ANTH 175: EVOLUTIONARY MEDICINE
Fall Quarter 2012 (CRN: 16957)
PLC 180    Monday/Wednesday 11:30 am-12:50 pm
(4 Credit Hours; Satisfies an SC Group Requirement)

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Course Description: Application of evolutionary thinking to the study of human health and disease

Format: Lecture and required weekly laboratory sections.

Course Content: This course provides an introduction to evolutionary (or Darwinian) medicine, a relatively new field that recognizes that evolutionary processes and human evolutionary history shape health among contemporary human populations. The field of evolutionary medicine emphasizes ultimate explanations, such as how natural selection and other evolutionary forces shape our susceptibility to disease; this perspective complements that of biomedicine, which generally focuses on identifying the immediate mechanisms that give rise to diseases and malfunctions. The evolutionary medicine approach has provided insights into why diseases occur at all and additionally has produced valuable insights on treatment strategies. This course will examine a variety of diseases using an evolutionary perspective, including infectious diseases, mental disorders, and cancers. The course will emphasize chronic diseases, such as cardiovascular disease, obesity, and diabetes, and will focus particular attention on the role of diet and psychosocial stress in the development and progression of these conditions.

Expanded Course Description: This is a science group satisfying course that is designed to be a comprehensive introduction to evolutionary, or Darwinian, medicine. In brief, evolutionary medicine is the application of evolutionary thinking, including evolutionary processes and human evolutionary history, to understanding health and disease among contemporary human populations. This course uses a scientific approach, drawing on the methods, theories, and bodies of knowledge from various scientific disciplines, including evolutionary biology, genetics, neuroscience, physiology, nutritional sciences, and medicine.

This course has four main sections:

Section 1 introduces students to the scientific method and evolutionary theory, and builds the foundation for the understanding the evolutionary medicine approach. Particular attention is directed towards the adaptation concept and life history theory. This section of the course also provides an introduction to human evolutionary history, concentrating on major events in hominid evolution (e.g., bipedalism and brain evolution), and to origins of modern human biological variation.
Section 2 focuses on the basic principles of evolutionary medicine, and emphasizes differences between proximate and ultimate explanations. This section of the course also provides a basic introduction to epidemiology (the study of patterns of human disease and their causes) and a brief discussion of contemporary global health issues.

Section 3 uses the evolutionary medicine approach to examine infectious diseases. This section of the course provides an introduction to human defenses to infectious organisms, and describes major cultural transitions in human history that altered exposure to infectious disease. This section also focuses on emerging infectious diseases.

Section 4 applies the evolutionary medicine approach to chronic diseases, including cancers and osteoporosis. This section of the course emphasizes cardiovascular diseases (heart disease and stroke), obesity, and diabetes and uses a biocultural framework to examine the role of diet and psychosocial stress in the development and progression of these conditions.

Required Readings: Assorted articles and book chapters (see below)

Expectations and Grading: Regular attendance at lectures and participation in laboratory sections are required. Course readings are required and are essential to passing exams, completing lab assignments, and participating in lab section activities. Your grade in the course will reflect performance on midterm and final exams, two quizzes, attendance and participation in required laboratory sections, and 5 short (1-2 page) lab write-ups.

Quiz 1 (online; end of week 3) 10%
Midterm Exam (in class; 10/29) 25%
Quiz 2 (online; end of week 8) 10%
Final Exam (in class; 12/5) 25%
Lab Exercises (5 short lab write-ups @ 4% each) 20%
Lab Attendance 10%

Grades will be assigned as follows: A = 90-100%, B = 80-89%, C = 70-69%, D = 60-69%, F < 60% (with minus and plus grades assigned at appropriate cutoffs).

The grading system used in this course is as follows:

A – Outstanding performance relative to that required to meet course requirements; demonstrates a mastery of course content at the highest level.
B – Performance that is significantly above that required to meet course requirements; demonstrates a mastery of course content at a high level.
C – Performance that meets the course requirements in every respect; demonstrates an adequate understanding of course content.
D – Performance that is at the minimal level necessary to pass the course but does not fully meet the course requirements; demonstrates a marginal understanding of course content.
F – Performance in the course, for whatever reason, is unacceptable and does not meet the course requirements; demonstrates an inadequate understanding of the course content.

