

Immunology in Context

Fall 2009

BSC 4933/6932

Instructor:

Lynn B. Martin

Email: lmartin@cas.usf.edu

Office: SCA 130

Office hours: Tuesdays 2:00-3:00

Time:

12:30 – 1:45

Days:

Tuesdays and Thursdays

Room: CHE 102

Course objectives:

The majority of our understanding of animal immune systems comes from molecular and cellular research on animals in unnatural conditions. The goal of this class is to highlight discoveries in the field of ecological immunology. This discipline merges evolutionary ecology and classic immunology to understand how organisms resist or endure diseases in their natural environments.

Text:

Required:

- 1) Sompyrac, Lauren. *How the Immune System Works*, 3rd Edition. Blackwell.
- 2) *Immunology in Context* readings booklet (available from ProCopy)

Recommended:

Murphy, Travers and Wolport, *Immunobiology*, 7th Edition, Garland,

Grading:

Grant proposal	100 points
Literature critiques (4)	25 points each
Review paper	100 points
Class presentation	50 points
Class participation	50 points
Final exam	100 points

Total

500 points

Grading scale: (No plusses/minuses)

A – 90 and above; B – 89-80; C – 80-79; D – 69-60; F – 59 and below

No extra credit will be given and grades will not be curved.

Attendance: USF policy mandates that you attend the first class or be dropped from the roster. Other class attendance is at your discretion; however, tardiness will not be accepted. You will not be allowed to attend a class if you arrive >5 minutes late.

NOTE: Last day to drop course with grade of “W” is October 31, 2009.

Research proposal

Topic due: **September 29, 2009**

Final paper due: **October 29, 2009**

One of the most important activities you will conduct as a research scientist will be grant writing. For this reason, you will conceive and write a short proposal to test an ecoimmunological hypothesis based on the guidelines of the Society for Integrative and Comparative Biology, Grants in Aid of Research Program

(<http://www.sicb.org/grants/researchgrant.php3#form>). Note that you need only complete items 9 and 10 (Investigation and References, formatted as below for the review paper).

By September 29, you should have formalized your hypothesis so that your reading is directed. This means that you should start reading now. Also, by September 29, you should decide whether you intend to compete for a slot to join my research group in Kenya in summer 2010. In brief, you will have the opportunity to test your hypothesis, or a variant of it, in Kenya if a) your proposal entails immune function in house sparrows, ii) you qualify for and can commit to 3h research credit in my lab in Spring 2010, iii) you earn an A or B in the present class, and iv) you are available July 2010 for 3-4 weeks field work. Please see me as soon as you decide to partake in this opportunity.

Review Paper

*Topic due: **September 17, 2009***

*Final paper due: **October 20, 2009***

This assignment gives you an opportunity to investigate in detail a topic of interest in eco-immunology. The paper should be written in the style of a paper in peer-reviewed scientific literature ("forums" section of many journals or articles in the *Trends* journals). Format for all papers is 3 pages of 1.5-spaced, Arial, 10 point, with 1" margins. NOTE: you will be graded most heavily based on the coherence of your argument and the support you garner for it. Thus, your emphasis should be on identifying and distilling the most important papers, not just writing about the first ones you find. Below is a suggested format for your paper, each section comprising 1 page.

I. Describe your system/phenomenon of interest.

II. Propose a novel hypothesis or back up an existing one.

III. Summarize your conclusions and discuss what other experiments are important

References: You must use references from primary literature, not Wikipedia or the like. This will mean going to the library or at least using its electronic resources. If need be, please ask librarians for help well in advance! When you cite a reference, use the formats below. The final paper should include at least 10 references. The bibliography is NOT included in the page limit.

Journal example: Kitaysky, A. S., E. V. Kitaiskaia, J. C. Wingfield, and J. F. Piatt. 2001. Dietary restriction causes chronic elevation of corticosterone and enhances stress response in red-legged kittiwake chicks. *Journal of Comparative Physiology B-Biochemical Systemic and Environmental Physiology* 171:701-709.

Book example (include relevant page numbers!): Sapolsky, R. M. 2002. Endocrinology of the Stress-Response. Pp. 409-450 (in J. B. Becker, S. M. Breedlove, D. Crews, and M. M. McCarthy, editors). Behavioral Endocrinology. M.I.T. Press, Cambridge.

Literature critiques **(due date: various)**

Four times during the semester, you will turn in a one paragraph summary of a paper in ecological immunology that you read. The topic is up to you, but you should consider selecting papers that you will use in the proposal and review paper. This way, you can

familiarize yourself with the literature, get feedback from me, and thus increase the likelihood of earning of a high grade on the larger assignments. Each critique should identify the hypothesis or study intention, explain the main result, identify any shortcomings, and place the discovery in the broad ecoimmunological context. You MUST limit your text to ½ page Arial 10, single-spacing, 1" margins. You will be required to submit electronically your critique, and identify the paper using the citation format for references in the review paper above. You will be evaluated on how concisely you summarize the paper.

