

Effective writing strategies

BIOL 426/626
Approaches to Molecular Biology



Class 12: Effective writing strategies for the research review



- **Learning Goal**
 - To understand the goal of a research review and some of the strategies used to make the review more effective in communicating to the reader
- **Learning Objectives**
 - Analyze the objective of a research review
 - Evaluate methods for identifying trends or patterns in published literature and to identify opportunities for future research
 - Discuss the correct method of organizing the review and for citing sources in the review
- **Next reading assignment:**
 - Penrose & Katz (2004) Chapter 7

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Topics for discussion



1. What is the overall purpose of a review?
2. Who should it be written for (who is its "audience")?
3. How do you find the content for the review (the literature reviewed)? How related should the reviewed articles be?
4. How can you find "trends and patterns" in the articles?
5. How do you identify areas for future research?

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Writing assignment: what is it?



- Explore the molecular biology of a "favorite gene/protein"
- Gene or protein with a known connection to human health
 - Each group focuses on a particular disease type
- Topics to be covered:
 - Structure and function of the gene/protein
 - 3-dimensional structure of the protein (or a related protein) if known
 - Protein's function in cellular process(es)
 - Observable phenotype of the disease state
 - Explore the current state of research, possible future research approaches
 - These should extend from features of structure and/or function of the protein and disease connections

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How to approach writing it



- Identify the gene
- Explore its disease connection (start with "Genetics Home Reference" (<http://ghr.nlm.nih.gov>) and Online Mendelian Inheritance of Man (OMIM: <http://www.omim.org>).
- Discover what is known about the gene/protein
 - Does the encoded protein have an obvious function (kinase, protease, membrane receptor, etc.)?
 - Has its structure been solved (<http://www.rcsb.org>)? Cellular location? Cellular processes it is involved with?
 - Mutant phenotypes for homologous genes in model organisms (yeast, Drosophila, Zebrafish, mouse, rat, etc.)
- Explore current state of research on the protein and propose future research goals
 - You should exploit the current papers to find hints about where future research will be going

Research articles?

How do you identify them?

Telling research from review papers?

How much should they overlap?

Hints for future research?



What is the purpose of a review?



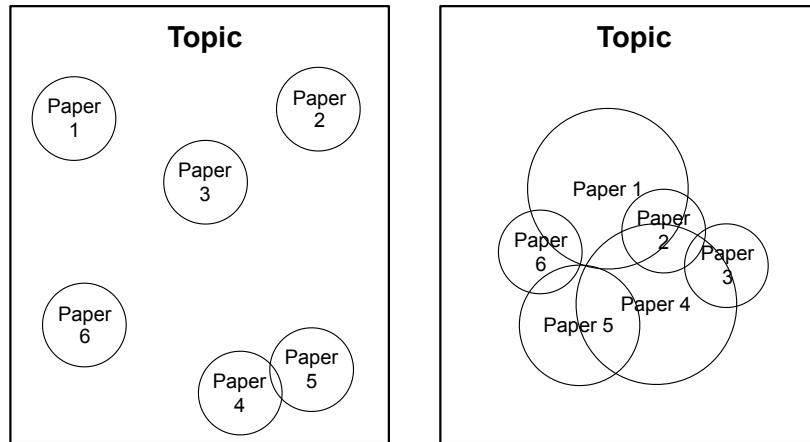
- Survey recent discoveries in a particular area of science
- *Synthesize* results from a group of published papers
 - What does the field already know about the topic?
 - What kinds of studies have been done?
 - What methods have been used? How useful were they?
 - What was learned from the studies?
- Provide roadmaps for future research
 - Where are the gaps in current knowledge?
 - Which gaps are the most critical to close?
 - How might that be done experimentally?
- Especially in the topic area of this assignment, how could the results of future research affect clinical care?

What questions should you be asking?



