Biology 376 – Animal Development – Fall 2009

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Lecture: Mon/Wed/Fri, 9:05 – 10:00, MRH 201
Lab: Wednesday, 2:30 - 6:30, ST330

Office Hours: Mon 2:00-4:00, Tues 8:30-10:30, Thurs 11:00-12:00 or by appointment. Email is also an excellent way to get a quick response to questions.

Course Home Page: home.sandiego.edu/~cloer/bio376.html
This is a good place to check for announcements and handouts. All Powerpoint lectures can be found here in note-taking format.

Main text (required) - *Developmental Biology,* 7th Edition. Author - Scott Gilbert. Sinauer Associates, 2003. The text should include the CD-ROM *Vade Mecum*. (Textbook Home Page: www.devbio.com - note that this goes to the 8th edition-associated site.)

Items on reserve -
Analysis of Biological Development. Klaus Kalthoff. McGraw-Hill, 1996.
Excerpts from *An Introduction to Molecular Neurobiology*. Zach Hall, editor. Sinauer Associates, 1992.
Excerpt from *Introduction to Neurobiology*. Heinrich Reichert. Oxford University Press, 1992. (Ch. 7 - Development)
Oncogenes and Cell Proliferation supplement
Genetics of Disease supplement

Books required for laboratory -
Atlas of Descriptive Embryology, 8th Ed., Mathews & Schoenwolf. Macmillan/Collier, 2006.
Animal Development Laboratory Manual. C. Loer, 2009 (this will be sold by in lab).
Student Handbook for Writing in Biology, 2nd Ed., Kinsely. W. H. Freeman Co., 2005 - this is now the official writing manual for the Biology Department (so you should have a copy).
See below or in the laboratory syllabus for information on additional lab supplies.

Goals of the Course

Students will become familiar with patterns and mechanisms of animal development, with an emphasis on model organisms such as *C. elegans*, *Drosophila*, *Xenopus,* chick and mouse. A central theme will be the examination of development as a phenomenon of differential gene regulation. Stages of embryogenesis, morphogenesis, pattern formation and differentiation of developing organisms will be examined. Developmental mechanisms, especially at a molecular level, will be examined for differences and commonality among organisms. The relationships between developmental mechanisms and the molecular genetic basis of human disease will also be examined and discussed.

At the end of Biology 376, a student should be able to:
* List and explain the principle features of animal development; compare and contrast these developmental stages in various organisms.
* Identify the three classical germ layers, understand how they arise and contribute to embryonic organization; explain conserved molecular mechanisms for their generation.

* Visualize embryonic development of selected organisms in four dimensions, from fertilization through early organogenesis; relate embryonic structure to cell/tissue interactions and mechanisms of cell/tissue specification.
* Explain how key historical experiments in developmental biology shape our current understanding of developmental events, mechanisms and evolution.
* Design an experiment to evaluate the role of a molecular component in a specific developmental decision, and critically analyze the results of such an experiment.
* Explain the components and functions of key molecular genetic and signaling pathways, how they work to determine cell fate in selected organisms, and how their dysfunction causes human disease and malformation; use these understandings to hypothesize the function of conserved components in other organisms.
* Apply developmental principles to analyze and present current primary literature in the field, and integrate this new knowledge into the broader field.
* Consider the role of developmental biology in biomedical ethics and policies.

Course Mechanics

Attendance at all lectures is **strongly recommended**, but not required, except as noted below. If attendance appears to be lagging, however, I may begin taking attendance. Students who miss more than a few lectures often do poorly in class; such students will find little sympathy for their plight. For any missed lecture, a student should consult a fellow student for notes. The instructor will gladly provide any printed material handed out, but not a repeat of material presented in lecture. Please note that attendance at class presentations/discussions is **required**. Four weekly sessions are scheduled during the Wednesday lecture time beginning in November. Attendance at any guest lectures is also **required**.

Missed quizzes or tests may be made up only for excused absences (e.g., sickness). Students should inform the instructor of the reason for their absence as soon as possible. Note also that grades on problem sets, papers or lab reports turned in late will be severely reduced except for excused absences.

