- **Developmental Genetics I**: Ch. 13 (“Genetic control of development”), pp. 552-559
- **DG II**: pp. 559-568; Problems 13.1, 13.2
- **DG III**: pp. 569-576, 578; “Problems 1 & 2” (p 586-7); Problems 13.4, 13.6, 13.12, 13.15
- **DG IV**: Ch. 8 (“Human . . . chromosome behavior”), pp. 301-304, Problems 8.4, 8.8
- **DG V**: Ch. 11 (“Molecular mechanisms of gene regulation”), pp. 478-481

Office hours: Rm. 401 Gould-Simpson (NE corner) or by appointment
- THURSDAYS, 1-2:30 pm

Development: fundamental concepts and introduction to genetic mechanisms, cont.
- Use of **model organisms** to study principles of developmental genetics
  - phylogenetic tree: [http://www.informatics.jax.org/silver/index.shtml](http://www.informatics.jax.org/silver/index.shtml) – go to Fig. 1.3
- where are *C. elegans*, *D. melanogaster*, *Mus musculus* and *H. sapiens*?
- strengths and limitations of different genetic model systems
- *C. elegans* (nematode) examples
  - ~1,000 cells: lineage is almost invariant; **lineage diagrams** are like pedigrees
  - cell lineage mutations: effect of cell fate transformation
    - **programmed cell death**: active suicide mechanism!
    - failure of programmed cell death → developmental defects (worse in flies, mice)
  - **P lineage** illustrates cell-autonomous and cell-signaling modes of development
    - polar granules segregate differentially between daughter cells
    - what's the risk (to the organism) of cell-autonomous development?
    - P cells develop autonomously, but control development of other cells by signaling to them
    - **lin-12** controls the cell fate of AC/VU
      - either of two neighboring cells becomes AC, other becomes VU (“coin toss“)
      - affect of cell ablation: what is the default cell fate?
      - phenotypes of **loss-of-function** mutations vs. **gain-of-function** mutations
        - what is normal function of LIN-12 protein (a transmembrane receptor)?

Pattern formation in Drosophila: a transcriptional cascade during embryogenesis
- Drosophila lifecycle; embryogenesis; segmentation of embryo, larva & adult
- how does an embryo becomes visibly segmented?
  - Nüsslein-Volhard & Wieshaus' screen for dead larvae with weird patterns!
  - phenotypes: abnormal A-P and/or D-V patterns