

**BIMM194 ~ IMMUNITY AND DISEASES  
SPRING 2016**

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**COURSE WEBSITE:**

<http://classes.biology.ucsd.edu/bimm194.SP16>

Username: bimm194sp16

Password: Immunity

The website will be the primary mode of communication during the course. All reading assignments will be posted on the website as well as other notifications. You will be responsible for locating and printing the weekly reading assignments.

**TEXT BOOK:** No text is required. You may find the recommended textbook to be useful references for review of relevant background material: **The Immune System**, Garland publishing, Third Edition by Parham. **PubMed.** Additional related research or review articles for support of your scholarly presentations can be found using the PubMed online database (<http://www.ncbi.nlm.nih.gov/sites/entrez>).

**CLASS TIME AND PLACE:** Wednesday 10:30am-12:00pm York 3010.

**PREREQUISITES:** BIMM100 (Molecular Biology), and their prerequisites. It is highly recommended to have completed BICD140 (Immunology). 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.

**GRADING:** There will be no final exam. Your performance in the course will be determined by the quality of oral presentations and written work, as well as the level of preparedness and participation in all class discussions. Evaluations will be based on performance with these requirements:

**Presentations (30%):** Oral group presentation of 1 assigned research article. (50% of your presentation will be determined by your peers' evaluation)

**Written Reviews (30%):** One-page critiques of 3 articles

**Participation (20%):** Involvement in all weekly discussions of research articles.

**Evaluations (20%):** Written evaluations done in class of all weekly presentations.

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### **Presentations**

Each student will be assigned **one** paper to present. Moreover, there will be a main topic related to a given research article. You will be a member of a group that will make a 60-minute presentation of one of the assigned research articles and its corresponding main topic. This includes approximately 45 minutes for the presentation and 15 minutes for questions and discussion. Each member of the group should be prepared to answer questions and engage in discussion of the presentation.

Presentations should be thoroughly prepared and clearly delivered. In addition, you may need to read additional publications to assist your understanding and presentation of each paper. Your job is to help the class gain a clear understanding of the conceptual context, purpose, approaches taken and significance of each paper. A good understanding of the experimental methods employed is essential for a critical reading of any paper. Leading the group discussion consists of taking the class step-by-step through the rationale, approach and results in each paper. This often requires judicious choices regarding which figures and concepts are central and which are secondary.

### **Preparation of Presentations**

Dr. Lu will be available for consultation during the preparation of your presentations, both to help you understand the experimental and scientific content of the paper and to offer guidance on presentation organization and delivery. Presenters should meet with Dr. Lu **immediately after the class one week prior your presentation** to discuss how to prepare your presentation. Presenters are encouraged to exchange contact information and arrange multiple meetings to prepare your presentations. I suggest that each group meet at least twice before your presentation. These papers are complicated, and the level of background and experience within the class vary. Nevertheless, by working together, the group should achieve a common level of understanding of the research performed.

### **Presentation Content**

In general, each group presentation should include the following information:

I. Background/Introduction. Provide the necessary background that gives the context for the paper. i.e. What are the authors attempting to show? How does this work fit into the broader view of the field? What tools are used to approach the problem?

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II. Discussion of Data/Results. Provide a thorough description of the techniques employed in the paper. Describe the specific experiments, highlighting any controls that are important for the interpretation of the data. Summarize the results of the experiment, including whether what *you* observe within the provided figures actually supports (or not) what the author's write in the text. Discuss any reservations you may have about the data. Figures should be divided between members of the group.

III. Conclusions and implications. Discuss the major conclusions from the findings presented in the paper. Where possible, include a model (often included at the end of the paper) to provide an overview of the findings. Discuss any caveats to the interpretation, and discuss the long-term implications of the work.

There are five major questions should be addressed during the presentation:

1. What is the most important conclusion and take home message?
2. What is the most critical experiment that can support their main conclusion?
3. What is the biggest caveat in their study?
4. What is the most important following up question should be addressed?
5. How does this study relate to human health and our daily life?

### **Presentation Format**

Each presenter should prepare powerpoint (or other suitable presentation software) slides to assist in the clarity of your presentation. A draft powerpoint file should be sent to Dr. Lu **at least one day (before Tuesday noon) prior your presentation** for comments and proofreading. We will have a projector available for hook-up to your own or the instructor's computer. In this case, the group's entire presentation should be on one computer. If you will use the instructor's laptop computer to deliver your presentation, you must prepare a Mac-compatible presentation and bring it on a memory stick before class.