Attendance at all laboratory sessions is **required**. If you miss a lab for a legitimate reason (e.g., sickness) you may have an opportunity to make it up later; however, if that lab session uses living material, this may be impossible. Some other form of makeup may be arranged.

Tests and Grading

There will be two hourly tests during the semester covering the material in lectures preceding them. Each will count for 20% of your grade. The final exam will cover mainly previously untested material (essentially a third hourly test) and also counts for 20% of your grade. The lab portion of the class will be 25% of your final grade (see the lab syllabus for more specifics). Your class presentation and participation will count for a total of 13%. Work done for the class home page will count for 2% of your grade. More details will follow on class presentations and home page work. Note that adjustments to grading percentages may be required if assignments are altered. For breakdown on lab grade, see the syllabus in the lab manual.

Tests will emphasize lecture material. Assigned readings contain more material than will be covered in lecture. The quality of your writing on exams is important. Your answer to a question must be clear (and legible) to be correct. Spelling must also be correct, especially of new words you are adding to your biological vocabulary.

Grading Summary:

1st hourly test	20%	Class presentation	10%
2nd hourly test	20%	Discussion participation/reviewing, attendance at required events	3%
Final (3rd hourly)	20%		
Lab	25%	'Read More About It' web page, etc.	2%

Academic Integrity

Please note that the text of all lab reports and papers may also be required to be submitted electronically to Turnitin.com. (Be sure to submit a regular paper copy for grading purposes.) Copying of any material from current or former Biology 376 students is plagiarism and will not be tolerated. Do your own work and demand that others do theirs. Take similar care in your use of material from the class lab manual and the textbook. All portions of lab reports and papers are expected to reflect ONLY your own work and your own writing. When working in groups, each member of the group is expected to synthesize the information, analyze data and prepare an individual report. If you use literature in your report, cite it appropriately. [For example, copying sentences from the book, followed by a parenthetical citation (Gilbert, 2000), is plagiarism.] **Be sure you understand what constitutes plagiarism.** If you have any questions about this, or any other item related to academic integrity, please ask. USD Academic Integrity policy will be strictly enforced. Please see the lab syllabus for further information on plagiarism.

Provisional Lecture Schedule

Unless stated otherwise, readings are from Gilbert, *Developmental Biology*, 7th Edition.

