BICD 130 — Embryos, Genes, and Development

Winter 2016 Posakony

Lectures: Tuesday/Thursday, 12:30-1:50 p.m., 3010 York Hall

Required Text: Scott F. Gilbert, *Developmental Biology*, Tenth Edition (2014)

Lecture #	Day/Date	Topic	Book Chapter(s)
1	Tu Jan 5	Introduction/Fertilization	4
2	Th 7	Fertilization/Cleavage	4
3	Tu 12	Cleavage	5, 6, 7, 8, 9
4	Th 14	Gastrulation I	6, 7
5	Tu 19	Gastrulation II	8, 9
6	Th 21	Development of vertebrate embryos I	10
7	Tu 26	Development of vertebrate embryos II	11
8	Th 28	Development of vertebrate embryos III	12, 13
9	Tu Feb 2	Cell adhesion, cell migration, and morphogenesis	3
	Th 4	MIDTERM EXAM (Lectures 1-8)	
10	Tu 9	Differential gene activity I	2
11	Th 11	Differential gene activity II	2, PART TWO*
12	Tu 16	Cell-cell communication	3, PART TWO*
13	Th 18	Axis specification and pattern formation I	6
14	Tu 23	Axis specification and pattern formation II	6, 8
15	Th 25	Limb development	14
16	Tu Mar 1	Sex determination and dosage compensation	15
17	Th 3	The germ line	17
18	Tu 8	Medicine and development	18, PART THREE**
19	Th 10	Evolution and development	20

*Introduction to PART TWO: Specification (pp. 107-115)

**Introduction to PART THREE: The Stem Cell Concept (pp. 319-331)

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NOTES ON THE COURSE

Instructional Assistant: The IA for the course this year is Olia Gaidarenko. Her office hours are Tuesdays, 11:00 AM-12:00 noon, in 4146 Bonner Hall.

Required Text: Scott F. Gilbert, *Developmental Biology*, Tenth Edition (2014).

Course Material: You are responsible for the course material presented *in both the lectures and the text*. It is essential that you read carefully the assigned text chapters associated with each lecture, since they contain material that will not be covered in the lecture.

Lecture Presentations: PDF versions of the PowerPoint presentations for each lecture are posted in advance on the course web site (see below).

Exams: There will be two exams — a midterm and a final. The midterm will be given in class and will cover Lectures 1-8 (and associated chapters in the text), and the final will be comprehensive (Lectures 1-19 and associated text material). The exam schedule is as follows:

Midterm: Thurs., Feb. 4, 12:30-1:50 p.m., 3010 York Hall
Final: Tues., Mar. 15, 11:30 a.m. - 2:30 p.m., TBA

Graded exams will be available on the following Tuesday (Feb. 9 for the midterm; Mar. 22 for the final). We will announce in class where the graded exams, along with the answer key, may be viewed.

Paper Critiques: To introduce you to reading the research literature in developmental biology, you will be responsible for preparing critiques of two research papers during the course. We encourage you to choose papers from the last five years (2011-2015) of the following journals: *Cell* (or other *Cell* journals, including *Developmental Cell)*, *Science*, *Nature* (or other *Nature* journals*)*, *Genes & Development*, *Development*, and *Developmental Biology* (all available in the Biomed Library, and all available online in the Biomed Library's E-Journals collection). Each paper you select must be clearly related to developmental biology (broadly defined) and must be approved by the IA in advance of writing the critique. A great way to find a paper is to search the PubMed database for articles on a particular problem in developmental biology that interests you.

Each critique is expected to be a concise, thoughtful, and critical analysis of the paper — not just a reiteration of what the authors say. Your critique should address the following questions:

(1) What is the broad scientific problem the authors are interested in?
(2) What did the authors set out to do in this particular study?

(3) What was their experimental approach?
(4) What were the essential results?
(5) Do the data presented justify the authors' conclusions? Be specific.
(6) What are the main strengths and weaknesses of the paper?

Important: Put your name on the front page of the critique, and attach a printout of the entire article to the back of the critique. Limit your critique to not more than 3 single-spaced pages. Critiques are due in class as follows:

Critique	Due Date
1	Tues., Jan. 26 (Lecture 7)
2	Tues., Mar. 1 (Lecture 16)

Late critiques will not be accepted unless you have made an arrangement with Dr. Posakony or the IA *in advance*.

Grading: The midterm exam will be worth 100 points, the two paper critiques will be worth 75 points each (for a total of 150), and the final exam will be worth 200 points. At the end of the quarter, your grade will be determined by your point total (out of 450 maximum).

Academic Integrity: For reasons of both ethics and fairness, we take academic integrity very seriously in this course. Your participation carries with it the presumption that you will conduct yourself honestly and honorably at all times, but especially when completing exams or assignments. Instances of cheating or plagiarism will be pursued vigorously through the campus Academic Integrity Office.

Regrades: Requests for regrades of either exams or critiques will not be accepted. We will be happy to make appropriate adjustments for the following errors in grading your exams: incorrect addition of points, or failure to grade a particular question.

Make-up Exams: In general, we cannot provide make-up exams or alternative exam times. If you miss the scheduled midterm or final for other than a family or medical *emergency*, your score for that exam will be zero, and your grade will be determined by the paper critiques and the other exam (out of 450 points).

Section: The format of the section meetings will be largely at the discretion of the IA. However, it is certain that valuable reviews and discussions of the course material will take place in section. In addition, in the section meetings the IA will instruct you in the art of critiquing a research paper, and this is guaranteed to help you significantly in writing your own critiques.

There will be no section meeting in the first week of class.

E-mail Addresses: Dr. Posakony and the IA may be contacted at the following e-mail addresses:

Jim Posakony: jposakony@ucsd.edu

4138 Bonner Hall, X46300
Olia Gaidarenko: ogaidare@ucsd.edu

Course Web Site: Information related to the course will be posted at the following web address: http://classes.biology.ucsd.edu/bicd130.WI16.

Online Supplement to Our Textbook: The web site http://10e.devbio.com offers an online companion to the textbook, in the form of expanded coverage of specific topics from each chapter. Information on bioethics is also included, and there is even a developmental biology humor page you won't want to miss.

Books on Reserve: Along with the required text (*Developmental Biology* by Gilbert, 10th edition, 2014), the following books have been placed on reserve in the Biomed Library:

The Regulatory Genome by Eric H. Davidson (2006). A fascinating and insightful book on how gene regulatory networks function as the engine of both development and evolution.

From DNA to Diversity by Sean B. Carroll, Jennifer K. Grenier, and Scott D. Weatherbee (2nd edition, 2004). Subtitled *Molecular Genetics and the Evolution of Animal Design*, this highly readable, beautifully illustrated book considers what we know about how morphological novelties evolve.

Endless Forms Most Beautiful by Sean B. Carroll (2005). Subtitled *The New Science of Evo Devo*, this is a highly acclaimed account of the exciting discoveries being made at the interface between developmental and evolutionary biology.

Coming to Life by Christiane Nüsslein-Volhard (2006). Subtitled *How Genes Drive Development*, this delightful little book by a Nobel Laureate is a very accessible overview of developmental biology at a basic level. The beautiful illustrations were all drawn by the author.