

Biology 222: Genetics and Molecular Biology

Literature Review Assignment

This literature research and writing assignment will allow you to explore a specific topic of your choice using recent primary scientific literature. The process is similar to the way that a scientist in most research areas establishes a contextual framework, essentially a baseline, of current scientific knowledge that the investigators attempt to extend through contribution of their own experimental findings.

You will select a topic related to the fields of molecular biology and/or genetics (these are very large research areas in biology containing innumerable potential topics). You will obtain and read current primary articles (you may want to read reference as well as review article(s) as well but these are distinct from primary scientific research articles). The **proposal** for your assignment will be due on January 31 (TH sections) or February 1 (MWF sections). You will then prepare an **annotated bibliography** (see below for details) that briefly summarizes, evaluates and critiques your primary articles in your own words. Next you will write a **review of the literature**, which will take the form of an **Introduction** to a scientific paper. After obtaining instructor and **peer review** of your literature review, you will **revise** the literature review and submit it for final grading.

A good resource to become familiar with is *A Handbook of Biological Investigation*, 6th edition, by Ambrose, et al. Chapters 9-11 and 13 will aid in your completion of this assignment. In particular, read pages 122-126 on the writing of an Introduction for a scientific paper. Be sure to follow CSE-style documentation in your reference list, as explained on pp. 375-384 in *Writing to Influence the Affairs of the World*. Within the text of your paper, use the “author, year” format as demonstrated in Ambrose.

Overview of Requirements and Due Dates:

Assignment	Points	Due Date (MWF/TH)
Proposal	10	February 1/January 31
Annotated Bibliography	40	February 18/19
Literature Review	40	March 17/18
Peer Review	10	March 26/27
Revised Literature Review	100	April 11/10

Literature Review Proposal:

When selecting a topic it is usually a good idea to be as specific as possible. Broad topics within these fields (e.g. “Human Genetic Diseases,” “Molecular Biology,” “AIDS” etc.) will result in too much information for a focused 3- to 5-page, double-spaced paper. Rather, frame your paper around specific topic or answering a specific question. For example, “What does recent research on gene therapy for the genetic disease cystic fibrosis tell us about current and/or future treatments for this illness?” Feel free to talk with your instructor further about potential topics.

The following dates are designed as a way to start you thinking about your paper and investigating research literature on a topic. During lecture on **January 24th/25th** we will meet with a librarian in the library to begin working with potential topics. *Please bring to this class a short list of at least two topic ideas that you would like to explore further to this class.* By **February 1st**, you will hand in a brief **research proposal**. This description should be approximately 200 words and provide an overview of what you hope your paper will accomplish. You should:

- Write a specific topic sentence. What is the purpose of your review?
- Why do you want to write a paper about this topic?
- What do you already know about your topic? What more do you need to learn about your topic in order to write a well-informed paper?
- Provide a preliminary outline of your research strategy. Which databases will you use? What keywords or phrases will you try? What challenges do you think you might encounter?

Annotated Bibliography:

An annotated bibliography of *at least 8* sources is required for this project. You must include at least one Review article pertinent to your topic, as well as at least one, but not more than three, Reference sources and at least *three primary research articles*. The remainder of your bibliography may include additional review and primary articles or it may reference secondary sources such as reputable media sources or Internet sites (try to obtain “.gov” or “.edu” Internet sources if you use them). Wikipedia and other open edit sites are not appropriate references for the bibliography, although they may help you get started on the early stages of your research.

An annotated bibliography is a list of citations to articles. Each CSE format citation is followed by a brief (~100 words) descriptive and evaluative paragraph; the annotation. The purpose of the annotation is to inform the reader of the relevance and quality of the sources cited. Each annotation should include as many of the following criteria as possible:

- Background/authority of the author(s)
- The currency of the article and its intended audience
- A comparison of this work with another you have cited
- Explanation of how this work illuminates your research topic
- Comments on pertinent charts, graphs, statistics or illustrations

Important: If you use an electronic database to locate materials for your annotated bibliography, remember that ***copying and pasting or even rephrasing the abstracts provided by the database is plagiarism***. Electronic databases are covered by copyright law, and therefore, using database entries to create annotations without actually **READING** the article they refer you to is highly unethical. Students who submit plagiarized annotated bibliographies will receive at least a 50% reduction in their grade and possibly no credit (a zero) for this assignment.

