

MOLECULAR, CELL, AND DEVELOPMENTAL BIOLOGY 138: DEVELOPMENTAL BIOLOGY SUMMER SESSION A 2009

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| Instructor: | Amy L. McWhorter, PhD | ahenkeni@ucla.edu |
| Office Hours: | W 9 - 10am: Boyer Hall 554 | Th 1:30 - 2:30pm: location TBA |

COURSE OBJECTIVE:

We will describe aspects of development common to many multicellular organisms, and, where possible, explain this in terms of genetic, cellular, and molecular mechanisms. Many developmental processes are triggered by two phenomena: changes in gene expression and cell-cell interactions. We will discuss many examples of these during the quarter, how they lead to particular developmental outcomes, and how alterations in normal patterns of gene expression and cell-cell interaction lead to developmental defects and disease. We hope that you will find developmental biology exciting and relevant, and that you will come away from this course with an appreciation of the unifying molecular genetic principles that underlie the generation of complex form in all animals

GENERAL INFORMATION:

Class hours and location

Lecture: MWF 11:30am - 1pm Botany 325

Discussion: 1A: M 1:30 - 3:40pm Boelter 5273 1B: W 1:30 - 3:40pm Boelter 5273

Course Materials

- Required Text: ***Principles of Development, 3rd edition, by Lewis Wolpert, available in the UCLA Book Store.*** You may use the 2nd edition, but you'll need to adjust the reading assignments. In addition, lecture notes, as well as figures, are available on the course website.

Course website (Blackboard)

The main course website is <http://www.lsic.ucla.edu>. Login and click on the link to the course.

Course information will be posted on the site. Use of the discussion board for course related questions is encouraged.

Prerequisites

Life Sciences 1, 2, 3, &4. Refer to your texts for these classes to refresh your memory.

Discussion sections

You are ***required*** to attend one of the weekly two-hour discussion sections; you should attend the same section every week. If you cannot make it to your regular section, you can arrange to attend a different one as long as you clear this with your TA so that you will receive credit for attending. Each week you will be assigned an original research paper to read (available on the course web site). You will turn in a short report on the research paper at the ***beginning*** of section. During the section, you will discuss the research paper, and you will be able to review material from the lectures and the text. Points will be earned for ***attendance*** and ***participation*** in Discussion.

TA Contact Information and Discussion Sections

Please put "MCDB 138 STUDENT" in the subject heading of all e-mails.

John Costumbrado (jcostumbrado@gmail.com) Sections 1A, 1B

Weekly Reports

Each week you will be assigned an original research paper to read (available on the course website). A one-paged typed report on the research paper must be submitted at the beginning of discussion (download the report format sheet on the course website). **NO LATE REPORTS WILL BE ACCEPTED UNDER ANY CIRCUMSTANCE.** If you are unable to turn in a report due to an emergency, the lowest grade of your discussion reports will be dropped.

Review Quizzes

On the week of midterms & the final, you will take an open note review quiz during discussion section. The review quizzes will cover material from lectures that will be on the midterms. There will be no regrades for review quizzes.

GRADING:

Your grade in this course will be determined as follows:

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|---|--------------------------|---------------------|
| Midterm 1 | (July 6; 11:30am - 1pm) | = 150 points |
| Midterm 2 | (July 17; 11:30am - 1pm) | = 150 points |
| Discussion attendance & participation | | = 60 points |
| Discussion reports (5) and quizzes (3) [8 assignments - lowest score] | | = 140 points |
| Final Exam | (July 31; 11:30am - 1pm) | = <u>300 points</u> |
| TOTAL | | = 800 points |

The exams will consist of multiple choice questions, short answers and essay questions and will cover lecture material and the papers you will be discussing in discussion section. The final will cover the entire course with an emphasis on most recent material.

Regrading Policy:

Per university regulations, grade assignments are final, except for mistakes in adding up points or in grading exams, and cannot be appealed. We will be happy to go over your exam with you, explain the grading method, and if applicable, discuss how you can do better on the next exam. Grades will be available through URSA.

Make-up exams will only be given in the case of an unavoidable emergency (almost always a *severe* medical problem). To be fair to your classmates, only if you contact Dr. McWhorter **before** the exam will it be decided whether your situation merits a make-up exam; failure to make contact before the exam will result in loss of the right to take a make-up.

TENTATIVE SCHEDULE WITH ASSIGNED READINGS (WOLPERT, 3RD ED.)

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| Wk | Lect | Date | Topic | Reading |
|--|-----------|---|---|--|
| 1 | 1 | 6/22 M | Introduction: Principles, Models and Genetic Approaches | Ch 1, 89-104, 297-309, 327-34, Box 3D (112-13) |
| | 2 | 6/24 W | Oogenesis and spermatogenesis | 421-31, Box 3A (93) |
| | | | Fertilization | 431-36, 257-67, 92-93, 96, 98, 104-5, 133 |
| 3 | 6/26 F | Ooplasmic (cytoplasmic) determinants | 25-26, 37-43, 191-201 | |
| 2 | 4 | 6/29 M | Maternal control of pattern formation in the early Drosophila embryo | 31-57 |
| | 5 | 7/1 W | Zygotic control of pattern formation in the Drosophila embryo: segmentation genes | 57-77 |
| | | 7/3 F | HOLIDAY | |
| 3 | | 7/6 M | MIDTERM 1: Lectures 1-5 | |
| | 6 | 7/8 W | Determining cell fate along the anterior-posterior axis: homeotic genes in Drosophila and vertebrates | 78-84, 155-64 |
| | 7 | 7/10 F | The cellular basis of morphogenesis | 257-85 |
| The molecular basis of gastrulation in vertebrates | | | 89-103, 108-19, 125-43 | |
| 4 | 8 | 7/13 M | Gastrulation/Mesoderm formation in birds and mammals | 149-155, 164-166 |
| | 9 | 7/15 W | Neural development: I Neurulation and Induction | 166-75, 283-85, 387-93 |
| | | 7/17 F | MIDTERM 2: emphasis on Lectures 6-9 | |
| 5 | 10 | 7/20 M | Neural development: II. Subdivision of the brain and spinal cord | 175-80, 286-88, 392-401 |
| | 11 | 7/22 W | Directed cell migration. Axonal pathfinding and neural crest cells | 177, 322-24, 401-414 |
| | 12 | 7/24 F | Ectoderm: sensory placodes and ectodermal | 318-319 |
| Development of epithelia: Endoderm | | | 374-75 | |
| 6 | 13 | 7/27 M | Limb development | 339-58 |
| | | | Kidney development and Sex determination | 375-77, 437-46 |
| | 14 | 7/29 W | Review | |
| | 7/31 F | FINAL EXAM: comprehensive emphasis on Lectures 10-14 | | |