Sept. 2 (W)	Introduction to animal development. Course mechanics. The questions and approaches of developmental biology. Reading: pp. 3–30.
Sept. 4 (F)	Development of unicellular organisms. Metazoan developmental patterns. Reading: pp. 31–35, 38-47. View *Vade Mecum* CD-ROM, section on slime molds. VIDEO in class: *Dictyostelium* development.
Sept. 7 (M)	LABOR DAY
Sept. 9 (W)	Fertilization I. Gamete structure, gamete recognition, sperm activation and capacitation, acrosomal reaction. Reading: pp. 183–197.
Sept. 11 (F)	Fertilization II. Gamete fusion, blocks to polyspermy, cortical reaction, egg activation, cytoplasmic rearrangements. Reading: pp 197–213.
Sept. 14 (M)	Cleavage: Patterns of metazoan cleavage, cell cycle regulation, cytoskeletal mechanisms of karyokinesis and cytokinesis. Reading: pp 221–225.
Sept. 16 (W)	Gastrulation: Types of cell movement, creation of primary cell layers. Axis formation. Sea urchin and tunicate early development. Reading: pp 226–239. VIDEO: Sea urchin early development.
Sept. 18 (F)	Amphibian early development: cleavage and gastrulation. Reading: pp 305–317.
Sept. 21 (M)	Amniote early development: fish, birds & mammals. Reading: pp 345-360, 363-374. VIDEO: zebrafish development, mammalian early development.
Sept. 23 (W)	Vertebrate neurulation, neural crest. Reading: pp 391–400, 427-429. VIDEO: *Xenopus* (frog), chick development.
Sept. 25 (F)	Mesodermal derivatives, myogenesis, heart formation. Endodermal derivatives. Extraembryonic membranes. Reading: 465-474, 491–497, 510–517.
Sept. 28 (M)	Evidence for genomic equivalence, animal cloning, embryonic stem cells. Reading: pp 81–89, 708-711.
	Note: Molecular biological techniques used to study developmental biology will be discussed as needed throughout the course. Students should read this section of the book (pp 92-105) and review it as needed to understand experiments using particular molecular techniques.
Sept. 30 (W)	Differential gene expression: transcriptional & post-transcriptional regulation. Dosage compensation and X-chromosome inactivation. Reading: pp 107–137.
Oct. 2 (F)	**FIRST HOURLY EXAM**
Oct. 5 (M)	*Drosophila* development I. Early development and the maternal genes: determination of anterior-posterior polarity. Reading: pp 263–278. VIDEO: *Drosophila* embryogenesis
Oct. 7 (W)	*Drosophila* II. Zygotic genes: gap, pair-rule and segment polarity genes in anterior-posterior patterning. Homeotic selector genes. Reading: pp 278–290.
Oct. 9 (F)	*Drosophila* III. Dorsal/ventral patterning. Reading: pp 290-298.
Oct. 12 (M)	The Homeotic Complex/Hox genes: Conservation of anterior/posterior pattern formation, evolution via changes Hox gene number & expression. Reading: pp 377-380, 751-761.
Oct. 14 (W)	Pattern formation in tetrapod limb. Reading: pp 523–538.
Oct. 15 (Th)	Darwin/Evolution Special Seminar – Dr. Bill McGinnis, UCSD. Manchester Aud., 12:15 PM **Attendance required.** Readings TBA.
Oct. 16 (F)	Mechanisms of cell specification. Experimental embryology. Reading: pp 56–76. Also, molecules and signaling pathways involved in cell-cell communication will be discussed throughout the course (especially beginning here). Students should read Chapter 6 (pp. 143–175) now, and refer to it later as needed.

Oct. 19 (M)	Autonomous & conditional cell specification in tunicate & nematode (*C. elegans*). Reading: pp 246–257. VIDEO: *Styela* development, *C. elegans* development.
Oct. 21 (W)	Cell-cell interactions in vertebrate development: Spemann & Mangold and the "organizer," primary embryonic induction. Reading: pp 317–325.
Oct. 23 (F)	FALL HOLIDAY
Oct. 26 (M)	Molecular mechanisms of vertebrate axis formation II. Reading: pp 325–338.
Oct. 28 (W)	Induction at the single cell level: *C. elegans* vulva. Reading: pp 154–158. Kalthoff (on reserve) pp 607–612.
Oct. 30 (F)	**SECOND HOURLY EXAM**
Nov. 2 (M)	Developmental Neurobiology I. Neurogenesis and patterning of vertebrate CNS. Reading: pp 401–407. Note: Reichert, Ch.7 is recommended as an excellent overview of developmental neurobiology lecture material.
Nov. 4 (W)	Developmental Neurobiology II. Neurogenesis. Neural crest cell migration and specification. Reading: pp 429-442; Hall/Anderson (on reserve) pp. 369–372.
Nov. 6 (F)	Developmental Neurobiology III. Axonal outgrowth and guidance. Reading: pp 410–412, 444-451. "Molecular Biology of Axon Guidance," Tessier-Lavigne & Goodman, 1996 (on reserve), especially pp 1123–4 (Introductory section) and pp 1130–31 (Conclusions). Also recommended: Hall/Patterson pp. 388–410. VIDEO: Retinal growth cone migration and repulsion.
Nov. 9 (M)	Developmental Neurobiology IV. Neuron-target interactions. Neurotrophic substances. Reading: pp 451–457. Hall/Patterson pp. 438–451.
Nov. 11 (W)	Programmed cell death/apoptosis I. Roles of PCD in normal development, genetics of PCD in *C. elegans*. Reading: pp 538-540. Kalthoff pp. 603–607.
Nov. 13 (F)	Programmed cell death/apoptosis II. Molecular mechanisms. pp. 164–166.
Nov. 16 (M)	Cancer and developmental biology I. Characteristics of transformed cells, causes of cancer. Reading: pp 621-622, 703-705. Kalthoff pp. 727–737.
Nov. 18 (W)	**CLASS PRESENTATIONS** - GENES & DEVELOPMENT (attendance required)
Nov. 20 (F)	Cancer and developmental biology II. Molecular mechanisms, genetics of cancers. Reading: Gilbert website 5.6, 8.1, 9.2
Nov. 23 (M)	**CLASS PRESENTATIONS** - GENES & DEVELOPMENT (attendance required)
Nov. 25-27	**THANKSGIVING HOLIDAY**
Nov. 30 (M)	Cancer and developmental biology III.
Dec. 2 (W)	**CLASS PRESENTATIONS** - GENES & DEVELOPMENT (attendance required)
Dec. 4 (F)	Evolution and development I. Reading: pp 751-780.
Dec. 7 (M)	Evolution and development II.
Dec. 9 (W)	**CLASS PRESENTATIONS** - GENES & DEVELOPMENT (attendance required)
Dec. 11 (F)	Lecture catch-up, review, etc.
Dec. 14 (M)	Review session for final
Dec. 16 (W)	**FINAL EXAM - 8:00 - 10:00 AM**

