



DEVELOPMENTAL BIOLOGY LABORATORY WRITING PRACTICUM

BIOSC 1531

SYLLABUS SPRING 2008

Instructor

Dr. Gerard Campbell

203 Life Sciences Annex

Office Hours: By appointment, e-mail to arrange.

Phone: (412) 624-6812

e-mail: camp@pitt.edu

Course Objectives

This course is designed to improve your ability to write in a clear, concise, structured, well-reasoned manner on scientific topics. Your primary goal is to be able to read appropriate materials on a given topic in developmental biology and extract from this material relevant facts and hypotheses that can then be used to compose an essay on this topic. At this stage of your academic career you should be reasonably proficient in the basics of the English language; any deficiencies in this regard will be pointed out early on and efforts should be made to improve these during the course.

Format

Three essays will be assigned for this course, the titles can be found below. Your goal is to write a clear, concise, well-argued essay on each topic.

For each essay, you will:

- Read papers I provide, find and read papers yourself on the essay topic
- Produce a plan which you will e-mail to me.
- Meet with me as a group to discuss your plans.
- Write your first draft and e-mail it to me.
- Your first draft will be graded.
- Meet individually with me to discuss your first draft.
- Write a revised, final version.
- This will be graded.

Your grade will be based on a combination of your grades for your first drafts and final drafts of the three essays.

The essays

You may not have had much experience with writing essays, so the following advice will help:

Before starting

- Read the title of the essay very carefully and decide what information might be required to answer the essay.
- Read the title of the essay again. An essay is not necessarily a simple review of a particular topic, but you will need to review the topic in the essay.
- These are scientific essays and so will differ stylistically from an essay you might write, for example, on a topic in English Literature. You should be familiar with scientific writing, but read a review article on anything to get a feel for the kind of style that is appropriate. For example, direct quotes are rarely used.

Reading material

- Determine where you can find the information you need for your essay.
- Have you covered the topic before in lecture or in the lab class?
- Your text book should have some information on the topic.
- You must read additional papers. You should be aware that there are two types of papers you will find in journals – ‘review’ articles and ‘research’ papers or primary literature. Review articles can be a good introduction to a particular topic (assuming you can find an appropriate review), but you must also read some primary literature – i.e. the papers that actually document specific experiments.
- For some of the essays I will provide papers for you to read. You must read all of these.
- You should also find additional material yourself. Relevant papers may be referenced in the papers I provided for you. In addition you can search for other papers. A simple Google search can sometimes be productive. Two more specific places to do this are:

PubMed <http://www.ncbi.nlm.nih.gov/sites/entrez?db=pubmed>

Google Scholar http://scholar.google.com/advanced_scholar_search?hl=en&lr=

- Finding appropriate papers can be a somewhat daunting task given the quantity of papers available, but doing this is another skill you need to acquire. You should be able to determine whether a paper might be relevant just from its title, a quick perusal of the abstract will indicate if you should bother reading any more. In general there are less review articles than primary literature so it is sometimes easiest to find two or three good reviews and then look for good primary literature that is referenced in these reviews. However, you should always look for recent primary literature that has been published after the most recent review you are using. The introduction section to research
- Pitt has a subscription to almost all of the journals that you will need access to so you will be able to download the papers from a Pitt computer. If you have any problems downloading articles you are interested in get in touch with me.
- If you have difficulty finding appropriate reading material you should set up a meeting with me to get help.

Read and take notes

- When reading papers you obviously need to identify important points and experiments that are relevant for your essay.

- Make notes while you read. To prevent plagiarism, be very careful when you do this, you need to make very clear when you are copying directly from a source and when you are summarizing and using your own words. An excuse that is almost always made in cases of plagiarism is that the plagiarist used notes they thought were their own words but in fact were copied directly from a source. This is not an excuse that is accepted by anyone.
- You do not necessarily need to read the whole of a paper in detail. One skill you must acquire is the ability to determine whether what you are reading is relevant for your task at hand. This can be difficult, especially if you do not fully understand what you are reading, but gets easier with experience. So only some of a paper may be relevant for the essay you are writing. Just because I recommend you read a paper, does not mean that everything or even most of what is in the paper is directly relevant to your essay.
- In your essay you must present examples of real experiments to support any arguments you make (and reference these appropriately), so be aware of this when you read.
- If you feel that you just do not understand what you have been reading, you should set up a meeting with me to get help.
- If you come across a word that you do not understand, do not just ignore it, search on-line for a definition.