### **Written Reviews**

You are expected to read EVERY assigned paper before coming to class. In addition, you are required to write a 1-page maximum review for three of the assigned research articles (not of the one that you present). These reviews should be written in a format that is understandable by non-scientists. The first paragraph should succinctly describe the results of the research (what did they find). This should be followed by details regarding the research with a focus on

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the assigned paper that was discussed in class (how did they find it). Lastly, you should frame the discovery in a broader biomedical context (why was it important and why should you care). You will turn in your review at the beginning of class following the chosen presentation. Although each individual should turn in their own write-up, I encourage you to discuss the articles together. Do not leave all three reviews for the end of the quarter.

### **Participation**

You are expected to read EVERY assigned paper before coming to class and to be prepared to discuss it. Participation during discussions will be a major factor of my evaluation in assigning final grades. It is assumed that each student has read carefully, and is conversant with the contents of, each of the papers assigned for a given week. Anyone in the class may (and will) at any time be called upon by the presenters or instructor to discuss a particular figure or finding in the paper under discussion. In addition, it is expected that each student will regularly make spontaneous contributions to the discussion.

### **Evaluations**

After each presentation, you will fill out a peer evaluation form (will be available online) with constructive and substantive comments on the group's presentation of the background material and data in each paper. It is important to be critical in a productive way (not always easy). Comment on what you liked about the presentation and what you thought could be improved upon. Were parts of the presentation not well-communicated? Was the choice of illustrations helpful or overly complicated? Additionally, you will have a chance to observe and comment on presentation styles of the presenters. The quality of your critique is important. These written evaluations will be due at the end of the class. I will post recurring comments or points of confusion on the course website discussion board. Discussion on the comments is strongly encouraged and will be integrated into your participation grade.

**EMAIL COMMUNICATION (TO DR. LU):** Please remember to include your first and last name in the body of the email and WRITE BIMM194 IN E-MAIL SUBJECT (your e-mail will not be read if you do not write that). I will not 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. Please come talk to me in person.

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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. While lack of sufficient immunity would result in recurring and life-threatening infections, uncontrolled immune activation would also lead to deleterious immune-mediated inflammation and tissue damage. This course will focus on understanding how the normal immunity is established and the consequences when our immune system is not functioning properly.

There will be a heavy emphasis on understanding the basis of design, execution and interpretation of relevant scientific experiments. The goal of the course is to learn not only about historically significant immunological research, but also to read, critically evaluate and present primary data from research articles.

**SCHEDULE FOR SEMINARS AND READING MATERIAL**

**Seminar 1: March 30.** Overview of the course and introduction to Immunology.

**Seminar 2: April 6.** Presentation Demonstration

**Main topic:** Policing our own immunity

“Regulatory T cells prevent catastrophic autoimmunity throughout the lifespan of mice.”

Nat Immunol. 2007 Feb;8(2):191-7.

**Seminar 3. April 13.**

**Main topic:** Transplantation tolerance ~ can tolerance be infectious?

“Infectious transplantation tolerance.”

Science. 1993 Feb 12;259(5097):974-7.

**Seminar 4. April 20.**

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**Main topic:** Fetal/maternal tolerance ~ Protect your baby from your own immune response

“Pregnancy imprints regulatory memory that sustains anergy to fetal antigen.”

Nature. 2012 Oct 4;490(7418):102-6.

**Seminar 5: April 27.**

**Main topic:** Having a C section-born or vaginally-delivered baby? ~ That is an immunological question!

“miR-146a Mediates Protective Innate Immune Tolerance in the Neonate Intestine.”

Cell Host & Microbe. 2010 October 21;8(4):358-68.

**Seminar 6: May 4.**

**Main topic:** Different type of tolerance

“Role of tissue protection in lethal respiratory viral-bacterial coinfection.”

Science. 2013 Jun 7;340(6137):1230-4.

**Seminar 7: May 11.**

**Main topic:** Living with good bugs

“Regulation of inflammatory responses by gut microbiota and chemoattractant receptor GPR43.”

Nature. 2009 Oct 29;461(7268):1282-6.

**Seminar 8: May 18.**

**Main topic:** Friendly fire! ~ are all vaccines safe?

“CD4+ T Cell Autoimmunity to Hypocretin/Orexin and Cross-Reactivity to a 2009 H1N1 Influenza A Epitope in Narcolepsy.”

Sci Transl Med. 2013 Dec 18;5(216):216ra176.

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**Seminar 9: May 25.**

**Main topic:** Turning to the dark side ~ why tumors are so difficult to get rid of?

“CD47 is an adverse prognostic factor and therapeutic antibody target on human acute myeloid leukemia stem cells.”

Cell. 2009 Jul 23;138(2):286-99.

**Seminar 10: June 1.**

**Main topic:** Obsessive compulsive disorder ~ a new type of immune disease!?

“Hematopoietic Origin of Pathological Grooming in Hoxb8 Mutant Mice.”

Cell 2010 May 28;141(5):775-85.