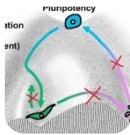


Developmental Biology



BIOL 322 lecture



Fall 2016, Agnes Ayme-Southgate

INSTRUCTOR CONTACT: Agnes Ayme-Southgate

Office: HWWE room 306

Phone: 953-6544

e-mail: southgatea@cofc.edu

My office visit times are Friday 8:30 to 9:30 and 10:30-12, as well as Monday after lab, or by appointment. If you need an appointment, the best way to contact me is by e-mail (southgatea@cofc.edu) providing me with times when you are available. I check my e-mail frequently and will give you a specific meeting time in return.

COURSE DESCRIPTION

Lecture surveys the different stages of development from fertilization to organogenesis in both invertebrate and vertebrate model systems. Lecture covers both the descriptive nature of embryonic development, as well as the conserved molecular and cellular patterns. The laboratory covers some techniques of developmental biology, as well as histology slides of embryonic development, and research paper discussion. Lectures three hours per week; laboratory three hours per week. Prerequisites: BIOL 111/111L, BIOL112/112L, BIOL 211/211D, and BIOL305.

MEETING TIMES

LECTURE: M, W, and F 9:30 to 10:20 in Harbor Walk West room 211.

LABORATORY: Monday: 2-5 pm (Agnes Southgate) in HWWE room 208. The second lab section is on Wednesday 1:30-4:30 pm (taught by Richard Southgate)

Lab is mandatory. There is a separate syllabus for the lab.

COURSE LEARNING OUTCOMES

1. Describe the steps of development and tissue formation in several major animal groups (echinoderm, nematodes, insects, and several vertebrates).
2. Explain the concepts of cell potency, plasticity and determination
3. Describe the importance of intrinsic and extrinsic cues for early developmental specification
4. Explain the concept of induction
5. Explain the processes involved in combinatorial regulation and control of gene expression as they apply to development.
6. Describe cell biology processes such as cell communication, cell migration, and cell shape as they pertain to developmental stages
7. Demonstrate an understanding of developing hypotheses and interpreting results on the basis of their hypothesis.

COURSE OBJECTIVES

The lecture and laboratory are integrated and complementary. The lecture and laboratory are designed to:

- Excite your imagination and love of biology.
- Develop critical reading and discussion skills using primary literature papers.
- Develop team work, as well as information gathering, critical analysis and presentation skills through research and oral presentation.

TEXT BOOK

There is no REQUIRED textbook. Any recent versions of Developmental Biology by Gilbert or Wolpert are fine. All necessary reading and notes will be posted on OAKS

LABORATORY: There is no book or manual to buy for the lab. The protocols and other information for each week will be posted on OAKS.

I will be using OAKS to post information and announcements. Make sure to check the site **at least once every day**. If you are not familiar with OAKS, please let me know. Instruction is also available from the Library.

IMPORTANT DATES

College dates:

- Tuesday, August 23 First day of class
- Monday, August 29 and Wednesday August 31st: First developmental biology lab

- Saturday October 8: dedicated Storm Day (SD). Please to not plan anything in the morning as I will have this SD if necessary
- Thursday, October 27 Last day for students to withdraw with a grade of "W"
- Monday, November 7 Fall Break (SD*).
- Tuesday, November 8 Election Day. No Classes. College Closed.
- Wednesday, November 23- Sunday, November 27 Thanksgiving Holiday.
- Monday, December 5 Last day of full semester
- Tuesday, December 6 Reading Day. (dedicated Storm day)
- Wednesday , December 14 8am-11 am Final exam

Test dates: 50 minutes in class

- Friday 9/23: First test in class
- Friday 10/21: Second test in class
- Friday 11/18: Third test in class

Quizzes: on OAKS every Friday except on test days. Quizzes are timed to 15 or 20 minutes. There will be two time windows every Friday with times to be discussed on the first day of class.

TESTING and GRADING:

Lecture and laboratory testing are integrated (you get only one grade)

- There will be 3 tests during the semester. These will be research paper-based tests. The dates for the tests are on the syllabus. Tests will use materials from both lecture and lab. 10% for lowest grade and 15% for the other two tests.
- Weekly quizzes on lecture materials 15%
- Class participation, attendance, and classwork 10%
- FINAL: The final is cumulative 15%
- Laboratory 20% (breakdown on laboratory syllabus)

GRADING SCALE:

92 and above: A

90-91.9: A-

87-89.9: B+

83-86.9: B

80-82.9:

B-

77-79.9: C+

74-76.9: C

70-73.9:

C-

67-69.9: D+

64-66.9: D
60-63.9: D-
Below 60: F

COURSE POLICIES

Electronic devices

You are encouraged to bring your laptop or tablet for every class, but they can only be used for class activities. Breach of that trust will lead to you losing that right.

Attendance Policy

You are expected to be present for every lecture. You will be allowed three absences for the course without penalty to your attendance grade. For each absence after that, you will lose 5% of the attendance points (i.e. you start with 100 points and you lose 5 points for each missed class after 3). **EXCESSIVE ABSENCE, i.e. MISSING 4-5 CLASSES IN A ROW WILL RESULT IN A “WA” GRADE (WITHDRAWN EXCESSIVE ABSENCE) AT MIDTERM AND/OR FINAL GRADE. At midterm WA can still be changed to a regular final grade. A final “WA” grade is calculated as an “F” in your GPA. This is College policy.** This policy does not apply if the absences are due to a **SERIOUS** medical or personal reason.