Provisional Lab Schedule - Fall 2009 – Animal Development

(a copy of this lab schedule is also included in your lab manual)

Preparation for lab always includes reading the appropriate sections of the class lab manual, and may include (as indicated below) viewing sections of the CD-ROM *Vade Mecum* (packaged with the main text).

Sept. 2	Introduction to lab, safety, microscopy and measurements Reading: "How cells are studied: Microscopy," Alberts et al., *Molecular Biology of the Cell*, pp 143-148, on reserve. *Vade Mecum* CD-ROM, sections on Microscopy and lab safety. **Quiz before leaving lab**
Sept. 9	Echinoderm Gametes, Fertilization and Cleavage *Vade Mecum* CD-ROM, section on sea urchin **Lab report due in lab, Wed., Sept. 16**
Sept. 16	Frog Embryogenesis (prepared slides and whole embryos), Introduce SERIAL SECTION RECONSTRUCTION PROJECT. *Vade Mecum* CD-ROM, section on amphibian early development. **Quiz before leaving lab**
Sept. 23	Chick Embryos I (prepared slides) *Vade Mecum* CD-ROM, sections on chick development, histotechniques
Sept. 30	Chick Embryos II (live embryos, wholemount chick preparation)
Oct. 7	**Present and turn in SERIAL SECTION RECONSTRUCTION PROJECT; Take LAB PRACTICAL/EXAM, turn in lab notebook and chick wholemount slide.**
Oct. 14	Begin Chick Teratogenesis experiments – Experimental design, using ANOVA; Inject eggs with teratogens. **ANOVA practice report due Oct. 21 in lab**
Oct. 21	Open eggs (Teratogenesis expt), begin evaluation and staining
Oct. 28	Complete chick embryo histology and evaluation **Lab report due in lab, Wed., Nov. 4**
Nov. 4	*C. elegans* reporter fusions and developmental genetics. Introduce *C. elegans* RNA interference project lab, spread bacterial clones (examine and save bacterial plates next day). **Quiz likely (on supplemental reading for project lab).**
Nov. 11	*C. elegans* RNAi project lab. (Start overnight cultures Monday evening, grow and plate Tuesday, add worms Wednesday.) **Introduction to project lab report (with references) due in lab, Wed., Nov. 18**
Nov. 18	Complete *C. elegans* developmental genetics and RNAi project (evaluate resulting phenotypes). **Lab report due in lab, Wed., Dec. 2**
Nov. 25	THANKSGIVING HOLIDAY
Dec. 2 **in ST429**	Homeobox-Polymerase Chain Reaction week 1. DNA purification, set up reactions
Dec. 9 **in ST429**	Homeobox-Polymerase Chain Reaction week 2. Agarose gel electrophoresis - analysis of PCR products. **Quiz at beginning of class. Final lab report due no later than 5 PM, Fri., Dec 18**

Additional Lab Supplies needed

Sharpie extra-fine or ultra-fine permanent marker (a few different colors may be useful or fun), used for marking slides and plates (they can write on glass and plastic).