Student presentations **(due date: various)**

On Thursdays later in the semester, groups of 3-4 students will lead a discussion of 1-2 papers from the primary literature relevant to the lecture topic the prior Tuesday. You must choose papers and have them approved and submitted electronically to me 2 weeks prior to presentation.

Steps:

1. Choose a date/topic by **September 3**
2. Choose 1-2 papers that cover your topic, have them approved by me, and send me an electronic copy.
3. Give your presentation
 - 1/3 class: review the paper in PowerPoint format
 - 2/3 class: generate discussion of the paper and related topics

You will be evaluated on the quality of the presentation (2/3) and the discussion you lead thereafter (1/3). All individuals in your group will receive the same grade, so it will be your responsibility to ensure that your peers carry their share of the workload (please consult with me well in advance if this becomes an issue). Under no circumstances will an absence on the day of your presentation be excused; you will receive a '0' if you miss it. Once your date is selected, it cannot be changed. A rubric will be provided to you before the first presentation so you can see in detail what will be evaluated.

Student participation **(due date: various)**

Participation in discussions will be integral to learning in the class (1/10 of your grade). For this reason, you will be awarded points based on your involvement in discussions. Attendance will be assumed, so points will be earned through questions about the presented material, suggestions about future directions, and critiques of ideas in the literature or those of your peers or me. Scores will be posted on BlackBoard soon after each discussion, but points will not be negotiable. Note that you will be evaluated on both the quality and quantity of your contributions. If you have concerns about your points, discuss this with me early. This activity has the potential to help or hurt your grade depending on your effort.

Final exam **(due date: December 10)**

Your final exam will be cover material from the entire class and will include multiple choice, fill-in-the-blank, short answer, essay and other question types. In particular, interpretation of figures and tables from the primary literature will be important, many of which you will not have seen previously. The exam will be given to you on the last day

of class (Dec. 3), and you will have until December 10th to email it to me. I will grade all exams within one week and post them on BlackBoard once graded.

Other important notes:

1. Students who anticipate missing class due to a religious observance must submit notification in writing by the third class. Other absences are not excusable and NO LATE ASSIGNMENTS WILL BE ACCEPTED.
2. The content of the course is the sole property of the instructor and may not be reproduced or distributed in any form for sale.
3. Assignment due dates and lecture content are subject to change, so your attendance is critical.
4. S-U grades must be negotiated in writing within the first three weeks of the term.
5. An "I" grade indicates incomplete course work and may only be awarded when only a small portion of coursework is incomplete and when the student otherwise has a passing grade. A Biology department "Incomplete Grade Contract" must be completed before the "I" grade is given.
6. No cell phones, PDAs, or other electronic devices are allowed in the classroom. Any use of these devices is grounds for dismissal from the class that day; second offenses will result in permanent dismissal.
7. Disruption of academic process is an act by a student in a classroom or teaching environment which in the reasonable estimation of a faculty member: i) distracts attention from the academic material (e.g., persistent, disrespectful or abusive disruptions), or ii: presents danger to the health, safety or well-being of class participants. These acts will not be tolerated.
8. Uncollected assignments will not be retained longer than 90 days from the due date. Grades cannot be disputed beyond 90 days from their assignment.
9. Academic dishonesty will not be tolerated and you will be held to all academic policies and standards of the USF. Any form of cheating is academic dishonesty. 'Cheating' is defined by the University as (1) unauthorized granting or receiving of aid during the prescribed period of a course-graded exercise (students may not consult written materials such as notes or books, may not look at the paper of another student, nor consult orally with any other student taking the same test); (2) a student's asking another person to take an examination for or in place of him/her; (3) taking an examination for or in place of another student; (4) stealing visual concepts, such as drawings, sketches, diagrams, musical programs and scores, graphs, maps, etc., and presenting them as one's own; (5) stealing, borrowing, buying, or disseminating tests, answer keys, other examination materials, research papers, creative papers, speeches, other graded assignments, text or phrases from websites, etc., except as officially authorized; (6) stealing or copying of computer programs and presenting them as one's own. Engaging in plagiarism is academic dishonesty, even though a student may plagiarize without any intent to be dishonest. 'Plagiarism' is defined by the University as literary theft, consisting of the unattributed quotation of the exact words of a published text, or the unattributed

borrowing of original ideas by paraphrase from a published text. Plagiarism detection software (e.g., SafeAssign) may be used on your assignments.

