy and the Immune Response*, L.M. Lichtenstein

*The Immune System as a Therapeutic Agent*; H. Wigzell

March 27; Hypersensitivity Reactions

*Insights into Shock*, D. W. Landry and J. A. Oliver

Chapter 15

March 28; Hypersensitivity Reactions

March 30; Hypersensitivity Reactions and Inflammation

March 31; Hypersensitivity Reactions

April 3; Immune Response to Infectious Diseases

Chapter 17

*Infectious Diseases and the Immune System* by W. Paul

*Superantigens in Human Disease*, H. M. Johnson, J.K. Russell and C. H. Pontzer

*Bacterial Endotoxins*, E. T Rietschel and H. Brade

*Will We Survive*, A. Mitchison

April 4; Immune Response to Infectious Diseases

*War on Diseases*, R. Weiss

*Preparing for a Pandemic*, W. Gibbs and C. Soares

*The Endless Plague*, Newsweek

*Mosquitos Bite More than Once*, W. F. Bynum

*Sleeping Sickness*, L. M. Ariza

*Tackling Malaria*, C. Dunavan

*Hookworm Infection*, P. J. Hotez and D. I Pritchard

*Tackling Malaria*, C. P. Dunavan

April 6; Review (a.m.)/Exam 3 (p.m.)

**Block 4: The goal is for you to understand the different kinds of vaccines and how they work, what happens to a host in the absence of an immune system and what happens when the immune system turns against its host. You will also understand the factors that regulate transplantation success and how the immune system inhibits and helps the development of cancer.**

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April 7; Vaccines

**Chapter 17**

*Metchnikoff and Syphilis Research during a Decade of Discovery, 1900-1910*, R. M. Krause

*The Immune System as a Therapeutic Agent*, H. Wigzell

*Edible Vaccines*, W. Langridge

*The Land of Milk and Money*, G. Stix

*Jonas Salk*, Time Magazine

*New Hope in Defeating Rotavirus*, R. I. Glass

*Preparing for a Pandemic*, W. W. Gibbs and C. Soares

*The Vaccine Search Goes on*, Watkins

April 10; Vaccines

April 11; Immunodeficiencies (**Reports due**)

**Chapter 18**

*Searching for a Cure*, M. Klesius

April 13; Immunodeficiencies

April 14; AIDS

**Chapter 18**

*Can HIV be Cured?* Stevenson

April 17; AIDS

April 18; Autoimmunity

**Chapter 16**

April 20; Autoimmunity

April 21; Transplantation Immunology

**Chapter 16**

*Xenotransplantation*, R. P. Lanza, D.K.C. Cooper and W. L. Chick

April 24; Transplantation Immunology

April 25; Transplantation Immunology

April 27; Cancer and the Immune System

**Chapter 19**

*The genetic basis of cancer*, W. Cavenee and R. White

*Teaching the immune system to fight cancer*, T. Boon

*Cancer immunotherapy comes of age*, Mellman, Coukos and Dranoff

*Gene therapy for cancer*, R. M. Blaese

*Untangling the Roots of Cancer*, W. W. Gibbs

April 28; Cancer and the Immune System

May 1; Cancer and Modulation of the Immune System

*Immunotherapy for cocaine addiction*, D. W. Landry

*The immune system as a therapeutic agent*, H. Wigzell

*Anti-TNF therapy, from rationale to standard of care: What has it taught us?* M. Feldman and R. Maini

May 2; Catch-up

May 4; Catch-up

May 5; Review

May 9; Exam 4

**K-State Online:** The class will be set up on K-State Online. Announcements will be dispersed through email or K-State Online.

**Office Hours:** Email Dr. Fleming for an appointment or see me after class.

**Class Times:** MTUF @ 10:30 a.m. 221AK

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### **Review, Problem Sessions and Quizzes:** Thursday nights @ 7:00 p.m. 221AK

This session happens every week unless announced otherwise.

### **Exams:** 1) February 9, 7:00-8:50 p.m.

2) March 9, 7:00-8:50 p.m.

3) April 6, 7:00-8:50 p.m.

4) May 9, 9:40-11:30 a.m.

### **Grades:** 90%, A; 80%, B; 70%, C; 60%, D; <60%, F.

Each block's work will range 110-130 points. Exams are approximately 100 points. Quizzes\* are given during Thursday night recitation/quiz section. Class exercises\* (presentations, worksheets, group exercises, i-clicker questions) may or may not be announced. If you are absent, you do not get credit for the exercise.