The following are two examples of journal article citations and annotations drawn from the Annotated Bibliography of Aron Gorackowski (Biology 222, 2007).

Amos W and Harwood J. 1998. Factors affecting levels of genetic diversity in natural populations. *Philos.Trans.R.Soc.Lond.B.Biol.Sci.* 353(1366):177-86.

The two authors of this review article work for the Department of Zoology and the University of St. Andrews, both in the UK. It was published nine years ago and appears to be intended for a more novice scientific audience interested in factors contributing to genetic diversity. This article is important to my topic because it provides a basis by which genetic diversity is affected, other than bottlenecks. The majority of my other research articles focus solely on the genetics of the bottleneck. Several factors that affect diversity and are listed in this paper are inbreeding depression and heterozygote instability. Inbreeding depression is the decrease in fitness through the increased expression of deleterious (harmful) alleles; it is much more common in small population sizes. Heterozygote instability proposes that mutation will increase with heterozygosity, therefore boosting genetic variation in already diverse populations.

Drake GJ, Kennedy LJ, Auty HK, Ryvar R, Ollier WE, Kitchener AC, Freeman AR, Radford AD. 2004. The use of reference strand-mediated conformational analysis for the study of cheetah (*acinonyx jubatus*) feline leukocyte antigen class II DRB polymorphisms. *Mol.Ecol.* 13(1):221-9.

The authors of this article work for the University of Liverpool, University of Manchester, and the National Museums of Scotland. The intended audiences of this piece are scientists interested in the genetic variation of cheetahs and in alternative ways to study their variation. The major histocompatibility complex (MHC) is a very common region used to analyze genetic variability, however, this study uses reference strand-mediated conformational analysis to evaluate genetic variation in cheetahs by examining the feline leukocyte antigen (FLA). Extending from genetic variability, the authors also address the disease susceptibility due to the cheetahs' high monomorphism. A very useful graph is presented to show the degree of variation in the FLA region.

Literature Review:

The review will be between three and five double-spaced pages and written in the form of an Introduction to a scientific paper. Include your reference list in CSE format and appropriately reference all sources in the text of your review. Two copies will be submitted. One copy of the paper will go to your instructor and one copy to your peer reviewer. You will receive written and/or oral feedback from the professor and peer reviewer in preparation for the final paper.

Peer Review:

You will serve as a peer reviewer for the literature review written by one other member of the class. Your assignment is to give that student both written and oral feedback about the strengths of their paper and suggestions for ways their paper can be improved. Please prepare **two copies** of a 1-2 page double-spaced typed summary of your overall comments, as well as write specific suggestions on the paper itself. You will provide the author of the paper with your written review as well as meet with them to go through your specific comments and suggestions. Time will be available during class on the due date for these meetings. You will also hand in a copy of your written review to your professor -

this review will be graded and will count for 10 points of your total score on the literature review assignment.

You may want to think about the following questions as you formulate your review. These are suggestions to help you get started; you do not have to cover every point on this list and you may want to add additional points that pertain to the paper you are reviewing.

- What things do you like about this paper?
- What did you learn from this paper?
- Is there anything confusing about this paper?
- Is there any unnecessary information in this paper?
- Is there any important information that is missing from this paper?
- Is there anything that could be explained more clearly?
- Do the ideas in the paper flow in a logical sequence?
- Are there any terms used in this paper that you do not understand?
- Do you have any suggestions concerning the overall structure of the paper (should sections be presented in a different order or format; should more space be given to a certain section of the paper, etc.)?
- Did you detect any problems with grammar, spelling, or citation style?
- What are your reactions to the writing style?
- Is there anything that you did not understand when you read this paper? If so, you should work with the author to come up with ways to make the problem topic more understandable.

Final Literature Review:

Based on the feedback you receive from your instructor and your peer reviewer, revise your literature review in both content and style for final evaluation.