

BIO 531: COMPARATIVE AND EVOLUTIONARY IMMUNOLOGY

DR. KURT A. MCKEAN, BIOL 329

OFFICE HOURS: T, W, R 10:15 – 11:00

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COURSE MATERIALS ON ERES: PASSSWORD: inducible

COURSE OBJECTIVE:

The parasitic life style appears as ancient as life itself. This long history of parasite-induced natural selection has resulted in the elaborate and effective mechanisms of immunological defense we see today. In this course we will examine the evolutionary origins of various mechanisms of defense against parasites, from the innate immune systems of animals and plants to the intricate mechanisms of acquired immunity in vertebrates. Emphasis will be placed on how such a comparative analysis facilitates an understanding of the evolutionary origin of various mechanisms of immune defense. We will also examine how more recent and ongoing selection by parasites is acting to shape the genome and patterns of genetic diversity, as well as the role that natural selection may play in the maintenance of susceptibility to disease.

READINGS AND CLASS PARTICIPATION:

There is no required textbook. The topics in this class are so new and exciting that none exists! All readings are taken directly from the primary literature. Critical reading of the material is a requirement of the course. 50 points toward the final grade will be based on participation in class discussions of the paper.

Class Participation	50 pts.
Midterm Exam	100 pts.
Term Paper (Due 5/5)	100 pts.
Oral Presentation	100 pts.
TOTAL	350 PTS.

MIDTERM EXAM:

The midterm is a take-home exam that will require knowledge of the material presented in the first 16 lectures as well as some independent research. Each student should work on the exam on his or her own. ***The midterm exam is due 4/2.***

TERM PAPER:

Choose a topic within the field of comparative/evolutionary immunology for a paper. Please email me your topic ***prior to 3/31*** for approval. Your topic cannot be the same as the topic for your oral presentation. ***Papers are due in my office by 5 pm 5/ 7.***

STUDENT PRESENTATIONS:

Students will be required to select a topic of their own choosing, provide 1 or 2 papers for the class to read, and then prepare a lecture/presentation. The lecture should provide the background for the topic and a detailed discussion of the paper(s). Each student presentation will be 35 minutes in duration. The date of your presentation will be decided by a random draw. ***Please email me your topic prior to 3/12 for approval.***

POLICY ON ACADEMIC INTEGRITY:

Breaches of academic integrity will not be tolerated. Please refer to the Undergraduate Bulletin, or the following website to see what constitutes a breach and the consequences.
http://www.albany.edu/undergraduate_bulletin/regulations.html

SCHEDULE OF TOPIC DISCUSSIONS:

<u>DATE</u>	<u>LECTURE TOPIC</u>	<u>READING</u>
1/22	Introduction to the course.	
1/27	A history of immunology and a theory of immunity.	Danilova 2006; Frost 1999; Litman and Cooper 2007
1/29	Ecological immunology I – Trade Offs.	Schmid-Hempel 2003; Kraaijeveld et al. 2002; Imonen et al. 2000
2/3	Ecological Immunology II – Sex and Sexual Selection.	McKean & Nunney 2005; McKean & Nunney 2008
2/5	Ecological Immunology III - Genetic basis of resistance.	Lazzaro et al. 2004; Ma et al. 2007
2/10	Pathogenesis I – The Evolution of Virulence.	Alizon et al. 2008; Merrell & Falkow 2004; Frank & Schmid-Hempel 2008
2/12	Pathogenesis II – Molecular mimicry and immune evasion.	Bhavsar et al. 2007; Stebbins & Galan 2001; Elde et al. 2008
2/17	NO CLASSES – WINTER BREAK	
2/19		
2/24	Population Genetics of Immune Genes	TBA
2/26	Evolution of the MHC	TBA
3/3	Immune regulation	TBA
3/5	Comparative Genomics of Immune Genes I	TBA
3/10	Comparative Genomics of Immune Genes II	TBA
3/12	Immune defense in plants	TBA
3/17	Immune memory in non-vertebrates	TBA
3/19	Vertebrates – Toll-like receptors	TBA
3/24	Evolution of Acquired Immunity – I	TBA
3/26	Evolution of Acquired Immunity – II	TBA
3/31	Student Presentations	
4/2	Student Presentations	
4/7	Student Presentations	
4/9	NO CLASSES – SPRING BREAK	
4/14	Student Presentations	
4/16	Student Presentations	
4/21	Student Presentations	
4/23	Student Presentations	
4/28	Student Presentations	
4/30	Student Presentations	
5/5	Student Presentations	
5/7	Term Papers Due	