\*Note: Because each quiz or work sheet makes up such a small percentage of the grade, **there are no make ups for those exercises or quizzes** for any reason. 6 free quiz points are given to all students due to this policy. Any missed quizzes or class exercises will count zero. If you have to miss a significant number of quizzes or classes, talk to Dr. Fleming.

**Research Report** (Paper citation and reason you chose the article is due March 13 in class, in **hard copy**. Report due April 11, 2017 in class, **in hard copy**). One of the goals of the course is to introduce students to the primary immunology literature. Each student will be required to search out an immunology journal article dealing with some topic in immunology. The journal should be an primary immunology research journal like Journal of Immunology, Infection and Immunity, etc (not a review article). The topic will be the student's own choice, but I will be happy to help you choose a topic if you need help. The student will be required to read the article and write a short report. The report should include the title of the article, the authors, the journal, volume and pages. The student should summarize why they chose the article (note due date for this), the rationale for the research, what hypothesis or hypotheses were tested, the types of procedures used, the findings and the discussion. In addition, the student is expected to comment on the article. For example, What did you learn in class that helped you read the article? What was the most important experiment done? What other types of experiments could be done to prove the same point? Do the data presented allow you to accept the hypotheses? Did the authors forget to do some obvious experiment? You must also provide a complete citation for the article. At the end of the report, the student should indicate how the student found the article. The article presented must have been published in 2017 (no exceptions). The report should be typed and should be 3-4 pages long (1-inch margins, double spaced, typed). Include a copy of the article at the end of the report.

### **The report will be evaluated based on the following criteria:**

The journal must be a 2017 immunology research journal

The report should include a complete citation the title of the article

include the authors, journal, volume and pages (You must use the ASM style:

[http://iai.asm.org/misc/journal-ita\\_org.dtl#02](http://iai.asm.org/misc/journal-ita_org.dtl#02))

The report should be typed.

The report should be 3-4 pages long (1-inch margins, double spaced).

The report should include a copy of the article at the end of the report.

The student should summarize why they chose the article (does not have to be different from first hand-in)

The student must summarize what hypothesis or hypotheses were tested

The student should summarize the types of procedures used

The student should summarize the findings

The student should summarize discussion.

The student must comment on the article

What did you learn in class that helped you read the article?

What was the most important experiment done?

What other types of experiments could be done to prove the same point?

Do the data presented allow you to accept the hypotheses?

Did the authors forget to do some obvious experiment?

How did you find the article?

### **Other Important Information**

**Academic Honesty:** Kansas State University has an Honor and Integrity System based on personal integrity, which is presumed to be sufficient assurance that, in academic matters, one's work is performed honestly and without unauthorized assistance. Undergraduate and graduate students, by registration, acknowledge the jurisdiction of the Honor and Integrity System. The policies and procedures of the Honor and Integrity System apply to all full and part-time students enrolled in undergraduate and graduate courses on-campus, off-campus, and via distance learning. The Honor and Integrity System website can be reached via the following URL: [www.k-state.edu/honor](http://www.k-state.edu/honor). A component vital to the Honor and Integrity System is the inclusion of the Honor Pledge which applies to all assignments, examinations, or other course work undertaken by students. The Honor Pledge is implied, whether or not it is stated: "On my honor, as a student, I have neither given nor received unauthorized aid on this academic work." A grade of XF can result from a breach of academic honesty. The F indicates failure in the course; the X indicates the reason is an Honor Pledge violation.

**Statement Regarding Student Disabilities:** Students with disabilities who need classroom accommodations, access to technology, or information about emergency building/campus evacuation processes should contact the Student Access Center and/or their instructor. Services are available to students with a wide range of disabilities including, but not limited to, physical disabilities, medical conditions, learning disabilities, attention deficit disorder, depression, and anxiety. If you are a student enrolled in campus/online courses through the Manhattan or Olathe campuses, contact the [Student Access Center](mailto:accesscenter@k-state.edu) at [accesscenter@k-state.edu](mailto:accesscenter@k-state.edu), 785-532-6441; for Salina campus, contact the [Academic and Career Advising Center](mailto:acac@k-state.edu) at [acac@k-state.edu](mailto:acac@k-state.edu), 785-826-2649.

**Statement Defining Expectations for Classroom Conduct:** All student activities in the University, including this course, are governed by the [Student Judicial Conduct Code](#) as outlined in the Student Governing Association [By Laws](#), Article V, Section 3, number 2. Students who engage in behavior that disrupts the learning environment may be asked to leave the class.

