

BIO43: Developmental Biology

Class #/Date	Topic	Readings
[1] Mar 30 Mon	- Course Introduction - Concepts and History	Pgs. 1-13 (Wolpert 6 th Ed) Wallingford: We are all developmental biologists
[2] April 1 Wed	- Fertilization - Lineages - Genomic Equivalence - Yamanaka Factors → FBX15 Question	Pgs 13-35 Milestone 5.
[3] April 3 Fri	- Transcription Primer → What is a gene? Question - C. elegans Vulva intro - C. elegans vulva induction - RTK and Notch signaling	Pgs 412 - 418
[4] April 6 Mon	- Intro to Drosophila - The Heidelberg Screen - Drosophila Oogenesis - Germline Stem cell Niche - DPP - Maternal vs. Zygotic	Pgs 37-44 Introduction to Mutants by Leroi
[5] April 8-10	- Pole cells - Schupbach pole cell transplantation - Epistasis and D/V patterning → Epistasis Question	Pgs 45 - 66 Milestone 22
[7] April 13 Mon	- Frohnhofer background → Frohnhofer problem set	Frohnhofer (1986) Pgs 66-71 Milestone 16 Lipshitz Review (optional)
[8] April 15	- Cytoplasmic Polarity - Gap genes	Pgs 71-83 Milestone 13
[9] April 17 Fri	- Pair rule genes → Eve transcription exercise - Segment Polarity genes → Enhancer problem - Hox genes, collinearity - Hox genes, posterior dominance	Pgs 90-95. Milestone 11 Meyerowitz, Science 295:1482
[10] April 20 Mon	- Nellen background → Nellen problem set	Nellen (1996) Milestone 17 Pgs 436 - 451
[11] April 22 Wed	- Asymmetric cell division	

	- Maternal effect lethal screen in worms
	- Asymmetric division of the worm zygote
[12] April 24 Fri	- Discovery of RNAi - Discovery on miRNAs
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[13] April 27 Mon	- Vertebrates: A/P and D/V Axes
[14] April 29 Wed	- Vertebrates: A/P and D/V Axes
[15] May 1 Fri	- Gastrulation and the Germ layers
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[16] May 4 Mon	- Gastrulation II
[17] May 6 Wed	- Neurulation
[18] May 8 Fri	- Palmereimin background → Palmereimin problem set
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[19] May 11 Mon	- Neurogenesis
[20] May 13 Wed	- CNS development
[21] May 15 Fri	- Kidd background → Kidd problem set - Axonal pathfinding
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[22] May 18 Mon	Limb Development I
[23] May 20 Wed	Limb Development II - Discovery of Apoptosis
[24] May 22 Fri	- Clever background → Clever problem set
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[25] May 27 Wed	Organoids
[26] May 29 Fri	- Gurley background → Gurley problem set
[27] June 1 Mon	- Regeneration
[28] June 3 Wed	Developmental “omics”
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Faculty:

Professor Erik Griffin
Room 348 LSC
Zoom PMID 603-646-8269
erik.e.griffin@dartmouth.edu

Meeting times:

This course will be run asynchronously
Optional Zoom “office hours”
Mon 10:10am – 11:15 pm, Thurs 12:15 – 1:05 pm (X hour)

Pre-Requisites: Biol 012 or Biol 013.

Course Description: This is an intermediate level Biology course that will examine the fundamental processes that mediate embryonic development. This course will emphasize conserved molecular, cellular and genetic mechanisms that underlie embryogenesis in animals.

Textbook and Readings:

- The primary text for this course will be Principles of Development, by Wolpert and Tickle (5th or 6th edition). Textbook readings are intended to reinforce and contextualize material covered in class.
- We will read several primary literature articles throughout the term. These articles will provide a basis for 6 problem sets.
- I will post a series of short reviews (“Milestones”) that were recently published by Nature magazine. These reviews place important advances in developmental biology within a scientific, historical and biomedical context.
- There will be several additional supplemental articles posted on the course Canvas site. I will indicate whether these articles are required or optional. Optional readings may help you understand and contextualize the course material and provide an entry point for further independent study.
- I will post links to a number of online videos that relate to various aspects of developmental biology. These videos are intended to emphasize how our understanding of developmental biology relates to other areas of inquiry, including evolution, disease pathogenesis and biomedical research and ethics.

Class meetings:

Because students are spread over many time zones, this class will be run asynchronously. I have converted all of the normal in class material to online videos. These include power point lectures as well as videos of in class discussions from previous terms. My initial plan is to hold optional “office hours” during the Monday and Thursday class periods. I am open to feedback about how this works for you and to adjust this plan as needed.

Assessment:

Bio 43 is credit/no credit for the 2020S term. To receive credit for the course, students need to complete each of the assignments (including the primary literature problems sets) posted on Canvas. I encourage students to work together and collaborate on these problem sets. If you do collaborate, please include a statement indicating who you worked with and how you managed the collaboration (worked together on Zoom, over the phone, by email etc). Groups of up to 4 students can submit a group answer to the primary literature problem sets. Putting your name on a group submission indicates that you have engaged substantively in the development of the answer.

While I encourage you to keep up with the course work in a timely manner, I recognize that this may be a particularly challenging and unpredictable term for many of us. To account for this, primary paper discussions are due at 11:59 PM one week after the day they are assigned on the syllabus. Of course, you should contact me if there are circumstances that make meeting these deadlines problematic.