Make a plan

- Before you begin to write your essay, you should make a plan of what you are going to say, outlining each paragraph or group of paragraphs – these will break the main body of the essay into sections (and possibly sub-sections). Decide on titles for each of these sections and sub-sections. There should be a logical progression between the sections, so that adjacent ones are related and so the essay is not a random assortment of topics. You will submit this plan to me before you start to write your essay.
- Your plan will consist of your list of sections and sub-sections, with possibly a sentence in each section.
- Your essay must start with an introductory paragraph and end with a concluding paragraph, so write 'Introduction' as a title at the beginning and Conclusion as title at the end.
- List your sources of references (all the ones I gave you plus additional ones you have found and read yourself).

Diagrams and Figures

As they say: 'a picture is worth a thousand words' and this very true for science. You have two options: draw your own diagrams or import relevant ones from the papers you have read. For the former option you would have to scan the drawing afterwards and then import it into your essay. The latter option is probably easiest and should be considered 'fair use' and not infringe copyright laws assuming this is the only place you will use the image, and the source is properly acknowledged (if you are worried about copyright you can get in touch with the publisher).

- Figures must be numbered and be referred to in the text as (Fig. 1).
- You must provide a legend below the figure – your own legend, not just a copy of the one that came from the original paper.
- At the end of the legend you must cite where the figure came from, unless you drew it yourself.
- Figures do not count towards the length requirements of the essay.

Some advice on inserting figures into your essays:

- These can be acquired either from the pdf of the paper or from the ‘full text’ HTML version of the paper on the internet.
- For a pdf, you can simply select and copy the relevant figure in Acrobat and then insert it into your Word document (see below).
- For a full text paper, simply click on the image enough times to get the version with the best resolution then right-click, select ‘Copy’ and then insert into your Word document.
- To insert an image you have copied into your Word document, go to a new line, go to Edit>Paste Special>choose ‘Picture’. You can resize the image by clicking on it once and using your cursor to move the box in or out. To position the image how you want it you may want to modify the Wrapping – click on the image once, go to the Formatting Palette, and choose the Wrapping style that is most appropriate (it would take me too long to explain all this, just experiment yourself, if you have problems, just come and see me).

References

- You must reference your sources of information. The references should be listed at the end of the essay.
- There are different formats for listing, but as there are no space limits for your references (they do not count towards the word limits) you should use the full reference with the title along with the authors and journal name, issue and page, e.g.:
Wehn, A. and Campbell, G. (2006). Genetic interactions between scribbler, Atrophia and groucho uncover links in transcriptional repression. *Genetics* **173**, 849-861.
- Within the essay refer to the references as is done in most published papers with the authors and date in parentheses, e.g., (Wehn and Campbell, 2006), as the source for something you have just stated.
- In general it is not a good idea to refer to a web page.
- You should not refer to discussions with me or to lectures or lecture notes as sources of your information: any source should be published.

Write your essay

- Write the full title of the essay at the top of the first page, along with your name and the date. Number the pages, put your name in the header (page 2 onwards) or footer.
- Before you start to write your essay, in bold write down the headings of the sections you decided on in your plan. Then write ‘Introduction’ and ‘Conclusion’ as headings at the beginning and end of your essay – your essay must start with an introductory paragraph(s) and end with a concluding paragraph.
- You should probably write the introduction first – but do not forget to revise it when you have finished. The Introduction tells the reader what you are going to do in the essay (so that they can determine whether they want to read the rest of it), briefly mention the main points of your different sections, or what these sections are trying to say. You do not need to give your opinion here (if one is asked for in the title), but you can if you like.
- Fill out the different sections.
- Go through your text and make sure that everything you say is backed up by a reference.
- After the Conclusion heading put the final heading: References, and list all your references as mentioned above.
- Insert diagrams/figures, give each a number and write the legend. Go through the text and insert the figure number wherever you refer to it.

- Write the Conclusion – remind the reader what you have talked about, bring everything together, what does it all mean, what is the bigger picture, what is your opinion and why?
 - Make sure your essay conforms to the format and length described below.
 - Reread your essay. Make changes. Does it have an introductory paragraph? Is there a conclusion? Look at your plan again, does your essay include all the points you wanted to make? Is your language appropriate – would it look out of place in a published paper?
 - Spell check.
 - Proof read.
 - Do a word count (excluding the title and the references and the legends) and put this at the end of the essay: after the last reference write ‘ Word count: =’.
 - Get someone else (anyone) to read your essay, they do not have to understand it.
 - Take it to the Writing Center and ask them to look over it with you.
 - Make sure the name of your essay file is ‘yourlastname1531-#’ and then e-mail it to me before the deadline.
-