Missing classes penalizes you more than a drop in the class activity points because you can rarely make up on your own the missed materials and never can make up the skill practice, discussion and shared ideas. Students are responsible for all content for any class missed. Under extenuating circumstances, I will make one-on-one decision based on individual conditions and provided documentation.

I will work individually with student-athletes who will need to be absent for meets/competitions/games.

COLLEGE POLICIES

- **Disability Services**

The College will make reasonable accommodations for persons with documented disabilities. Students should apply at the Center for Disability Services / SNAP, located on the first floor of the Lightsey Center, Suite 104. If there is a student in this class who has a documented disability and has been approved to receive accommodations through SNAP Services, please feel free to come and discuss this with me during my office hours.

- Any student eligible for and needing academic adjustments or accommodations because of a disability is requested to speak with the professor in a timely manner so that your needs can be addressed.
 - The College will make reasonable accommodations for persons with documented disabilities. Students should apply for services at the Center for Disability Services located on the first floor of the Lightsey Center, Suite 104. Students approved for accommodations should notify their professors as quickly as possible.
 - This College abides by section 504 of the Rehabilitation Act of 1973 and the Americans with Disabilities Act that stipulates no student shall be denied access to an education “solely by reason of a handicap.” Disabilities covered by law include, but are not limited to, learning disabilities and hearing, sight or mobility impairments. If you have a documented disability that may have some impact on your work in this class and for which you may require accommodations, please see an administrator at the Center of Disability Services, (843) 953-1431 or me so that such accommodation may be arranged.
- **College of Charleston Honor Code and Academic Integrity**
 - Lying, cheating, attempted cheating, and plagiarism are violations of our Honor Code that, when identified, are investigated. Each incident will be examined to determine the degree of deception involved.
 - Incidents where the instructor determines the student’s actions are related more to a misunderstanding will be handled by the instructor. A written intervention designed to help prevent the student from repeating the error will be given to the student. The intervention, submitted by form and signed both by the instructor and the student, will be forwarded to the Dean of Students and placed in the student’s file.
 - Cases of suspected academic dishonesty will be reported directly by the instructor and/or others having knowledge of the incident to the Dean of Students. A student found responsible by the Honor Board for academic dishonesty will receive a XXF in the course, indicating failure of the course due to academic dishonesty. This grade will appear on the student’s transcript for two years after which the student may petition for the XX to be expunged. The F is permanent. The student may also be placed on disciplinary probation, suspended (temporary removal) or expelled (permanent removal) from the College by the Honor Board.

- Students should be aware that unauthorized collaboration--working together without permission-- is a form of cheating. Unless the instructor specifies that students can work together on an assignment, quiz and/or test, no collaboration during the completion of the assignment is permitted. Other forms of cheating include possessing or using an unauthorized study aid (which could include accessing information via a cell phone or computer), copying from others' exams, fabricating data, and giving unauthorized assistance.
- Research conducted and/or papers written for other classes cannot be used in whole or in part for any assignment in this class without obtaining prior permission from the instructor.
- Students can find the complete Honor Code and all related processes in the *Student Handbook* at <http://studentaffairs.cofc.edu/honor-system/studenthandbook/index.php>

- **Center for Student Learning**

I encourage you to utilize the Center for Student Learning's (CSL) academic support services for assistance in study strategies and course content. They offer tutoring, Supplemental Instruction, study skills appointments, and workshops. Students of all abilities have become more successful using these programs throughout their academic career and the services are available to you at no additional cost. For more information regarding these services please visit the CSL website at <http://csl.cofc.edu> or call (843)953-5635.

- **Study Skills Workshops**

Each semester a series of study skills workshops are offered free of charge to all College of Charleston students. The Workshop Series 101 is geared towards the general student population wanting more information on study skills. The Workshop Series 101 occurs three times a week lasting about 50 minutes for each session. Students will receive weekly reminders via email and [Facebook](#) for the upcoming session with time and place. You can also visit <http://csl.cofc.edu/study-skills/workshops/index.php>

TOPICS

Introduction and developmental biology concepts

Early cleavage in model systems: sea urchin, *C. elegans*, and *Xenopus laevis*

Cell polarity and asymmetric cell division

Cell adhesion, sorting and epithelial barriers

Review cell adhesion-ECM

Cues in early cell specification: intrinsic maternal products, morphogenetic gradients

- Discussion of sea urchin, *C. elegans*, and *Xenopus laevis* axis establishment
- Overview of *Drosophila* early cleavage

Review control of gene expression: transcriptional control,

Early cleavage in other systems: *Danio rerio*, chicken, and mammals

Cues in early cell specification: intrinsic maternal products, morphogenetic gradients

- Discussion of axis establishment

Gastrulation in sea urchin, *Drosophila*, and *Xenopus laevis*

Review cytoskeleton and cell movement

Germ layer specification process: induction and organizer

Review cell communication

Gastrulation in *Danio rerio*, chicken, and mammals

Germ layer specification process: induction and organizer

Left-right specification

DNA constancy concept

Cell potency and specification

Concept of combinatorial regulation

Cell differentiation

Neurulation: movements and molecular induction

Field formation and homeotic gene

Ectoderm derivatives including nervous system and neural crest cells

Eye development

Mesoderm derivatives

Endoderm derivatives

Limb formation

Possible wrapping up discussions:

- how do cells acquire and use information for specification
- how do cells know where to move to when to stop
- how do cell layers form tubes and lumina
- others?