Information about recording:

(1) Consent to recording of course and group office hours

a) I affirm my understanding that this course and any associated **group** meetings involving students and the instructor, including but not limited to scheduled and ad hoc office hours and other consultations, may be recorded within any digital platform used to offer remote instruction for this course;

b) I further affirm that the instructor owns the copyright to their instructional materials, of which these recordings constitute a part, and distribution of any of these recordings in whole or in part without prior written consent of the instructor may be subject to discipline by Dartmouth up to and including expulsion;

b) I authorize Dartmouth and anyone acting on behalf of Dartmouth to record my participation and appearance in any medium, and to use my name, likeness, and voice in connection with such recording; and

c) I authorize Dartmouth and anyone acting on behalf of Dartmouth to use, reproduce, or distribute such recording without restrictions or limitation for any educational purpose deemed appropriate by Dartmouth and anyone acting on behalf of Dartmouth.

(2) Requirement of consent to one-on-one recordings

By enrolling in this course, I hereby affirm that I will not under any circumstance make a recording in any medium of any one-on-one meeting with the instructor without obtaining the prior written consent of all those participating, and I understand that if I violate this prohibition, I will be subject to discipline by Dartmouth up to and including expulsion, as well as any other civil or criminal penalties under applicable law.

(3) My recording policy for Bio43.

I will record the regularly scheduled Monday and Thursday Zoom “office hours” as these are class times in which every student is invited to attend. I am hoping these sessions will be valuable discussions that will benefit all students, but recognize some students may not be able to attend them live. I plan to edit these recordings to make them easier and quicker to watch. I will not record any one-on-one or small group Zoom meetings held outside of the regularly scheduled Monday and Thursday sessions. If I feel discussions from office hours would benefit the entire, I will prepare a separate video and post it on Canvas.

Technology Expectations:

Given the online nature of this course, it is required that students have the ability to stream ~1 hour of video content each day. Please let me know what barriers you have to completing the online course as soon as possible.

Health Addendum

While the COVID-19 pandemic has already drastically disrupted this course, it has the potential to result in further personal impact which may prevent you from continuing engagement in the class. This may be due to contraction of the disease by you or a loved one, increased familial responsibilities, financial difficulties, or impacts on your mental/emotional health.

In the event that you are directly or indirectly impacted by COVID-19 in such a way that will affect your performance in the course, it is imperative that you reach out to me as soon as possible. You may also reach out to your undergraduate Dean if that would make you more comfortable. My first priority is your health and security and I will work to put you in touch with appropriate resources to assist you. In

addition, appropriate accommodations (for example: deadline extensions and/or extra office hours) will be implemented.

I have structured the course so that these disruptions will not necessarily prevent you from successfully completing this course. The posted lecture videos can be viewed on a flexible schedule and there are no required synchronous components of the class.

ACADEMIC HONOR PRINCIPLE:

The Dartmouth College Student Handbook (page iii) states "Fundamental to the principle of independent learning are the requirements of honesty and integrity in the performance of academic assignments, both in the classroom and outside. Dartmouth operates on the principle of academic honor, without proctoring of examinations. Students who submit work which is not their own or who commit other acts of academic dishonesty forfeit the opportunity to continue at Dartmouth." The complete text of the Dartmouth Academic Honor Principle is given in the Dartmouth College Student Handbook.

Honesty is the foundation of the academic pursuit of knowledge. In recognition of this, I will not overlook any violations of the Academic Honor Principle. Indeed, the Faculty Handbook of Dartmouth College states explicitly that College Faculty members are obligated to report potential violations of the Academic Honor Principle to the Dartmouth College Committee on Standards. Should the Committee on Standards find the student to be in violation of the Academic Honor Principle, punishments usually involve suspension for multiple terms or separation of the student from the College.

Note to Students with Physical or Learning Disabilities:

Students requesting disability-related accommodations and services for this course are encouraged to schedule a phone/video meeting with me as early in the term as possible. This conversation will help to establish what supports are built into my online course. In order for accommodations to be authorized, students are required to consult with Student Accessibility Services (SAS; student.accessibility.services@dartmouth.edu; SAS website; 603-646-9900) and to email me their SAS accommodation form. We will then work together with SAS if accommodations need to be modified based on the online learning environment. If students have questions about whether they are eligible for accommodations, they should contact the SAS office. All inquiries and discussions will remain confidential.

Religious Holidays:

Some students may wish to take part in religious observances that occur during the academic term. If you have a religious observance that conflicts with your participation in the course, please speak with Prof. Griffin as soon as possible to discuss appropriate accommodations.

Title IX Policy:

At Dartmouth, we value integrity, responsibility, and respect for the rights and interests of others, all central to our Principles of Community. We are dedicated to establishing and maintaining a safe and inclusive campus where all have equal access to the educational and employment opportunities Dartmouth offers. We strive to promote an environment of sexual respect, safety, and well-being. In its policies and standards, Dartmouth demonstrates unequivocally that sexual assault, gender-based harassment, domestic violence, dating violence, and stalking are not tolerated in our community.

The Sexual Respect Website (sexual-respect.dartmouth.edu) provides a wealth of information on your rights and obligations with regard to sexual respect and resources that are available to all in our community. As a faculty member, I am obligated to share disclosures regarding conduct under Title IX with Dartmouth's Title IX Coordinator.

Should you have any questions, please feel free to contact Dartmouth's Title IX Coordinator (Kristi.Clemens@Dartmouth.edu) (and deputies if appropriate).

Wellness:

I recognize that the academic environment at Dartmouth is challenging, that our terms are intensive, and that classes are not the only demanding part of your life. There are a number of resources available to you on campus to support your wellness, including: your undergraduate dean (<http://www.dartmouth.edu/~upperde/>), Counseling and Human Development (<http://www.dartmouth.edu/~chd/>), and the Student Wellness Center (<http://www.dartmouth.edu/~healthed/>). I encourage you to use these resources and come speak with me to take care of yourself throughout the term.