Colored pencils (Drawings of embryos should use standard embryological code: red = mesoderm, blue = ectoderm, yellow = endoderm; green is sometimes used for neural crest).

Lab notebook ~8.5 x 11 in.; Flat notebook preferred. Example: Bienfang 8.5x11 horizontal "NoteSketch" book (BIE-239-101) – this will be available for purchase in lab.

Lab coat (You should bring this to lab and wear it when so instructed.)

Flash drive for backing up/transferring your computer 3-D reconstruction project

Class Presentations - Genes & Development

Think of this as a mini-senior seminar. (Many students have in fact used their topic as the starting point for a senior seminar.) Each student will present once, and act as a "reviewer" 2-3 times during the semester. Typically, you will not have to review on the week of your presentation.

Format: Formal 8 - 10 minute oral presentation with about 2-4 minutes for questions and discussion. The talk must be very well prepared and rehearsed in advance so as to fit in the allotted time (including timed rehearsals). **(A 12 minute maximum per person will be strictly enforced.)** Also, there will be no time at the beginning of class for last minute preparations; the first talk must begin promptly at 9:05. Presenters are encouraged to use appropriate overheads and/or provide handouts to augment their presentations. Because of the limited time available (and chance for technical problems), Powerpoint presentations are not allowed. (Note however that Powerpoint can be used to prepare a talk, and printed on to overheads/transparencies.) Remember that the presentation represents 10% of your final grade.

Students will present a summary with appropriate background of a recent paper or few closely-related papers from the scientific literature (no older than 2003). The paper(s) must be **primary literature**, not a review article. Beside introductory material and conclusions, the talk should present some specific key experiments found in the paper(s). This part of the presentation usually is centered around showing and explaining one or more key figures and/or tables from the paper. Although some basics of the topics may be covered in lectures leading up to the presentations, the student is encouraged to read all necessary and appropriate background in preparation for the presentation. It is likely that you may need to obtain some materials by visiting the UCSD Biomedical library. Directions can be found on the Biology 376 home page.

Students should select the paper and submit a copy no later than 3 weeks prior to the date of presentation for approval by the instructor (PDFs preferred). Students are strongly encouraged to discuss paper selection with the instructor as soon as possible. It is often best to provide several possible paper selections. The final paper selection must be completed by 2 weeks prior to the presentation. Once a topic is selected, the student should schedule at least one session with me to discuss the paper and the background/context for the paper. [As most students have limited experience reading the primary literature, you will likely need help to prepare an excellent presentation. Students without such preparation may not be able to achieve a top grade on the presentation.] It is helpful for you to alert me several days in advance of our meeting to ensure I have time to read the paper completely.

One week prior to presentation, materials to be added to the class home page must be given to me for posting (see "Read More About It" below). Also one week prior, copies of the paper must be provided to assigned student "reviewers" and the instructor. Reviewers are required to read the paper and expected to ask questions following the presentation that reflect their knowledge of the paper, and examine the web materials provided by the presenter in the week prior to the presentation. Reviewers will also fill out a brief evaluation of the presentation in question. Following presentations, all students (not just assigned reviewers) are encouraged to ask questions or make comments; one's participation here constitutes a portion of the "Discussion participation" grade.

Presenters for a given week may coordinate their talks to cover closely related topics if they wish. This can lend a coherence to the session that benefits everyone participating. Topics are listed by week below. By prior approval, a student may deviate from the suggested topics.

There is considerable virtue in selecting an article that you believe will be accessible to the greatest number of your peers; for example, by choosing one directly related to course topics.

Presenter responsibilities:

Select paper in consultation with instructor
Meet with me at least once to discuss your chosen paper in detail
Provide web materials to instructor for posting
Distribute copies of paper to reviewers and instructor on selected day (emailing a good PDF of the article is preferable – and will save you the cost of reproduction.)
Complete tasks on the assigned schedule; it is not the responsibility of the instructor to remind you of due dates.

