

Evolutionary Medicine
Bi 410/510 CRN 15796/15795
Fall 2011

Instructor: Dr. Susan Masta; email smasta@pdx.edu; office ph 725-8505

Office hours: Tuesdays 11-12 Room 531A SB1

Class meets: 2:00 – 3:50 pm Tuesday, Thursday; Room 203 UTS (2121 SW Fourth Avenue)

Desire2Learn will be used to post materials and for online quizzes. You will need an active ODIN account.

There is no Required Textbook. However, the following recommended textbook will help you understand the concepts and topics in this course: “*Principles of Evolutionary Medicine*” by Peter Gluckman, Alan Beedle, & Mark Hanson. 2009. Oxford University Press, New York.

Required book: We will read and discuss multiple chapters from “*Why We Get Sick: The New Science of Darwinian Medicine*” by Randolph Nesse and George Williams. 1994. Vintage Books, New York.

Course Description:

This course will provide an introduction to evolutionary thinking as it applies to human diseases, diet, and aging. Concepts in evolutionary theory will be introduced and will provide a framework for understanding the difference between proximate and ultimate causes of human ailments. You will learn why certain populations are prone to specific diseases, explore how virulence evolves, and come to understand why we crave ice cream and French fries. The course will be a combination of lectures, group discussions, and student presentations.

Prerequisite: One year of introductory biology.

Course Goals:

- Gain an understanding of natural selection and other fundamental concepts in evolutionary biology that have relevance to the practice of medicine.
- Differentiate between ultimate and proximate levels of causation as they pertain to human disease.
- Learn why we are susceptible to illness, how genetic and environmental factors contribute to this vulnerability, and why certain diseases become expressed in particular populations, all within an evolutionary framework.
- Discover the roles played in certain diseases by evolutionary constraints and historical happenstance.
- Come to appreciate how knowledge of evolutionary concepts helps medical researchers and physicians and how application of those concepts benefits the practice of medicine.

Course Requirements & Grading:

Students will be expected to attend all lectures. Students must complete assigned readings **prior** to that week’s lecture and must contribute to discussions. Each class, following lectures and discussions, students will be asked to complete an in-class written summary of that class’s discussion topic. Each week, there will be on-line quizzes. As a one-time assignment, students will be asked to summarize and evaluate a journal article in evolutionary medicine, and write a one-page report. In week 8, this article will be presented to the class within a group where each person will provide commentary and answer questions their classmates may pose. As a one-time final assignment, students will form small groups and pursue work culminating in a poster presentation during the final exam period. Students should choose an area that interests them. Grades will follow the A = 90-100%, B = 80-89%, C = 70-79%, D = 60-69%, F < 60%, with minus and plus grades at appropriate cutoffs.

Final grades will be determined by:

- 1) Attendance, participation, written summaries – 30% (15 out of 16, the one lowest grade will be dropped)
- 2) Weekly quizzes (10 total) – 20%
- 3) Journal article report and presentation – 30%
- 4) Final Poster Presentation – 20%

Accommodations:

Accommodations are collaborative efforts between students, faculty and the Disability Resource Center (DRC). Students with accommodations approved through the DRC are responsible for contacting the faculty member in charge of the course prior to or during the first week of the term to discuss accommodations. Students who believe

they are eligible for accommodations but who have not yet obtained approval through the DRC should contact the DRC immediately at 503-725-4150.

Syllabus

Date	Topic	Reading for Discussion	Assignments
27 September	Introduction to Evolutionary Medicine; Ultimate versus proximate levels of causation		
29 September	Evolutionary Medicine overview; selection, fitness	Nesse and Stearns 2008	
4 October	Disease symptoms	<i>Why We Get Sick</i> , Chs. 1 & 3	
6 October	Natural selection of antibiotic resistance	<i>Why We Get Sick</i> , Ch. 2 & 4;	
11 October	Evolution of virulence	Björkman et al. 1998	Presentation topics assigned
13 October	Recent natural selection in humans	Tishkoff et al. 2007	
18 October	Gene-environment mismatch	Watson 2009; Norn 1997	
20 October	Why selection has not eliminated genetic diseases	Allison 2004	
25 October	Evolution of food preferences; the thrifty phenotype hypothesis	<i>Why We Get Sick</i> Ch.6; Hales & Barker 2001	Poster group topics selected
27 October	Life history evolution	Migliano et al. 2007	
1 November	Evolution of reproductive senescence	Hawkes et al. 1998; Kirkwood & Shanley 2010	
3 November	Evolution of aging	<i>Why We Get Sick</i> , Ch.8; Flatt & Promislow 2007	
8 November	Evolution of mate choice	Hauber 2007; <i>Why We Get Sick</i> , pp. 188-190	
10 November	Reproductive conflict	Haig & Wharton 2003; <i>Why We Get Sick</i> , pp. 187-188	
15 November	Student-led presentations		Presentations
17 November	Student-led presentations		Presentations
22 November	The hygiene hypothesis	Falcone & Pritchard 2005	Report due
24 November	PSU closed: Thanksgiving		
29 November	Cancer	Crespi & Summers 2005; <i>Why We Get Sick</i> , Ch.12	
1 December	Students' choice	Reading TBA	

****Presentations of posters will occur during the final exam period (in lieu of a final exam) on Monday 5 December 2011, from 10:15 am-12:05 pm****