

**ANTH62**  
**Health and Disease in Evolutionary Perspective**  
*Spring 2015*

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Office Hrs: Thursday 2-4pm, or by appointment  
Office: Silsby 408A

Class Time: MWF 12:30-1:35  
X-hour: Tuesday 1:00-1:50pm  
Class Location: Silsby 317

**Course objective:**

Why do we get sick? Are illness and disease pathological conditions that we should strive to eliminate or, in some cases, could they instead be associated with important biological functions? In the past 20 years, the emerging science of Evolutionary Medicine has provided a framework merging evolutionary theory with medical science that challenges traditional concepts of health and sickness. The objective of this course is to explore how evolutionary perspectives on human biology (e.g., phylogeny, adaptation, and life history tradeoffs) can provide insight into human health and disease. Through a comparative approach that considers the evolutionary, physiological, and cultural bases of human health and disease, this course asks students to critically analyze prevailing medical concepts of 'normal' physiology. During the course students will:

- Apply principles of Evolutionary Medicine to analyze selected diseases and illnesses
- Analyze public health issues within an anthropological framework incorporating biological, social, and cultural factors
- Self-assess and further develop skills in scientific and anthropological research, including: literature review, identifying gaps for future inquiry, and developing original and synthetic arguments in writing

**Course description:**

The course will begin with discussion of key evolutionary principles and dynamics: natural selection, adaptation, natural selection, tradeoffs, and phylogeny. We will then consider various topics in the following areas:

- i) Human diet, nutrition, and energetics: past and present
- ii) Defenses
- iii) Life history and reproduction
- iv) Recent and future human evolution and health

These topics will be considered during lectures and class discussions. They will be based on readings in anthropology, evolutionary biology, and the medical sciences. Readings assigned for each date should be read carefully before class.

**Assessment (100 total points)**

Clinical brief #1	20 points
Clinical brief #2	20 points
Exam 1	20 points
Exam 2	20 points
Final Project	10 points
Minute papers	10 points

**Grade breakdown**

<i>Points</i>	<i>Grade</i>
≥ 94	A
90-93	A-
87-89	B+
84-86	B
80-83	B-
77-79	C+
74-76	C
70-73	C-
67-69	D+
64-66	D
60-63	D-

Clinical briefs

See handout

Exams

Two exams will test students' comprehension of principles and case studies from lectures, discussions, assigned readings, and clinical brief projects. The exam will be comprised of multiple choice, fill in the blank, short answer, and essays.

Minute papers

At the conclusion of selected class periods, students will spend one minute answering a question posed by the instructor. These short papers serve to gauge attendance, assess comprehension, and attain feedback from the students.

Graded 1(present)/0(unexcused absence).

Final project

See handout

**Academic Integrity and Dartmouth Honor Principle**

Students are expected to live up to the Dartmouth Honor Principle and not participate in behaviors—including cheating and plagiarism—that compromise it. For information on how to reference sources, please see *Sources, Their Use, and Acknowledgement* at: <http://www.dartmouth.edu/~sources/>.

### **Students with disabilities**

Students with learning, physical, or psychiatric disabilities who may need classroom accommodations are encouraged to see me before the end of the second week of the term. Discussions will remain confidential, but the Student Accessibility Office may be consulted to discuss how to best implement the requested accommodation.

### **Religious observances**

If you have a religious observance that may conflict with your participation in the course, please speak with me before the end of the second week of the quarter to discuss appropriate accommodations.

### **BOOKS**

These books are on reserve at Baker-Berry Library and available at the campus bookstore.

Williams GC and RM Neese. 1995. *Why we get sick*. Random House LLC.

#### **(WWGS)**

Travathan WR, Smith EO, and McKenna J (editors). 2008. *Evolutionary Medicine and Health: New Perspectives*. Oxford University Press. **(EMHNP)**

### **COURSE SCHEDULE**

#### Week 1 (March 30-April 3):

Monday                      Introductory lecture: the evolutionary approach to medicine

Wednesday                Natural selection and adaptation  
Read before class:  
                                    WWGS Preface, Chs.1-2

Friday                        Adaptation, levels of analysis, and tradeoffs  
Read before class:  
                                    EMHNP Ch. 1  
                                    WWGS, Ch. 7

#### Week 2 (April 6-10):

Monday                      Phylogeny and legacies of evolutionary history  
Read before class:  
                                    WWGS, Ch. 9  
                                    EMHNP, Ch. 23

- Tuesday X-hour      Clinical Brief Activity: How to do a literature search
- Wednesday            Environment of evolutionary adaptedness  
 Read before class:  
                             R Foley. 1995. The adaptive legacy of human evolution: A search for the environment of evolutionary adaptedness. *Evolutionary Anthropology* 4:194-203.  
                             Watch Hadza video
- Friday                   Hunter-gatherers and models for the human past  
 Read before class:  
                             FW Marlowe. 2005. Hunter-gatherers and human evolution. *Evolutionary Anthropology* 14:54-67.  
                             Marlene Zuk "The evolutionary search for our perfect past." *New York Times*, January 19, 2009  
                             The Paleo Lifestyle: The way, way, way back. *New York Times* Sept 19, 2014