Reviewer responsibilities:

Receive paper from presenter on selected day [note: if you miss class that day, it becomes your responsibility to get the paper from the presenter].
Read paper and examine presenter's web materials prior to presentation.
Ask questions following presentation (that demonstrate your knowledge of the paper)
Fill in a one-page sheet evaluating the presenter's presentation and web page (due by next class date).

Additional Guidelines for selecting a paper:

The article must be a basic research article, not a clinical or epidemiological report (i.e., an article from a journal with the word "Clinical" in the title is highly unlikely to be acceptable). Note that some free online journals are obscure and not particularly good. You need not restrict yourself to articles that are available online (unless you are at the UCSD Biomedical Library, where many good journals are available online).

Check the "Read More about it" pages to see examples of papers presented by students in previous years (accessible from the class home page). Papers used previously are not eligible for presentation – you should check yours against those.

Preferred Journals

Developmental Biology	Development	Evolution & Development
Genes & Development	Science	Nature
Neuron	Cell	Development, Genes & Evolution
Developmental Cell	PLOS Biology	BMC Developmental Biology

Proceeedings of the National Academy of Science (PNAS)

Any PLOS (www.plos.org) or BMC (www.biomedcentral.com) journal is acceptable with respect to quality (these are all open access online). Note, however, that the BMC journals include many clinically-oriented journals (generally unacceptable).

A 'lottery' will be held to determine priority for presentation date selection (to be announced). Be sure not to miss class or arrive late on the appointed day.

Class Presentation Topics and Dates

Nov. 18 (W) Developmental Neurobiology-related or patterning genes. Examples: Neurotrophins (NGF, BDNF, NT-3, CNTF, CDF-LIF, etc.) in normal development and as therapeutic agents in human disease; The human L1 gene and fetal alcohol syndrome; Limb pattern formation genes (Tbx, Hox, sonic hedgehog, FGFs, etc.)

Oct. 28: **Copy of proposed paper(s) due to instructor**
Nov. 4: **Paper selection completed**
Nov. 11: **Submission of "Read More About It" web materials to instructor**
Copies of complete paper distributed to "reviewers"

Nov. 23 (M) Cell death/Apoptosis in normal development & disease. Examples: ced genes, bcl-2 gene, p53 gene, bax genes, caspase genes.

Nov. 2: **Copy of proposed paper(s) due to instructor**
Nov. 9: **Paper selection completed**
Nov. 16: **Submission of "Read More About It" web materials to instructor**
Copies of complete paper distributed to "reviewers"

Dec. 2 (W) Cancer: Oncogenes & Tumor suppressor genes. Examples: p53 gene, p21 gene, p73 gene, p16/p16Ink4a, BRCA genes, telomerase, sonic hedgehog, growth factor signaling pathways, Wnt signaling pathway genes, etc.

Nov. 11: **Copy of proposed paper(s) due to instructor**
Nov. 18: **Paper selection completed**
Nov. 23: **Submission of "Read More About It" web materials to instructor**
Copies of complete paper distributed to "reviewers"

Dec. 9 (W) Cancer: Oncogenes & Tumor suppressor genes.

Nov. 18: **Copy of proposed paper(s) due to instructor**
Nov. 23: **Paper selection completed**
Dec. 2: **Submission of "Read More About It" web materials to instructor**
Copies of complete paper distributed to "reviewers"

[Nov. 23 deadlines – underlined – are not on the regular one-week-prior schedule of deadlines because of the Wednesday, Nov. 25, holiday (Thanksgiving break). Please make note of this.]

Guidelines / hints for giving a good class literature presentation

Paper Selection

1. Select an interesting paper, and seek to make it interesting to your audience. If you don't find the article interesting, chances are no one else will either.
2. Select a paper that is closely related to material from class. There should be familiar keywords in the title (gene names, embryonic structures or cell types, familiar organisms and embryonic stages). The more familiar the material, the more likely your audience will be able to follow your presentation and find it interesting.

