

BIO SCI 12D: MOLECULAR BASIS HUMAN DISEASE (05030) WINTER 2008

Room: HSLH 200 Day & time: Tue & Thu 2:00pm to 3:20pm

Class Website: <https://eee.uci.edu/08w/05030>

Instructors: Dr. Katrine Whiteson

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Office Hours: after class or by appointment

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Description

One hundred years ago disease was not understood at a molecular level. Now we understand which proteins and genes are responsible for an increasing number of diseases. We will explore the causes and treatments of human diseases at a very small scale, in terms of the molecules involved. Readings will consist of articles at the level of Scientific American posted to the class website. Students will become comfortable learning about disease in terms of the biological macromolecules that are involved (DNA, proteins, fats and carbohydrates).

Week 1. Jan 8th + 10th Introduction to biological macromolecules, Genetic Diseases (i.e. Sickle Cell Anemia)

- * The Structures of Life, an NIH educational booklet
Chapter 1 required, Chapters 2-5 are optional
- * Molecule of the Month: DNA
- * How Linus Pauling named Sickle Cell Anemia the first Molecular Disease
- * Evolution and Disease, Scientific American Nov 1998
- * Mendelian Genetics Article from the Encyclopedia of Life Science
- * Molecule of the Month: Hemoglobin
- * The Enigma of Huntington's Disease
2002 Scientific American article describing molecular basis of Huntington's disease

Week 2. Jan 15 + 17th Genetic diseases cont'd: PKU, CF, Huntingtons & Intro to Immune system, Allergies

- * Vampire Disease
2003 Scientific American Article describing the red blood cell manufacturing disorder that may have motivated vampire folklore.
- * History of Phenylketonuria (PKU) (understand the warnings on all diet soda cans...)
OPTIONAL: Article describing the story of how a Norwegian doctor and the mother of two developmentally disabled kids discovered PKU.
- * Cystic Fibrosis in The New Yorker
Really interesting article by Atul Gawande about variability in the quality of doctor's care for CF patients

Week 2. Jan 17th Intro to immune system continued

- * Allergy and Immune System Articles from the Encyclopedia of Life Science

Week 3. Jan 22 + 24 Autoimmune diseases: Type I diabetes and rheumatoid arthritis

- * Molecule of the Month: Insulin
- * Autoimmune Disease
2007 Scientific American article, primarily about Type I diabetes and Rheumatoid Arthritis
- * Multiple Sclerosis Research @ UCI in the news
- * Optional reading: Lupus (2005 Scientific American)

Week 4. Jan 29 + 31 Protein folding disorder: Alzheimers, Parkinsons and Mad Cow

- * "The Gene Hunters"
2005 Alzheimers Disease New Yorker Article by Sue Halpern
- * Mad Cow Disease
2004 Scientific American
- * Parkinsons
2005 Scientific American
- * Molecule of the Month: Amyloid Beta
Molecular description of the protein involved in Alzheimer's Disease

Week 5. Feb 5th + 7th Cancer: The Philadelphia chromosome, BRCA1 and modern cancer treatment and Midterm review!

- * Cancer Textbook Chapter
- * Breast Cancer Gene and Prophylactic Mastectomy in the NY Times
- * Optional: Chronic Myeloid Leukemia in the Encyclopedia of Life Science
- * Practice Midterm: MidtermReviewandPracticeW08.doc

Week 6. Feb 12 Midterm! & Feb 14 Type II Diabetes, lifestyle disease

- * Mayo Clinic Description of Type II diabetes
- * Optional: J Clinical Investigation article about insulin resistance and pancreas failure
- * New Yorker Article about Pre-eclampsia

Week 7. Feb 19 + 21 Lifestyle diseases cont'd: obesity, heart disease

- * Scientific American reading about Heart Disease
- * Optional: Cholesterol and Vascular Disease from the Encyclopedia of Life Science

Week 8. Feb 26 + 28 Intro to infectious disease: viral, bacterial and other microbial infections

- * Washington Post article describing the reconstruction of the genome of the 1918 Flu Virus
- * Infectious Disease from J Clinical Investigation
- * "Who put the Tubercle in Tuberculosis" from Nature Reviews in Microbiology
- * Antibiotic resistant bacteria article in the NY Times

Week 9. March 4 + 6 Vaccines and AIDS

- * Vaccination of Humans from the Encyclopedia of Life Science
- * Encyclopedia of Life Science: AIDS
- * New Yorker article about research to understand why AIDS sickens humans and not other primates

Week 10. March 11 + 13 Stem Cells + Final Review!

- * Scientific American Article about Stem Cells

Course Policy

Homework questions based on the lectures and reading will be due weekly. The homework will be announced in class and posted on the class website. Homework should be typed and limited to one page. Late homework received in the following class will receive 50% credit, and after the corrected homeworks have been returned it will not receive credit. The lowest homework score will be dropped. Each homework assignment is worth about 3% of your final grade, completing your homework is an easy and important way to do well in this class.

Exams: midterm (2/12/08 in class) and a final (Thursday, 3/20/08 1:30-3:30).

Grades will be based on the two exams as well as homework and participation.

HW+participation 1/3
Midterm 1/3
Final 1/3

Exams will be in short answer format, and will cover lecture and reading material. New concepts found in the reading which were not covered in class will not be on the exams. The midterm will cover lectures from weeks 1-5. The Final will heavily emphasize lectures from weeks 6-10. Grades will be assigned on a curve.