**THEME 1: Human diet, nutrition, and energetics: past and present**

Week 3 (April 13-17):

- Monday                Mismatch and human diet  
 Read before class:  
                             Listen to Fresh Air interview with Dan Lieberman  
                             WWGS, Ch. 10
- Tuesday X-hour      Presentation by Adam Nemeroff on Digital Exhibitions

**Clinical brief #1 first draft due midnight Tuesday**

- Wednesday            Human diet  
 Read before class  
                             L Cordain et al. 2005. Origins and evolution of the Western diet: health implications for the 21st century. *The American journal of clinical nutrition* 81:341-354.  
                             Diamond J. 1987. The worst mistake in the history of the human race. *Discover* 8(5):64-66.

**Upload Clinical brief #1 presentations by midnight Thursday**

- Friday                    Clinical brief #1 presentations  
 Read before class  
                             EMHNP, Ch. 2

Week 4 (April 20-24):

- Monday Clinical brief #1 presentations  
Read before class:  
DC Benyshek and JT Watson. 2006. Exploring the thrifty genotype's food-shortage assumptions: a cross-cultural comparison of ethnographic accounts of food security among foraging and agricultural societies. *Am J Phys Anthropol* 131:120-126
- Tuesday X-hour No class  
Read before class:  
EMHNP, Ch. 3

**Clinical brief #1 final draft due midnight Tuesday**

- Wednesday Energetics  
Read before class:  
WR Leonard. 2007. Lifestyle, diet, and disease: comparative perspectives on the determinants of chronic health risks. *Evolution in Health and Disease* (Eds. S Stearns and J Koella):pp. 265-276.
- Friday Obesity and diabetes  
Read before class:  
H Pontzer et al. 2012. Lessons from the Hadza: poor diets wreck efforts to prevent obesity and diabetes. *Diabetes Voice* 57:4:26-29.  
EMHNP, Ch. 17

Week 5 (April 27-May 1):

- Monday Guest lecture by Jeff Kerby on polar diets and disease
- Tuesday X-hour No class
- Wednesday Exam 1 (Content: weeks 1-4)
- Friday Cancer (guest lecture by Dr. Jeff Robinson)  
Read before class:  
WWGS, Ch. 12

**THEME 2: Defenses**

Week 6 (May 4-8):

- Monday Defenses  
Read before class:

WWGS Chs. 3, 5, and 6

Tuesday X-hour No class

Wednesday Guest lecture by Tom Kraft on allergies  
Read before class:  
WWGS, Ch. 11  
Listen to Parasites Radiolab

**THEME 3: Life history and reproduction**

Friday Human life history evolution  
Read before class  
EL Charnov and D Berrigan. 1993. Why do female primates have such long lifespans and so few babies? Or life in the slow lane. *Evolutionary Anthropology* 1:191-194.

Week 7 (May 11-15):

Monday Developmental origins of adult health  
Read before class:  
EMHNP, Ch. 18

Tuesday X-hour Guest lecture by Amanda Veile on breastfeeding and weaning  
Read before class:  
WWGS, Ch. 13

**Clinical brief #2 first draft due midnight Tuesday**

Wednesday Aging  
Read before class:  
WWGS, ch. 8  
Listen to Radiolab: Fountains of Youth

**Upload Clinical brief #2 presentations by midnight Thursday**

Friday Clinical brief #2 presentations

Week 8 (May 18-22):

Monday Clinical brief #2 presentations

Tuesday X-hour No class

**Clinical brief #2 final draft due midnight Tuesday**

**THEME 4: Recent and future human evolution and health**

Wednesday Contemporary human evolution  
Read before class:  
JT Stock. 2008. Are humans still evolving? *EMBO Reports* 9(S1):S51-S54.  
J Hawks. 2014. Still Evolving (After All These Years). *Scientific American* 311(3):86-91.

Friday Milk and lactase persistence  
Read before class:  
EMHNP Ch. 5

Week 9 (May 25-29):

Monday NO CLASS, Memorial Day

Tuesday X-hour No class

**Digitized versions of Clinical Brief #2 due midnight Tuesday**

Wednesday Skin color  
Read before class:  
NG Jablonski. 2012. Human skin pigmentation as an example of adaptive evolution. *Proceedings of the American Philosophical Society* 156(1): 45-57  
Nina Jablonski TED Talk: Breaking the illusion of skin color

Friday Personalized medicine  
Read before class:  
J Kahn. 2007. Race in a bottle. *Scientific American*, 297(2):40-45.  
EMHNP, Ch. 20

Week 10 (June 1-5):

Monday Exam 2 (Content: weeks 5-8)

Wednesday Final Presentations in Baker-Berry (provisional date)