

BIOLOGY 311, EMBRYOLOGY WINTER, 2003

Jonathan Slack 2001, *Essential Developmental Biology*, Blackwell Science; Sean Carroll, Jennifer Grenier, & Scott Weatherbee 2001 *From DNA to Diversity*, Blackwell Science; Cor van der Weele 1999 *Images of Development*, State University of NY Press; Literature via electronic catalog or **ERes** [choice: Ambrose III, H. et al. 2002 *A Handbook of Biological Investigation*, 6th Ed., Hunter Textbooks, Inc.

Date	Topic	Assignment
Jan 7	Introduction; Setting the stage; LAB: Planning	Chs. 1 & 2 Slack
9	Common features	Ch. 4 Slack
14	Some genetics & some experimental embryology LAB: Sea urchins	Parts Chs. 5 & 6 Handout
16	Ransick, Andrew & Eric H. Davidson 1993 A complete second gut induced by transplanted micromeres in the sea urchin embryo, <i>Science</i> 259, 1134-1138	ERes
21	Nishida, Hiroki 1992 Regionality of egg cytoplasm that promotes muscle differentiation in embryos of the ascidian, <i>Halocynthia roretzi</i> , <i>Development</i> 116, 521-529 LAB: Amphibian development	ERes Handout
23	Amphibian development	Ch. 9 Slack
28	Amphibian development; LAB: Amphibian development	Ch. 9 Slack
30	Gurdon, J.B. et al. 1999 Single cells can sense their position in a morphogen gradient, <i>Development</i> 126, 5309-5317	Eres
Feb 4	Examination I ; LAB: Project planning	
6	Lane, Mary C. & Michael D. Sheets 2002 Primitive & definitive blood share a common origin in <i>Xenopus</i> : A comparison of lineage techniques used to construct fate maps, <i>Developmental Biology</i> 248, 52-67	ERes
11	Building animals; LAB: Projects	15-19; 43-47; 51-57; 77-92 Carroll et al.
13	O'Rourke, Meredith et al. 2002 <i>Twist</i> plays an essential role in FGF and SHH signal transduction during mouse limb development, <i>Developmental Biology</i> 248, 143-156	ERes
18	Zebra fish development; LAB Zebra fish development; Projects	Ch. 10 Slack; Handout
20	Thisse, Christine & Leonard Zon 2002 Organogenesis - Heart & blood formation from the zebrafish point of view, <i>Science</i> 295, 457-462	Eres
25	Development of the nervous system; LAB: Projects	Ch. 16 Slack
27	Development of the nervous system	Ch. 16 Slack
Mar 11	Causeret, F. et al. 2002 Slit antagonizes netrin-1 attractive effects during the migration of inferior olivary neurons, <i>Developmental Biology</i> 246, 429-440; LAB: Projects	ERes
13	Boyl, Pietro P. et al. 2001 Forebrain and midbrain development requires apiblast-restricted <i>Otx2</i> translational control mediated by its 3' UTR, <i>Development</i> 128, 2989-3000	ERes
18	Environmental causes in development; LAB: Projects	Chs. 1 & 2 van der Weele
20	Examination II	
25	<i>Drosophila</i> development; LAB: Projects	19-43; 57-77 Carroll et al.

27	Evolution of Arthropods	Ch. 5 Carroll et al.
Apr 1	Hughs, Cynthia & Thomas Kaufman 2002 Exploring Myriapod segmentation: The expression patterns of <i>even-skipped</i> , <i>engrailed</i> , and <i>wingless</i> in a centipede, <i>Developmental Biology</i> 247, 47-6; LAB: Projects	Eres
3	Piotrowska, Karolina & Magdalena Zernicka-Goetz 2002 Early patterning of the mouse embryo - contributions of sperm and egg, <i>Development</i> 129, 5803-5813	ERes
8	Davidson, Eric et al. 2002 A genomic regulatory network for development, <i>Science</i> 295, 1669-1678; LAB: Projects	ERes
10	Environmental causes in development	Ch. 5 & Coda van der Weele
15	PROJECT PRESENTATIONS	
17	Review	
22	FINAL EXAMINATION: 4-22-03 8-11 AM PROJECT PAPER DUE 4-23-03 4 PM	

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The lecture and laboratory part of this course are NOT separate! Notice that half of the grades come from participation in laboratory/lecture and in discussion. We will be reading several papers so that you are able to see how full studies are done rather than just “results and conclusions”. Your texts have some experimental work, but research papers provide much more information about the “how”. All of the papers can be understood at some level even if you are not able to understand every experimental detail. The texts have explanatory material about methods; use the indexes. As noted later on this syllabus you are expected to come to class PREPARED to discuss the day’s topic and then hand in some written evidence of your preparation and understanding. You might also have unanswered questions included. You will be taking turns leading discussions after a few led by the instructor. If you have questions or do not understand the research, please come to see me or email me with questions.

Grades will be assessed as follows: Project Participation 50 pts; Project Group Presentation 50 pts; Notebook 50 pts; 2 Hourly Examinations 100 pts each; Discussion Classroom and Laboratory 100 pts; Individual Formal Written Project Report 50 pts; Final 100 pts. Grades 90% and above are A’s; generally 80-88 are B range, but this may be lowered a bit if a person with a 78, for instance, has earned a B-. The C range will be from the bottom of the B’s down to the high 60’s. The borders of all levels are appropriate -’s and +’s [A- to C-]. Healthy attitude, interest, persistence, and participation will all add to the objective number score. We will use the scheduled class/lab time as best fits.