Preparation

1. Read the paper thoroughly as soon as selection is complete. It may take several careful readings to get a solid understanding of the paper. Take notes, and list questions you have about techniques, experiments and concepts covered in the paper.
2. Read related background material that places your paper in a bigger context of developmental biology questions. This can include literature reviews, textbooks and websites. As necessary, read or skim key other articles cited by your paper.
3. Meet with the instructor at least once during office hours to discuss your paper in detail. Some students find a briefer preliminary meeting early in preparation is helpful, followed by a longer, more detailed meeting in the week prior to the presentation is best. You should come prepared with specific questions and notes. A few days notice of your intended meeting date is helpful to be sure the instructor has time to thoroughly read your paper before the meeting.
4. Anticipate questions that your reviewers and others might have so that you can answer clearly and quickly.

Talk Mechanics

1. Start with a 'big picture' introduction, putting the paper in the overall context of developmental biology – especially, relate it to material covered in class and in the text. Allow 1-2 minutes for this. Ideally, allow a minute to summarize and return to the big picture at the end of the talk.
2. Primary literature articles may be long and very thorough – don't try to cover everything in the paper. Select what you consider the highlights. That is one of the major tasks and challenges of your talk: summarizing and simplifying a large complex written presentation into a coherent, brief oral presentation.
3. Present actual data from the paper using its figures and tables. Since these figures can be quite complex, you may reproduce and simplify them for your presentation. Remove or block from view parts of a figure or table you are not dicussing. If necessary, rework data into a new, simpler figure.
4. Present little or nothing about methods/techniques – only as much is necessary to understand the experiments presented. You should, however, understand how the work was done to some reasonable degree by the time you present. If you find the techniques completely incomprehensible or extremely difficult to explain, maybe this isn't the best paper to present.
5. Use the allotted time well. The talk should be at least 8 minutes and not more than about 10 minutes to allow time for a few questions and answers. The organization of your talk is an important portion of your grade.

"Read More About It" web page associated with your class presentation. This is due to the instructor one week prior to the presentation (by 5 PM).

Format: a few paragraphs, up to the equivalent of about a page of text that succinctly explains the background, significance, and main points of your paper - in your own words. This should be understandable to anyone in the class and should NOT be a copy of the paper's abstract (see below).

The text will be followed by a list of at least 5 related links. The first of these links must be to the PubMed abstract or full text of the paper being presented. Additional links may include links to review articles (especially good if you can link to an accessible full-text article) that you used to help understand the materials, laboratory websites of the paper authors, lay information about subject (there may be many of these if a human disease is involved). Not all the additional links should be to related literature. Note: in collecting web addresses ("URLs"), beware of websites that use "Frames" - it may be difficult or impossible to create a link directly to the page of interest. Be sure to test your web addresses prior to submission to make sure they work.

Use one of three different methods for submitting your mini-webpage:

1) Submission page on the class website - this is the easiest, most reliable method. Everything will be automatically formatted for you (assuming you input correctly). You don't have to know any HTML code. Try to get everything right the first time to avoid having to submit a corrected version.

2) Submitting a plain text file in HTML code - if you already know how to do this, or can use a program such as Dreamweaver to assist you. This provides more flexibility in formatting. You can add 'bells & whistles' if you wish.

3) Setting up your own web page and providing the instructor with an appropriate link only. This requires the most knowledge about web publishing, etc., but the greatest flexibility, and the ability to change any errors without resubmitting to the instructor through the submission page.

Note that grading will based on content - not by appearance. If you want to, and enjoy doing fancier web 'stuff,' then by all means do so. Otherwise take the simple route and use the provided web submission page. This assignment is NOT about teaching you HTML or web publishing, but rather to write about your article in your own words, and to provide links to related information.

After your web page appears on the website, check it for errors and malfunctioning links. Corrections should be submitted as soon as possible. [Note that your web page does *not* appear automatically. It may take a day or two for me to examine and post your submission.]

As noted above, examples of previous year's pages are accessible from the class home page.