10. No make-ups or extensions will be made without a valid excuse. If you believe you are entitled to an extension, you must make your case within 2 days of the assignment due date. Otherwise, you will earn a "0" for that assignment. Valid excuses include medical emergencies (individual or immediate family only), legal (accident or court case; individual only), or funerary (immediate family only). Reasons for requesting a make-up must relate specifically to the time period of the missed coursework. Reasons for requesting a make-up must be documented in writing by an involved professional. The instructor retains the right to make additional inquiries concerning the documentation. The instructor retains the right to give a make-up that is different in exact content and/or style than the missed coursework. A staff member is not permitted to administer a make-up. Chronic attendance problems for reasons beyond a student's control may warrant withdrawal from the course. You should see the Undergraduate Program Assistant for information concerning late withdrawals and refund of fees.

11. In the event of an emergency, it may be necessary for USF to suspend normal operations. During this time, USF may opt to continue delivery of instruction through methods that include but are not limited to: Blackboard, Elluminate, Skype, and email messaging and/or an alternate schedule. It's the responsibility of the student to monitor Blackboard site for each class for course specific communication, and the main USF, College, and department websites, emails, and MoBull messages for important general information.

Immunology in context readings list				Other readings	
Date	Topic	Assgmt due	Sompyrac	First author	Title
25-Aug	syllabus and immune basics		1		
27-Aug	Innate immunity		2	Medzhitov Kluger	Origins and physiological roles of inflammation Adaptive Value of Fever
1-Sep	Adaptive immunity		3-5	Hedrick Rolff	The acquired immune system: A vantage from beneath Why did the acquired immune system of vertebrates evolve?
3-Sep	Immune organization	Presentation date due	12	Schmid-Hempel Janeway	On the evolutionary ecology of specific immune defence Innate immune recognition
8-Sep	Psychoneuroimmunology			Martin Galic	Stress and immunity in wild vertebrates: timing is everything Post-natal programming of the innate immune response
10-Sep	Costs of immune function	Lit critique 1		Adelman Bonneaud	Vertebrate sickness behaviors: adaptive and integrated neuroendocrine immune responses Assessing the cost of mounting an immune response
15-Sep	Tolerance		7	Lochmiller Råberg	Trade-offs in evolutionary immunology: just what is the cost of immunity? Decomposing health: tolerance and resistance to parasites in animals
17-Sep	Grad student presentation	Review paper topic		Råberg Sears	Disentangling genetic variation for resistance and tolerance to infectious diseases in animals
22-Sep	Optimal immunity			Viney	Optimal immunity
24-Sep	Grad student presentation	Lit critique 2		Coon	
29-Sep	Maternal effects	Grant proposal topic	9	Grindstaff Grindstaff	Immune function across generations: integrating mechanism and evolutionary process in maternal antibody transmission Transgenerational priming of immunity: maternal exposure to a bacterial antigen enhances offspring humoral immunity
1-Oct	Grad student presentation			Liebl	
6-Oct	Development and senescence			Hanssen Moret	Cost of reproduction in a long-lived bird: incubation effort reduces immune function and future reproduction Immune responses of bumblebee workers as a function of individual and colony age: senescence versus plastic adjustment of the immune function
8-Oct	Undergraduate presentation	Lit critique 3			
13-Oct	Seasonality			Love Nelson	Specific variability in the immune system across life-history stages Seasonal immune function and sickness responses
15-Oct	Undergraduate presentation				
20-Oct	Population variation	Review paper		Lee Tella	Linking immune defenses and life history at the levels of the individual and the species Is cell-mediated immunity related to the evolution of life-history strategies in birds?
22-Oct	Undergraduate presentation				
27-Oct	Social context			Hawley Reisen	Pathogen resistance and immunocompetence covary with social status in house finches (<i>Carpodacus mexicanus</i>) Comparison of immune responses of Brown-headed Cowbird and related blackbirds to West Nile and other mosquito-borne encephalitis viruses
29-Oct	Undergraduate presentation	Grant proposal			
3-Nov	Autoimmunity		10	Graham Profet	Evolutionary causes and consequences of immunopathology The function of allergy- immunological defense against toxins
5-Nov	Undergraduate presentation	Lit critique 4			
10-Nov	Sex differences			Klein Nunn	Adaptive immune responses are linked to the mating system of arvicoline rodents On sexual dimorphism in immune function
12-Nov	Undergraduate presentation				
17-Nov	Immunoeology			Kraaijeveld Råberg	Basis of the trade-off between parasitoid resistance and larval competitive ability in <i>Drosophila melanogaster</i> The role of immune-mediated apparent competition in genetically diverse malaria infections
19-Nov	Undergraduate presentation				
24-Nov	Disease resistance			Bradley	Measuring immune system variation to help understand host-pathogen community dynamics
26-Nov	Thanksgiving				
1-Dec	Undergraduate presentation				
3-Dec	Exam review	Final exam provided			