The Writing Center at the University of Pittsburgh

Additional assistance is available from the Writing Center at the University of Pittsburgh. A statement from their website is as follows:

‘The Writing Center is a free tutorial service for Pitt students. Writing Center consultants can help you with your academic, professional, or creative writing. They can help you learn how to generate ideas, organize your writing, and understand assignments. They can help you deal with any sentence-level problems that you have, too. It's a great place to go in order to have a thoughtful reader for your work. For more information about the Center or to make an appointment, visit the website: www.writingcenter.pitt.edu. ‘

It is essential that you take advantage of this service:

YOU MUST GO TO THE WRITING CENTER AFTER YOU HAVE WRITTEN THE FIRST DRAFT OF EACH OF YOUR ESSAYS TO DISCUSS THEM WITH A CONSULTANT BEFORE YOU HAND THEM IN TO THE INSTRUCTOR.

You can make an appointment online to see a consultant either at the O’Hara Student Center or Hillman Library. Drop ins are also available at the OSC. Meetings last 25 minutes, and you can have a maximum of two in one week (so you could go before completing your plan and then after your first draft).

Format and length of Essays

Each essay should be double spaced with 1 inch margins top bottom and side using Times 12 point (around 320 words per page). The length should be around 1600 words or can be slightly longer if you wish, but not longer than 2000 word (as Mark Twain once said: ‘I would have written a shorter letter, but I did not have time’). The essays should be e-mailed to me (camp@pitt.edu) before the deadline. Label your files with ‘yourlastname1530-#’

Plagiarism

Avoid! Read the informative page from the Department of English at Pitt:

http://www.englishlit.pitt.edu/lit_plagiarism.html

Note, for our scientific essays, direct quotation is not usually appropriate, so you must paraphrase (and obviously reference your source).

Course info

The website is: <http://courseweb.pitt.edu>, and 1531 should be listed on your opening page. The site will be used by the instructor to post announcements, reading materials, and grades. If you have any problems entering the site or if this course is not listed you should get in touch with the help desk (624-HELP).

GRADES

You will be given a mark out of 10 for each essay (both first effort and revision) and the total for the six will be used to determine your final grade. Obviously, expectations will be much higher for a revision.

Outline of schedule

I WILL NOT REMIND YOU THAT YOU NEED TO SCHEDULE OR HAVE ALREADY SCHEDULED A MEETING WITH ME! IF YOU MISS ONE IT WILL NOT BE RESCHEDULED UNLESS YOU HAVE A GOOD EXCUSE.

January 12: Schedule first two group meetings and the five individual meetings later in the semester.

Inform Instructor (by e-mail) of times in your schedule when you can meet during the normal work day (8 am – 6 pm) in most weeks this semester. I cannot meet on Monday and Wednesday afternoons. I will try and schedule the group and your individual meetings for the same time on each week there is a meeting (obviously if something important comes up later you can request a different time).

My schedule is usually pretty tight so be very punctual (is more inconvenient if you are a couple of minutes early than late).

Week of January 5-9: Group introduction meeting. To discuss what is outlined in this syllabus.

Week of January 19-23: Group meeting to discuss the 1st essay before you write it. Before the meeting you must have read all the papers I supplied, plus additional papers you found for yourself. You must e-mail me your plan for the essay the day before the meeting.

February 1: 1st essay, first draft due by 11:59 pm.

Week of February 2-6: Individual meeting to discuss your 1st essay.

February 15: Revision of 1st essay is due by 11:59 pm.

Week of Feb 16-20: Group meeting to discuss the 2nd essay before you write it. Before the meeting you must have read all the papers I supplied, plus additional papers you found for yourself. You must e-mail me your plan for the essay the day before the meeting.

March 1: 2nd essay, 1st draft due by 11:59 pm.

Week of March 2-6: Individual meeting to discuss your 2nd essay.

March 22: Revision of 2nd essay is due by 11:59 pm.

Week of March 23-27: Group meeting to discuss the 3rd essay before you write it. Before the meeting you must have read all the papers I supplied, plus additional papers you found for yourself. You must e-mail me your plan for the essay the day before the meeting.

April 5: Third essay due by 11:59 pm.

Week of April 6-10: Individual meeting to discuss your 3rd essay.

April 19: Revision of 3rd essay due by 11:59pm.

Location of my office

All meetings will be held in my office in my lab, room 203 in the Life Sciences Annex, the new building attached to Langley and which projects towards Tennyson; this building is locked so you cannot just walk in. For your meetings I will meet you outside the main Biological Sciences office on the second floor of Langley (A234). If you are late you will have to call my office : 412-624-6812, or my cell if there is no response from my office, 412-848-3502. If everything fails, go to the main Biological Sciences office (A234 Langley).

