MCDB 2222: coreBio II - genetics

Course information

No need to purchase a text book:

- Book available on line – print it if you must (slides will be on line)

BEFORE CLASS:

- **read** via Nota Bene (you will received an email invitation to join)
- **required**: generate **one** or two (good) question inspired by the reading - may be used on exams…

some (but not many) **beSocratic activities**

- you should have received an email invitation
- you will need silverlight installed in your browser

Course information

No co-seminar:

- different from the other MCDB intro course

Exam review: in class before each exam

- we will consider possible questions (some from you)

Exams

- held during class time (~10 questions)

Learning assistant - Aidan Barker

Taking with me: make an appointment

Exams (350 point):

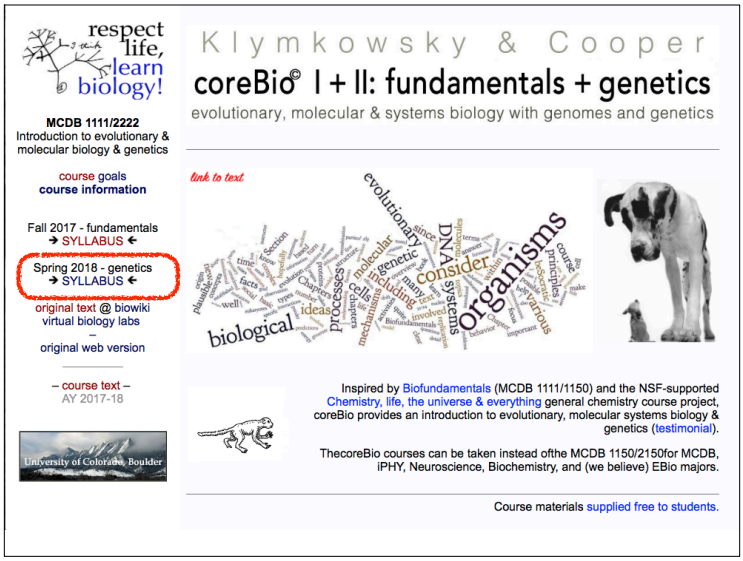
- two 100 point midterms, and a 150 point final

Questions from readings (worth 50 points)

- handed in at the start of each class

Semester project (worth 50 points)

- pick a genetic disease or process
  - research and present (in a short 5-8 page paper or a 5 minute video) what is known about the genes involved, or the pathogenic mechanism
  - we will review topics & storyboards in class -
    - submitted by week 4, paper due **before** last week of classes



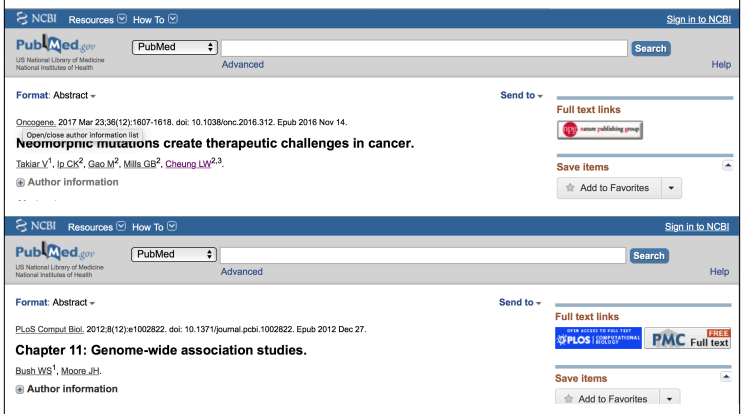
course learning goals

- behavior of genes (and alleles) along chromosomes
  - types of mutations / types of alleles
  - generation of variation (mutation / alleles)
- behavior during cell division / reproduction
  - meiosis - independent segregation/recombination
  - sex-linked traits, maternal effects and imprinting
- interactions between alleles
  - linkage
  - synthetic phenotypes
- genetically influenced pathologies (GWAS)
  - somatic behaviors somatic selection
    - cancer and neurodevelopment

We assume…

- **Learning is not easy**
  - requires engagement & effort
  - formulating clear questions & complete answers
- **Understanding biology**
  - involves understanding / ability to work with what are often strange and unfamiliar ideas
  - not memorizing words (although you have to learn the language)
- Articulating your assumptions + **practicing** using them and getting useful feedback (**coaching**) are key

Using pubmed



Using google scholar Using OMIM

Darwin:
variation (inherited) + selection (various types)

Mendel:
discrete (genetic) factors + phenotypes

Genetics and Genomics Timeline

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1908

Archibald E. Garrod (1857-1936) postulates that genetic defects cause many inherited diseases

In 1896, Archibald E. Garrod became interested in patients with a rare but rather harmless disorder known as alkaptonuria. When exposed to air, patients' urine turns distinctively dark. Garrod soon concluded that alkaptonuria is a congenital disorder, not the result of a bacterial infection as was commonly thought. Rare in the general population but frequent in children of first-cousin marriages, the incidence of alkaptonuria conformed to the pattern of recessive inheritance described by Gregor Mendel in his experiments with peas.

Genetics and Genomics time-line

DNA spit kits: 23andMe's ancestry results 'most confounding,' new report says : video

next

riday 9 January	2. Core ideas in molecular / cell biology Reviewing **important terms & concepts** in molecular biology	**Read:** Ellis-van Creveld syndrome and the Amish **Complete introductory beSocratic survey** **Review** Chapters 7-9 if necessary