

'Molecular Genetics 5715: Developmental Genetics
Spring 2023

Instructors:

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Office hours: See Carmen

Lecture: Class number 25380/25382, MW 1:50-2:45, Biological Sciences Building 609

Course Homepage: All course information will be posted on Carmen.

Prerequisite: A grade of B- or above in 5608, or Grad standing, or permission of instructor.

Catalog Description: An advanced study of the regulation of developmentally significant genes and cellular interactions involved in differentiation and pattern formation in invertebrate, vertebrate, and plant model organisms.

Textbook: No textbook is required for this course. Course materials will include instructor notes based on the course topics, articles from the primary literature, and material from other sources.

Course communication: We will use carmen announcements for course communication. We strongly encourage you to check your [notification preferences](#) to ensure you receive these messages. The best way to communicate with us is via email either through carmen or from your osu.edu email. Please understand that emails from a non-osu.edu email may be missed or may be sent to our junk or spam folders by the OSU email system. Please include the class name in the title of your email. Instructors will respond to emails within 2 business days.

Attendance: Attendance at all classes is expected, but given the current public health situation you should NOT attend class in person if you have any symptoms of COVID-19, or if you are required to isolate or quarantine. If you must miss one or more classes because of this, please contact the appropriate instructor as soon as practical so that we can arrange for you to access the materials for that day's class.

Course Structure: There are two modules in this course: invertebrate and vertebrate developmental biology. Each module will consist of lectures, journal readings, in-class activities, and a take home exam, assigned and evaluated by the instructor in charge of the module. In addition, there is a pre-test, due at the beginning of the term, and a post-test, due at the end of the term, featuring material common to all three modules. The pre- and post-tests are graded on completion only.

Grading Policy:

Pre-test/post-test completion: 5%

SEI (>90%): 5%

Invertebrate development: (45% total)

Figure facts: 21% (3% each)

Journal club presentation: 3%

Simulation worksheets: 9% (3% each)

Take home exam: 12%

Vertebrate development: (45% total)

Academic Misconduct Statement:

Academic integrity is essential to maintaining an environment that fosters excellence in teaching, research, and other educational and scholarly activities. Thus, The Ohio State University and the Committee on Academic Misconduct (COAM) expect that all students have read and understand the University's Code of Student Conduct, and that all students will complete all academic and scholarly assignments with fairness and honesty. Students must recognize that failure to follow the rules and guidelines established in the University's Code of Student Conduct and this syllabus may constitute Academic Misconduct.

The Ohio State University's Code of Student Conduct (Section 3335-23-04) defines academic misconduct as: Any activity that tends to compromise the academic integrity of the University, or subvert the educational process. Examples of academic misconduct include (but are not limited to) plagiarism, collusion (unauthorized collaboration), copying the work of another student, and possession of unauthorized materials during an examination. Ignorance of the University's Code of Student Conduct is never considered an excuse for academic misconduct, so we recommend that you review the Code of Student Conduct and, specifically, the sections dealing with academic misconduct.

If we suspect that a student has committed academic misconduct in this course, we are obligated by University Rules to report my suspicions to the Committee on Academic Misconduct. If COAM determines that you have violated the University's Code of Student

Conduct (i.e., committed academic misconduct), the sanctions for the misconduct could include a failing grade in this course and suspension or dismissal from the University.

If you have any questions about the above policy or what constitutes academic misconduct in this course, please contact us.

Disability Services Statement (16 point font recommended):

The university strives to make all learning experiences as accessible as possible. In light of the current pandemic, students seeking to request COVID-related accommodations may do so through the university's request process (slds.osu.edu/covid-19-info/covid-related-accommodation-requests/), managed by Student Life Disability Services. If you anticipate or experience academic barriers based on your disability (including mental health, chronic, or temporary medical conditions), please let me know immediately so that we can privately discuss options. To establish reasonable accommodations, I may request that you register with Student Life Disability Services. After registration, make arrangements with me as soon as possible to discuss your accommodations so that they may be implemented in a timely fashion. SLDS contact information: slds@osu.edu; 614-292-3307; slds.osu.edu; 098 Baker Hall, 113 W. 12th Avenue.

The instructors reserve the right to make necessary changes for the course any time during the term. The students are responsible for keeping up with possible changes.

Course calendar

Date	Instructor	Topic	Assessment
Jan 9	ATD,HME	Intro to developmental biology	IN CLASS: Pre-test
Jan 11	ATD	Intracellular signaling and spatial patterning at the single cell level: Asymmetric cell division in <i>C. elegans</i> (lecture)	
Jan 16		No classes: Martin Luther King day	
Jan 18	ATD	Asymmetric cell division: journal club	DUE: Figure facts: Kempthues et al (1988) Cell
Jan 23	ATD	Asymmetric cell division: journal club	DUE: Figure facts: Beatty (2013) Dev
Jan 25	ATD	Asymmetric cell division: simulations	
Jan 30	ATD	Intercellular signaling and tissue patterning: Segment polarity network in <i>Drosophila</i> (lecture)	DUE: Simulation worksheet
Feb 1	ATD	Segment polarity network: journal club	DUE: Figure facts: Nusslein-Volhard (1980) Nature
Feb 6	ATD	Segment polarity network: journal club	DUE: Figure facts: Houchmandzadeh (2002) Nature
Feb 8	ATD	Segment polarity network: simulations	
Feb 13	ATD	Mechanochemical signaling: Vasculature remodeling in <i>Botryllus</i> ; Body axis and directed growth in <i>Hydra</i> (lecture)	DUE: Simulation worksheet
Feb 15	ATD	Vasculature remodeling: journal club	DUE: Figure Facts: Rodriguez et al (2017) MBoC
Feb 20	ATD	Body axis and directed growth: journal club	DUE: Figure facts: Broun (2005) Dev
Feb 22	ATD	Body axis and directed growth: journal club	DUE: Figure facts: Livshits (2017) Cell Rep
Feb 27	ATD	Body axis and directed growth: simulations	
Mar 1	HME	Lecture 1: Intro to Vertebrate Developmental Systems	DUE: Simulation worksheet
Mar 6	HME	Lecture 2: Early Development I	DUE: Invertebrate Take Home Exam
Mar 8	HME	Lecture 3: Early Development II	
Mar 13		Spring break; no class	
Mar 15		Spring break; no class	
Mar 20	HME	Lecture 4 - Differentiation I	
Mar 22	HME	Group 1 Journal Club	DUE: FF1 & Q1

Mar 27	HME	Group 2 Journal Club	DUE: FF2 & Q2
Mar 29	HME	Group 3 Journal Club	DUE: FF3 & Q3
Apr 3	HME	Group 4 Journal Club	DUE: FF4 & Q4
Apr 5	HME	Lecture 5 - Differentiation II	
Apr 10	HME	Group 5 Journal Club	DUE: FF5 & Q5
Apr 12	HME	Group 6 Journal Club	DUE: FF6 & Q6
Apr 17	HME	Lecture 6 - Regeneration	
Apr 19	HME	Group 7 Journal Club	DUE: FF7 & Q7
Apr 24	ATD, HME	Group 8 Journal Club; Last day of classes	DUE: FF8 & Q8 IN CLASS: Post-test
May 2			DUE: Vertebrate Take Home Exam