**Statement for Copyright Notification:** Copyright 2017 (Sherry Fleming) as to this syllabus and all lectures. During this course students are prohibited from selling notes to or being paid for taking notes by any person or commercial firm without the express written permission of the professor teaching this course. This includes student note taking for subsequent posting on commercial or personal websites.

**Campus Safety Statement:** Kansas State University is committed to providing a safe teaching and learning environment for student and faculty members. In order to enhance your safety in the unlikely case of a campus emergency make sure that you know where and how to quickly exit your classroom and how to follow any emergency directives. To view additional campus emergency information go to the University's main page, [www.k-state.edu](http://www.k-state.edu), and click on the Emergency Information button.

**Academic Freedom Statement:** Kansas State University is a community of students, faculty, and staff who work together to discover new knowledge, create new ideas, and share the results of their scholarly



inquiry with the wider public. Although new ideas or research results may be controversial or challenge established views, the health and growth of any society requires frank intellectual exchange. Academic freedom protects this type of free exchange and is thus essential to any university's mission. Moreover, academic freedom supports collaborative work in the pursuit of truth and the dissemination of knowledge in an environment of inquiry, respectful debate, and professionalism. Academic freedom is not limited to the classroom or to scientific and scholarly research, but extends to the life of the university as well as to larger social and political questions. It is the right and responsibility of the university community to engage with such issues.

**Supplemental Reading:** All of the supplemental reading listed on the syllabus is available on K-State Online. You only have access to the material if you are registered in the class. The material is placed there for your convenience for you to read on a computer with access to the KSU class material. Please note that it may be a copyright infringement if you print and distribute the material on the website. Dr. Fleming does not encourage or condone this practice. Please use and access this material responsibly. It is acceptable to download and copy materials such as handouts, work sheets and practice quizzes that will be posted to K-State Online. If there are any questions, contact Dr. Fleming.

### **i>Clicker Instructions for Web Registration:**

You are required to purchase an i>clicker remote or i>clicker GO subscription for in-class participation. i>clicker is a response system that allows you to respond to questions I pose during class, and you will be graded on that feedback and/or your in-class participation (i>clicker GO works the same way) **In order to receive this credit, you will need to register your i>clicker remote or set up your i>clicker REEF app account by January 18, 2017.** If you have decided to use i>clicker REEF instead of a remote, please see below for registration instructions.

#### **i>clicker remote registration:**

You must have come to class at least once and voted on at least one question in order to complete this registration properly. Once you have responded to a question with your i>clicker remote, go to <http://www.iclicker.com/registration>. Complete the fields with your first name, last name, student ID, and remote ID. Your student ID should be your wildcat ID. The remote ID is the series of numbers and sometimes letters found on the bottom of the back of your i>clicker remote. i>clicker will be used every day in class, and you are responsible for bringing your remote daily.

#### **i>clicker REEF registration:**

To create a i>clicker REEF account, visit <https://www1.iclicker.com/products/reef-polling/> or download the app for iOS or Android. Creating an account automatically starts a free 14-day trial subscription. Please use this trial period to make sure i>clicker REEF will work for all of your i>clicker classes before purchasing a subscription as there are no refunds afterwards.

Once you create your i>clicker REEF account, you do not need to do anything else to register. Just be sure that your account has the following profile information:

Student ID: Wildcat ID

School ZIP/Postal Code: 66506

School Name: Kansas State University

At the end of your trial, should you decide to purchase i>clicker REEF, you can purchase access to i>clicker REEF in a variety of subscription lengths using your credit card online or through in-app purchase with your smartphone; this subscription includes an unlimited number of courses.

If you have an activation code from purchasing an access card in the bookstore or from a package with a textbook, you will need to redeem the code from the i>clicker REEF website. Once redeemed, the activation will take affect for iOS and Android apps. You cannot redeem access cards from within the iOS or Android apps. To redeem on the website, <https://www1.iclicker.com/products/reef-polling/> and log into your account . Enter your code from your account profile page if you do not see an entry field upon logging into i>clicker REEF.

If you have more questions on i>clicker registration, please visit <http://support.iclicker.com> for FAQs and other resources.



**Please Print Neatly** (return to Dr. Fleming)

Name \_\_\_\_\_ KSU e-mail address\* \_\_\_\_\_

Major or program of study

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Year in school \_\_\_\_\_

Other Biology or Biochemistry courses taken

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Reason for taking this class

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Expectations

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Concerns starting the class

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I agree to abide by the KSU Honor and the Student Judicial Conduct Codes for  
BIOL670 \_\_\_\_\_

*Signature*

\*Note: Please supply your KSU e-mail address (not Yahoo or other) will be used for class emailings for the instructor to contact the students.