What does each grade level mean?*	
A	Prepared for classes/labs and participates in class; Assignments done on time; Works well with others; Improves over the term; Has met or exceeded class goal and objectives
B	Most often prepared for classes and labs and participates in class; Almost all or all assignments done on time; Works well with others; Improves over the term; Has made good progress toward meeting class goal and objectives
C	Prepared for most classes and labs and does some participation in class; some to most assignments done on time; Works OK to well with others; Might or might not improve over the term; Has made some progress toward meeting class goal and objectives
D	Prepared for some classes and labs and might participate in class; A few to some assignments done on time; Works OK with others; Probably does not improve over the term; Has made little progress toward meeting class goal and objectives

* A-, B+, B-, C+... grades will be earned when a factor or 2 exceed or fall below the stated criteria AND the scores are at the border of the grade ranges.

At all times you should be prepared to DISCUSS the material assigned. THEREFORE:

- 1- You must come to each class with notes, page number references, questions, comments on outline handouts...that you will hand in at the end of the class period. Meanwhile this will be your source for discussion. ALSO mark up your copied ERes papers or other copies. You will have a guide to use.
- 2- You must keep a journal/lab notebook - BOUND - Composition Book [\$1.00 at Office Depot / Staples]. The first 2 pp. are to be "Table of Contents" and then NUMBER the pages. DO NOT ever tear out pages, but cross out what you do not want any longer. Do NOT use white-out either. ALL lab observations, notes for experiments, plans, DATA, sums of work, your conclusions must be in this book. In addition you might want to speculate and practice writing parts of your paper. Your analysis of your data will help you when you prepare to write your research paper. Questions about development in general might help you to think of ideas for your research. This, however, is not the place for your "lecture" paper notes, because you need to hand them in and must at all times have your notebook for the Project, etc. The notebooks will be collected periodically over the term.
- 3- "How to write your papers" will be distributed later.
- 4- For the lab projects and for classroom discussions you will be working in groups. THERE ARE NO EXCEPTIONS. ALL PROJECTS ARE TO BE DONE WITH 2 OR 3 PEOPLE. In-class discussions will be more or less ad hoc groups. All group problems need to be met head-on immediately. I am happy to mediate. All lab tools are used in common. Therefore, they are all kept in 158SB where everyone has access when the building is open.
- 5- You may come to me at any time and see where you stand in discussion and talk about how to improve. NO ONE will be allowed to monopolize the class time; everyone will participate even if I need to call on the reluctant ones. Your grade depends on this.
- 6- You will need to work on your projects outside of class time. That means that you might work in the evening after the projects are started, rather than on Tuesday afternoons. BUT, you must be present for the first part of the lab, because we will be sharing observations, have peer input that will help your projects, & occasionally do some other short exercise. The prep people will be able to help you to locate common items, but you are the ones responsible for ALL of the experimental work.
- 7- The reading material this year is in the 3 books listed and on ERes or can be accessed directly from the electronic catalog of our library; you must access this and copy the paper for your use. This does save money, but it means you need to plan ahead so that you do not get caught at the last minute with computer/copier problems. The "choice" book is one that should help you in your whole career!!
- 8- If you have never used the on line library searches, then ask a reference librarian for some help. I will have a computer in the laboratory so that you might be able to do some work then. There are several useful journals in the library including *Science*, *Nature*, *Cell*, *Developmental Biology*, *Journal of Experimental Zoology*. There are some texts in the library, but are probably outdated - be careful because old texts in this field are NOT accurate. The field changes very fast.
- 9- Laboratory projects will be primarily based on past student projects that yielded useable data and papers from the literature.
- 10- Course Goals / Outcomes: I expect that you as students will acquire some skills working with embryos and in addition practice some basic laboratory skills such as record keeping, working in groups, proposing hypotheses, planning and carrying out various experiments, reducing data, presenting your conclusions, and suggesting future work. You should become experts in reading research papers in the field of embryology [developmental biology] that will help you no matter what you do in your careers. Oral presentations, leading discussions, participating in discussions, writing about the field, and learning to constructively criticize will benefit you generally and in this specific field of study. Rather than memorizing information you will be using information to explain research outcomes and demonstrating the usefulness of various techniques and theories. I hope you will use your laboratory notebook to analyze some of our discussions with respect to your projects. In order to make the course really "yours" you should add specific goals to this list and keep asking yourself whether you are reaching your goals.
- 12- IMPORTANT: Two items! The University will make reasonable accommodations for persons with documented disabilities. Students should register with Disability Resource Services 1051/1061 CA. You must be registered by January 24, 2003 to be guaranteed services during Winter term 2001. AND Cheating in any form will not be tolerated in this course. If you do not understand what plagiarism is then ask and we will talk about it!! General respect and helpful sharing in class sessions and lab will be rewarded. Any questions? consult the student handbook. Generally any first infraction will result in a drastically lowered score; subsequently the exercise will earn 0 credit.