The midterm and final exams will cover lectures, readings, videos, and lab section material. Exams will include multiple choice, matching, and short answer (2-3 sentences) sections. The final exam will be cumulative, but will emphasize material from the second half of the course. Exams and assignments must be taken/turned in at the scheduled time—under no circumstances will make-up exams or assignment extensions be given without a documented excuse (e.g., signed note from your doctor). If you will not be able to take an exam or turn in an assignment, you must notify me in advance (preferably by e-mail).

Accommodations: Appropriate accommodations will be provided for students with documented disabilities. If you anticipate needing accommodations in this course, please make arrangements to meet with me soon.
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<tr>
<th>Week</th>
<th>Dates</th>
<th>Topics</th>
<th>Required Reading</th>
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<tbody>
<tr>
<td>1</td>
<td>9/24</td>
<td>Course Overview and Requirements</td>
<td>Nesse 2012</td>
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<td></td>
<td>9/26</td>
<td><strong>Anthropology, Science, &amp; Evolution: Introduction to Anthropology; The Scientific Method; Early Evolutionary Studies &amp; the Evidence for Evolution</strong></td>
<td>Wilson 2007, Brown 2010 (Chapter 2)</td>
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<td><strong>Lab 1: Introductions; The Scientific Method; Basic vs. Applied Research</strong></td>
<td>Lab readings, Firestein 2012, Bering 2012</td>
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<td>10/1</td>
<td><strong>Evolutionary Biology, Part 1: Natural Selection &amp; Adaptation; How Evolution Works</strong></td>
<td>Gluckman &amp; Hanson Introduction</td>
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<td>10/3</td>
<td><strong>Evolutionary Biology, Part 2: Evolution and Development; Human Adaptation &amp; Adaptability; Video Segment: Evolution—Darwin’s Dangerous Idea</strong></td>
<td>Gluckman &amp; Hanson Chapters 1-3</td>
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<td><strong>Lab 2: Video: Ghost in Your Genes</strong></td>
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<td>2</td>
<td>10/8</td>
<td>Video – The Life of Mammals: Food for Thought</td>
<td>Video: Becoming Human, Parts 1, 2, &amp; 3</td>
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<td>10/10</td>
<td><strong>Evolutionary Biology, Part 3: Human Evolutionary History &amp; Modern Human Origins</strong></td>
<td>Gluckman &amp; Hanson Chapters 4 &amp; 5</td>
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<td><strong>Lab 3: Evolutionary Theory</strong></td>
<td>Lab reading, Johnson 2011</td>
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<td><strong>Quiz on Evolutionary Biology</strong></td>
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<td><em>(Online—to be taken anytime 10/13-10/15; Covers everything from Weeks 1-3)</em></td>
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<td>3</td>
<td>10/15</td>
<td>Basics of Evolutionary Medicine: Proximate vs. Ultimate Explanations; The Biocultural Perspective</td>
<td>Zuk Chapter 1, Randall 2012</td>
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<td>10/17</td>
<td><strong>Evolutionary Medicine Case Study: Cold Adaptation &amp; Chronic Disease—Dr. Snodgrass’ Research in Siberia</strong></td>
<td>Leonard et al. 2009</td>
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<td><strong>Lab 4: Anthropometry (Body size, proportions, and composition) &amp; biomarkers/disease markers</strong></td>
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<td>4</td>
<td>10/22</td>
<td>Epidemiology &amp; The Big Picture of Global Health: Trends &amp; Historical Patterns; Epidemiological Transitions; Health Disparities; Video Segment: Global Trends in Life Expectancy</td>
<td>Larsen 2008</td>
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<td><strong>Lab 5: Food Production &amp; Health; Skeletal Health/Paleopathology</strong></td>
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| 6    | 10/29       | **Midterm Exam**  
(In Class—Covers everything from Weeks 1-5)**                                                                                   | Zuk Chapter 2                                         |
|      | 10/31       | **Allergy & Autoimmune Disease:** Changing Worlds & the Price of Victory over Infectious/Parasitic Disease  
**Lab 6: Physical Activity & Diet**  
**(Lab write-up due in lab the following week)** |                                                                                                       |
| 7    | 11/5        | **Guest Lecture: Dr. Melissa Cheyney (Oregon State University)—Human Birth in Evolutionary Perspective:** Evolutionary Obstetrics & Midwifery | Rosenberg & Trevathan 2001                            |
|      | 11/7        | **Lice, Ticks, and their Effects on our Biology, Health, and Psychology:** Skin Cancer, Hairlessness, & Xenophobia  
**Lab 7: Video—Typhoid Mary: The Most Dangerous Woman in America** | Dunn Chapters 13 & 14                                 |
| 8    | 11/12       | **Mental Disorders:** Novel Environments, Anxiety, and Depression; Self-Injury  
**Emerging Infectious Diseases:** Invulnerability Turns to Fear & Pessimism; The Third Epidemiological Transition  
**Quiz on material since the midterm (Online—to be taken anytime 11/17-11/19; Covers everything from Weeks 6-8) ** | Dunn 2011 Chapter 9  
Natterson-Horowitz & Bowers 2012  
Zuk Chapter 10  
Lab Readings:  
Couzin-Frankel 2009  
Specter 2011  
Wilson 2007  
(Read at least one) |
|      | 11/14       |                                                                                                                                            |                                                                                                       |
|      | 11/19       | **Guest Lecture: Dr. Kirstin Sterner (UO Anthropology)—An Evolutionary Perspective on HIV/AIDS:** Molecular Anthropology & HIV/SIV  | Reading TBD                                           |
|      | 11/21       | **Cancer:** The Cancer Lottery; Novel Environments & Cancers of the Reproductive System  
**No Labs—Thanksgiving Holiday!**                                                                                   | Zimmer 2007                                          |
| 10   | 11/26       | **Evolution of the Human Diet and Chronic Disease:** Obesity, Cardiovascular Disease, & Diabetes  
**Stress and Health:** The Effects of Chronic Stress on Disease Risk; Stress and Poverty  
**Lab 10: Video: Stress: Portrait of a Killer** | Leonard 2002  
Gluckman & Hanson Ch. 7  
Sapolsky 2005 |
|      | 11/28       |                                                                                                                                            |                                                                                                       |
| 12   | 12/5        | **Final Exam, Wednesday, December 5, 10:15-12:15 (In Class—Cumulative but emphasizes material from weeks 6-10)**                      |                                                                                                       |
ANTH 175: EVOLUTIONARY MEDICINE
Fall Quarter 2012

