

**BIOS E-204: Developmental and Regenerative Biology**  
Fall 2016

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Office Hours: by appointment

Meeting Times: Tuesdays  
7:40-9:40pm  
Sever Hall 211

Description: The field of developmental biology provides insights on a most interesting question: how do all of the cells in our bodies arise from a single cell, the fertilized egg? This graduate seminar probes this question through critical analysis of the primary literature. Both classical as well as contemporary papers are scrutinized. We cover topics ranging from fertilization, organogenesis, patterning, regeneration, and aging, with a focus on humans whenever possible.

Prerequisites: one year of introductory biology (BIOS E-1a and BIOS E-1b, or equivalent); developmental biology (BIOS E-55) and/or stem cell biology (BIOS S-129) strongly recommended

Course Website: <https://canvas.harvard.edu/courses/18360>

Textbook: No textbook is required for the course.

For a good general resource covering early development:  
Scott F. Gilbert and Michael J. Barresi  
Developmental Biology (11<sup>th</sup> Edition)  
Sinauer Associates  
ISBN# 978-1-60535-470-5

Grading:	Participation	10%
	Paper Presentation	30%
	Oral Proposal Presentation	30%
	Written Proposal	30%

<u>Date</u>	<u>Topic</u>
8/30	Introduction Scientific Writing Tips Evaluating Research Proposals
9/6	Manipulating Development
9/13	Fertilization
9/20	Germ Cells
9/27	Cloning
10/4	Pluripotency
10/11	Gastrulation
10/18	Organogenesis
10/25	Size
11/1	Regeneration
11/8	Aging
11/15	Disease Modeling
11/22	NO CLASS MEETING – Independent Study for Proposal
11/29	Evolutionary Developmental Biology
12/6	Student Proposal Presentations
12/13	Student Proposal Presentations Written Proposals Due

### Noteworthy Dates:

Tuesday, 9/6	Deadline for course and credit status changes Deadline to drop the course with 100% tuition refund
Tuesday, 9/13	Deadline to drop the course with 50% tuition refund
Friday, 11/25	Deadline to withdraw with WD/WN grade on record

### General Advice:

The standard to which students are held in this course is high, especially given that this is a graduate course. I will assume that students are here to be challenged, to gain new knowledge, and to ratchet up your close reading, writing, and analytical skills. As a result, I expect that students are prepared to put in the time and effort that will accomplish those goals.

### Course Website:

Students are expected to consult the course website each week. Announcements, papers, and general information will be posted there.

### Academic Integrity:

You are responsible for understanding Harvard Extension School policies on academic integrity (<http://www.extension.harvard.edu/resources-policies/student-conduct/academic-integrity>) and how to use sources responsibly. Not knowing the rules, misunderstanding the rules, running out of time, submitting the wrong draft, or being overwhelmed with multiple demands are not acceptable excuses. There are no excuses for failure to uphold academic integrity. To support your learning about academic citation rules, please visit the Harvard Extension School Tips to Avoid Plagiarism (<http://www.extension.harvard.edu/resources-policies/resources/tips-avoid-plagiarism>), where you will find links to the [Harvard Guide to Using Sources](#) and two free online 15-minute tutorials to test your knowledge of academic citation policy. The tutorials are anonymous open-learning tools.

All written work must be the student's own. Students may discuss work with others, but should be sure to write everything in their own words. Students also may not copy writings from textbooks, journals, or lab protocols without proper citations. Plagiarism is a very serious offense.

Any cases of breach of academic integrity will be sent to the Administrative Board.

### Accessibility:

The Extension School is committed to providing an accessible academic community. The Accessibility Office offers a variety of accommodations and services to students with documented disabilities. Please visit the link below for more information:

<http://www.extension.harvard.edu/accessibility-student-services>

### Participation:

Participation is an important part of the course. Attendance during lecture is a component of the participation grade, as is discussion during the lectures. Regardless of whether or not a student is presenting the papers for a given week, they are expected to read and come prepared to discuss the works.

### Paper Presentation:

Each week, a student will present papers assigned on a given topic. In almost all cases, this will be best performed using a Powerpoint presentation, although it may be possible to do at the board. Students should provide background to introduce the papers, the question being studied, and the data shown. The data, and particularly the conclusions drawn by the authors, should be critically analyzed. The presenter should engage their fellow classmates in the discussion.

Presenters will be analyzed on how well the student introduces the topic, how the student explains the data, and how the student analyzes the results.

### Proposal:

The major writing assignment for the course is a 15-25 page research proposal modeled after a NIH R01 grant (see <http://grants.nih.gov/grants/funding/r01.htm>) and investigating one of the topics covered during the term. Use 1" margins, 12 point font, typeset either Times New Roman, Arial, Calibri, or Cambria.

It should comprise the following sections:

#### Title

- This should be informative and not overly vague.

#### Abstract

- Summarize the question you plan to address and the aims of your research. This should be written in a language suitable for the lay public.

### Background and Significance

- Provide the relevant background information to the reader. Explain the question being addressed and the objectives. Explain why the research proposed is important to study. Generate a clear, falsifiable hypothesis. Be sure to cite appropriate references here – use parenthetical citation in text using (Author, Year) convention, not footnotes.

### Specific Aims

- Describe the experimental approach used to accomplish the work and investigate the hypothesis. Typically, proposals have about three specific aims, but depending on the hypothesis, a range of 2-4 is fine. Be sure to justify why the experimental approach is appropriate to address the question posed. Do not get bogged down in listing the details of the experimental techniques (e.g., the number of cycles of PCR used, the hybridization temperature of the probe for Southern blots, etc.). The important part here is the logic of how you plan to test the hypothesis.

### References

- Format as in the journal *Cell*. For example:  
Zhou, Q., Law, A.C., Rajagopal, J., Anderson, W.J., Gray, P.A., and Melton, D.A. (2007). A multipotent progenitor domain guides pancreatic organogenesis. *Dev. Cell* 13, 103-114.  
In the text, the reference would appear as:  
“Cpa1 marks pancreatic progenitors (Zhou et al., 2007).”

Figures can be included for clarity, but are not required.

Students will submit the written proposal on **Tuesday, December 13<sup>th</sup>**.

Additionally, students will present their proposals orally during the last two meetings of the course (**December 6<sup>th</sup>** or **December 13<sup>th</sup>**). Oral presentations will be judged much in the same way as the paper presentations during the term.