Darwinian Medicine: Bio 0183

I. Instructor:
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Office Hours: Friday 2:00-4:00, Dana 310A

II. The Course:
Human diseases have both proximate (mechanistic) and ultimate (evolutionary) causes. The common medical approach has been to ignore the ultimate causes and, instead, focus on the proximate. Thus, we may understand the physiological processes but not the evolutionary significance. In this course, we will focus on the evolutionary causes of disease.

The primary goal of this course is to teach research skills while sharpening understanding and application of Darwinian thought. To this end, students will generate hypotheses, collect and analyze data to test these hypotheses, and present the information in both oral and manuscript form.

After our first meeting, this course will meet in Barnum 113 Tuesdays from 1:30-4:00 PM.

III. Prerequisites
Biology 130: Animal Behavior.

IV. Attendance:
Class attendance is critical to your success in this course. Please arrive on time and prepared. Read over each assignment carefully and note any questions you may have about the material. This is a very interactive class - class participation is required and I look forward to your input. If you need to miss a class for a University accepted reason, speak to me about it in advance (if possible).

V. Readings:
Additional Readings: Additional readings will be handed out in class or posted on the webpage. (I will keep these to a minimum.)

VI. Grading:
15-20 Page Research Paper (30%)
   First Draft (35% of paper grade)
   Final Draft (65% of paper grade)
PowerPoint Presentations (20%)
PDF Library (20%)
Weekly Email Summaries (20%)
Attendance / Participation* / Subjective Evaluation (10 %)
   * Minimum of 4 written questions / discussion points on the week’s summaries (I may ask for these to be handed in after class)

VII. Class Format (2 sections):
A. Section 1: Student-led Presentations (~1:30 - 3:00)
   1. Short presentations (ideas / successes / problems / questions)
   2. Long presentation (update)
   3. Group discussion of presentation
VIII. TRUNK Assignment
A. Must be posted by 10:00 AM on Monday before Tuesday’s lecture.
B. General Format
   1. Brief synopsis of readings (you will not always have assigned readings.)
   2. Issues related to your project (new ideas, new summaries, specific problems, etc.)
      • Total length should not exceed 3 double-spaced pages

IX. Research Project (Proposal, 1st Draft, Final Draft, Presentation):
A. Proposal Format (Presented Sept 23, due by 5:00 PM Sept 26)
   1. 1-3 pages, double-spaced, 12-point Times font, and 1” margins on all sides.
   2. Identify disease, symptom, or health problem of interest
   3. Identify reference material relating to topic (10-15 sources)
   4. List 3-5 possible approaches to studying the topic.
      • You will present this to the group AND get feedback from us BEFORE the proposal is handed in.
B. Manuscripts (first draft, Nov. 4; final draft, Dec. 9)
   1. 15-20 pages, double-spaced, 12-point Times font, and 1” margins on all sides (references do not count toward page limit).
      • Note: there can be considerable variation on this format.
C. Final PowerPoint Presentation
   1. 20 minutes (15 for the talk, 5 for questions)
   2. Follows general paper format (intro, methods, results, and conclusions)

X. Plagiarism:
You must reference ideas and writings of others properly in the papers you produce for this course. Writing assignments must be your own work. Cheating of any sort will not be tolerated.

XI. Course Homepage:
The course has a web page. To get on the course home page, open an Internet browser and type in the address https://trunk.tufts.edu/xsl-portal. The page should allow you to log on using your basic student identifying information.

Image from http://www.eeb.lsa.umich.edu/logo.asp
## XII. Lecture Schedule

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<tr>
<th>Week</th>
<th>Topic (after chapters in Neese &amp; Williams 1994)</th>
<th>Readings</th>
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| **Background Information** | 1 (Sept. 2) Course Introduction  
Background Information (1): Evolution and Natural Selection; Levels and Units of Selection.  
Background Information (2): Scientific Method; Levels of Analysis. |                  |
|           | **Darwinian Medicine**  
2 (Sept. 9) Why disease?; Framework for Evaluating Disease  
*Guest Lecture:* Regina Raboin (Tisch Lib 2-3:00). | Chap. 1 & 3      |
|           | 3 (Sept. 16) Fever as an Adaptive Mechanism  
*Project Brainstorming!!!* |                  |
|           | 4 (Sept. 23) *Project Proposal (email by following Friday)*  
The ‘Red Queen’, an Evolutionary Arms race | Chap. 4          |
|           | 5 (Sept. 30) Injury (group 1) | Chap. 5          |
|           | 6 (Oct. 7) Poisons and Toxins (group 2) | Chap. 6          |
|           | 7 (Oct. 14) Genetic Disease (group 3) | Chap. 7          |
|           | 8 (Oct. 21) Senescence (group 4) | Chap. 8          |
|           | 9 (Oct. 28) Human Evolution and Evolutionary Legacies (group 1) | Chap. 9          |
|           | 10 (Nov. 4) Diseases of Culture (group 2)  
*First Draft of Paper Due* | Chap. 10         |
|           | 11 (Nov. 11) Veterans’ Day – No classes |                  |
|           | 12 (Nov. 18) Immunity and Allergy; Cancer (group 3) | Chap. 11 & 12    |
|           | 13 (Nov. 25) Sex and Reproduction (group 4) | Chap. 13         |
|           | 14 (Dec. 2) *Class Presentations*  
Mental Diseases; Darwinian Medicine and the Future | Chap. 14 & 15    |
|           | (Dec. 9) *Final Paper Due* |                  |