ESSAY 1

‘Multicellular animals (Metazoans) must have evolved from single-celled ancestors.

(a) What are some of the general mechanisms utilized by metazoans to achieve multicellularity, that are not strictly required by simple single-celled organisms?

(b) Is there any evidence that molecules involved in any of these mechanisms might actually have been present in the single-celled ancestors that gave rise to metazoans?’

Suggested reading

Before reading anything you should simply think about what the differences are between single celled organisms and multicellular animals. What is required to achieve multicellularity? Are any of these mechanisms already used in some way by single celled organisms?

Reviews

Wolpert, L. (2011) Principles of Development. (Oxford University Press), pp 559-562

Brooke, N.M. and Holland, P.W.H. (2003) The evolution of multicellularity and early animal genomes. *Curr*

Op Gen Dev **13**, 599-603.

Alegardo, R. A. and King, N (2014). Bacterial influences on Animal Origins. *Cold Spring Harb Perspect Biol* 2014;6:a016162.

de Mendoza and Ruiz-Trillo (2014) Forward genetics for back in time questions. *eLife* 2014;3:e05218.

Research papers

Alegado *et al.* (2012) A bacterial sulfonolipid triggers multicellular development in the closest living relatives of animals. *eLife* 2012;1:e00013.

King, N et al (2008). The genome of the choanoflagellate *Monosiga brevicollis* and the origin of metazoans. *Nature* **451**, 783-788.

Abedin, M. and King, N. (2008). The premetazoan ancestry of cadherins. *Science* **319**, 946.

Levin et al (2014) The *rosetteless* gene controls development in the choanoflagellate *S. rosetta*. *eLife* 2014;3:e04070. [The de Mendoza and Ruiz-Trillo paper above is a comment on this research paper].

ESSAY 2

‘Discuss the origin, both embryological and evolutionary, of the neural crest.’

Suggested reading

Donoghue, P. C. J, Graham, A., and N. Kelsh, R. N. (2008). The origin and evolution of the neural crest. *BioEssays* **30**, 530-541.

Sauka-Spengler, T. and Bronner-Fraser, M. (2008). A gene regulatory network orchestrates neural crest formation. *Nat Rev Mol Cell Biol* **9**, 557-568.

Bronner, M. (2014). Migrating into Genomics with the Neural Crest. *Adv. Biol* **2014**, 264069.

Sauka-Spengler, T, Meulemans, D., Jones, M., and Bronner-Fraser M. (2007). Ancient Evolutionary Origin of the Neural Crest Gene Regulatory Network. *Dev Cell* **13**, 405-420.

Yu, J. Meulemans, D., McKeown, S. J., and Marianne Bronner-Fraser, M. (2008) Insights from the amphioxus genome on the origin of vertebrate neural crest. *Genome Res* **18**, 1127.

Abitua, P. B., Wagner, E., Navarrete, I. A., and Levine, M. (2012). Identification of a rudimentary neural crest in a non-vertebrate chordate. *Nature* **492**, 104-108.

ESSAY 3

First, describe how the *hedgehog (hh)* gene was first identified. Second, discuss how the Hedgehog signal is made, moves within tissues and is transduced in responding cells. Finally, discuss how Sonic Hedgehog signaling can result in multiple transcriptional responses during patterning of the neural tube in vertebrates.

Suggested reading

- Nusslein-Volhard, C. and Weischaus, E. (1980) Mutations affecting segment number and polarity in *Drosophila*. *Nature* **287**, 795-801.
- Briscoe, J. and Therond, P.P. (2013). The mechanisms of Hedgehog signalling and its roles in development and disease. *Nat Rev Cell Mol Biol* **14**, 416- 429.
- Dessaud, D., McMahon A. P., and Briscoe J. (2008). Pattern formation in the vertebrate neural tube: a sonic hedgehog morphogen-regulated transcriptional network. *Development* **135**, 2489-2503.
- Cohen, M., Briscoe, J., and Blassberg, R. (2013) Morphogen interpretation: the transcriptional logic of neural tube patterning. *Cur Op Gen Dev* **23**, 423-428.
- Balaskas, N., Ribeiro, A., Panovska, J., Dessaud, E., Sasai, N., Karen M. Page, K. M., Briscoe, J., and Ribes.V. (2012). Gene Regulatory Logic for Reading the Sonic Hedgehog Signaling Gradient in the Vertebrate Neural Tube. *Cell* **148**, 273-284.