- When reading the papers under review think about...
 - Why did the researchers pursue the studies?
 - What questions did they ask?
 - What conclusions did they draw?
 - How does what they found relate to what you would like to understand about your gene/protein?
- Compare and contrast their work
 - How do they agree/disagree?
 - Are the differences important?

Relationships among the reviewed articles?



Which set of papers should produce a more interesting review? Why?

What central question do you want to answer?

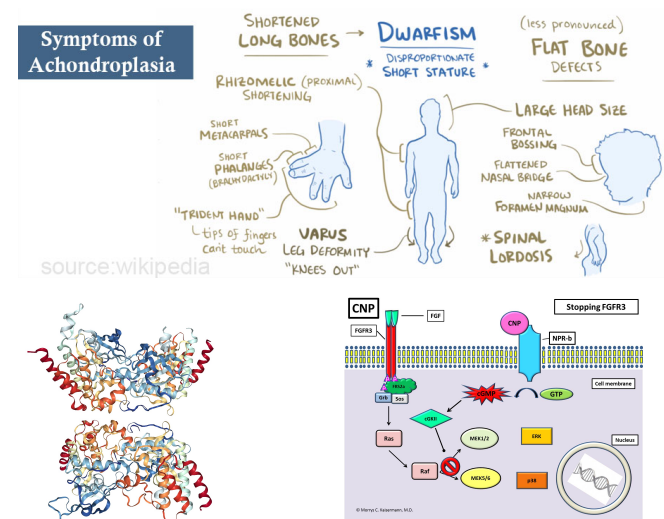


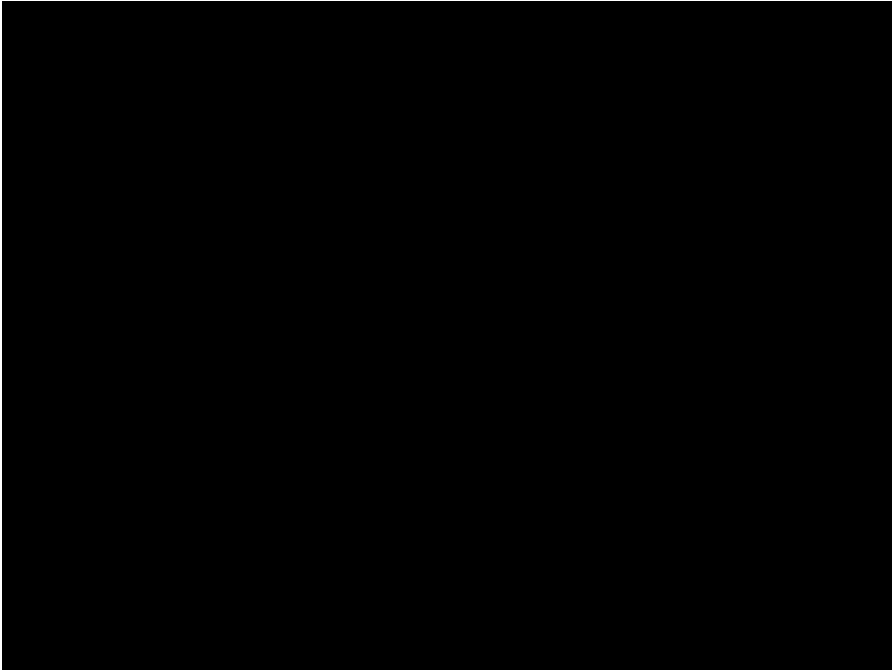
- Can you write a simple question about the molecular biology of your gene/protein?
- Could relate to...
 - ...the molecular mechanism of the associated disease
 - ...how the protein functions within a larger molecular complex
 - ...what knowledge about the protein contributes to finding a cure/treatment
- Formulate this question at the beginning of your research
 - Base it on what you learn from your reading
 - Make it as specific to your gene/protein as possible
 - Avoid broad, generalized questions

In-class activity: topic grids



Topic grid activity





Why is audience important?



Reading for next time:



- "Methods to engineer proteins: Dale, Genes to Genomes, Chapter 7