Required Readings

Week 1 Readings

Lab readings for week 1
• Bering J. 2012. How are they hanging? This is why they are. In: Why is the Penis Shaped Like That?...And other Reflections on Being Human. Scientific American/FSG, p. 3-10.

Week 2 Readings
• Gluckman P, Hanson M. 2006. When we were very young (Chapter 3). In: Mismatch: The Lifestyle Diseases Timebomb. Oxford University Press. pp. 74-93.

Week 3 Readings (and Videos)
• Becoming Human video series from NOVA. 2009. Watch all three volumes.
  o First Steps: Available at http://www.pbs.org/wgbh/nova/evolution/becoming-human-part-1.html
• Gluckman P, Hanson M. 2006. Things ain’t what they used to be (Chapter 4). In: Mismatch: The Lifestyle Diseases Timebomb. Oxford University Press. pp. 94-123.

Lab reading for week 3
**Week 4 Readings**


- Randall DK. 2012. The evolutionary mistake that chokes millions of people in their sleep every night. *Slate*; 8/13/12.


**Week 5 Readings**


**Week 6 Readings**


**Week 7 Readings**

- Dunn R. 2011. We were hunted, which is why all of us are afraid some of the time and some of us are afraid all of the time (Chapter 9). In: *The Wild Life of Our Bodies: Predators, Parasites, and Partners that Shape Who We Are Today*. Harper Collins Publishers. pp. 143-154.


**Lab readings for week 8 (Read at least one):**


**Week 9 Readings**

- Dr. Sterner’s reading TBD

**Week 10 Readings**