**Comparative Analyses** **4141W STUDENTS ONLY**

The objectives of these three assignments are:

- to help you process some of the challenging material in the first half of the course by working with it (writing to learn)
- to improve scientific writing skills on a series of relatively short assignments (learning to write)

| Assignment | Topic and viruses | Peer workshop in small group | Revision due |
|---|---|---|---|
| Analysis 1. | Compare and contrast the early events in infection (attachment/penetration/uncoating) in poliovirus and influenza virus-infected cells | Fri. Feb. 11<br><br>*Revising for content and clarity* | Tues. Feb. 15 |
| Analysis 2. | Compare and contrast mRNA synthesis and genome replication in poliovirus and vesicular stomatitis-infected cells | Fri. Feb. 18<br><br>*Revising for cohesion and conciseness* | Tues. Feb. 22 |
| Analysis 3. | Compare and contrast viral protein synthesis (translation mechanisms) in poliovirus and influenza virus-infected cells | On your own | Tues. March 8 |

The data sheet and in class activity on Feb. 3 serve as the basis for your first writing assignment: a comparative analysis of the events in the viral life cycle from cell attachment to uncoating/penetration (when the viral RNA genome becomes available for mRNA synthesis or translation---depending on the virus). In the second and third versions of this assignment (analyses 2 and 3), you will go on to compare and contrast the biosynthetic events (RNA and protein synthesis).

We will talk about how to write a comparative analysis, and we'll peer workshop some paragraphs from prior years in the writing session on Friday February 4.

A comparative analysis should be overt, and focus specifically and precisely on those molecular details/events that are similar and those that are different. Simply describing the early events for each virus in turn will not satisfy the goal of these assignments. Neither will describing virus A, describing virus B and then saying that they are similar or different. Your analysis should clearly indicate HOW certain structures, events, or mechanisms are similar and how they are different. Don't leave your reader to make the links…make them yourself (synthesis). Further, your analysis should be focused; there should be logic to the events/structures that you have chosen to compare. Your reader should know why they are important. Our work in class will help to clarify the logical frame of reference or lens through which to craft your comparison and the scope/level of detail.

> *This is the kind of critical scientific analysis that is a component of the background and significance section of a grant application.*

**Audience:** Write with the view that your "audience" is CBS classmates who may not be taking this course. The style and approach, therefore, should be very much like what you might read in a general scientific text or review article. Organize your thoughts, and support your generalizations with molecular details, but aim for a Scientific American level. Write to teach/inform.

> *This is what effective grant-writers do, because reviewers are often not individuals in your field. The importance of your work needs to be explicit and accessible to a wide audience.*

Write the material in your own words. In other words, do not plagiarize and beware of inappropriate paraphrasing. This should be easy because the assignment is asking for a comparative analysis---not simply a description of what each virus does. For information about paraphrasing and plagiarism, see the Writing Resources link in the Tools section of the website. If you need help deciding when to cite, ask!

**Length:** You should be able to accomplish the analysis of attachment and penetration/uncoating in 300-500 words. If the word limits seem unreasonable, please see Dr. Schiff for advice!

**Source material:** You should be able to get all the information for these analyses from the textbook. If you need to clarify material, consider:

- Fields Virology, 5th edition (Do not use older versions of this reference because the evolving nature of the field makes it unreliable as a current source)
- Recent review articles

Do not use websites (including wikipedia) for this assignment or others in this class. Also do not use general microbiology texts. These sources may not contain up-to-date, accurate information. When in doubt, ask!

**Referencing format:** If (and only if) you use a source other than the textbook, include a bibliography (not included in the word count). Use the reference format that is required for Journal of Virology. Instructions can be found on page 7 of "Instructions to Authors", a PDF file in the MicB 4141W/4171 Tools section of the course website. Follow the J. Virology format both for how to insert the citations in the document and how to prepare the bibliography.

Why do I specify a particular format? *Each scientific journal has its own idiosyncratic requirements for referencing. Authors are responsible for following the instructions perfectly! If they don't, reviewers get snarly.*

**Criteria for grading the paper:** Please look at the Writing Assignment Rubric on the course website. I have attached it to the end of this document. This paper, like all others, should be carefully prepared (well-organized, typed, proofread for errors and clarity). As mentioned above—the primary goal of this assignment is *synthesis*.

**Comment from a former student on the use of writing assignments as a tool to learn course material:**

- ".. "The first writing assignments both helped me learn the material in more depth. In order to really understand and remember processes viruses use for attachment, entry and regulation of gene expression, a student needs to analyze and work with the material. If hearing the lecture and reading the textbook are the only exposure students have to complex material, students can easily forget the material."

**Guidelines for ALL writing assignments in MicB 4141W**

1. A standard page has 1" margins on all sides. Use 11 point Arial or Helvetica (double-spaced).
2. Please indent paragraphs. Do not add extra spaces after headings or between paragraphs.
3. Include your name in the header of all pages and staple papers together before turning in the hard copy.
4. Please submit an electronic copy in WebCT as instructed.

   Name the document as follows: Assignment_yourlastname.doc (or docx).

   For example:

   - Early_events_schiff.doc
   - RNA_synthesis_schiff.doc
   - Translation_schiff.doc
   - Blog_schiff.doc
   - News_Views_schiff.doc

5. Referencing:
   a. You must (must) use the Journal of Virology reference format. Instructions to authors can be found assignment section of the web site. Follow the format for the references section **AND** for dealing with references in the body of your report. Follow the style guide precisely. Scientists must follow specific journal guidelines when they submit manuscripts for publication.
   b. If you use large reference books such as Fields' Virology, you need to reference the chapter and authors of that chapter.

6. Need help? Contact Professor Schiff.

General Scoring Rubric for Scientific Writing Assignments

| | |
|---|---|
| **Exemplary**<br><br>an A paper….. | • Clearly and overtly establishes the context and purpose for writing (helps the reader care); meets or exceeds the expectations of the assignment with respect to scope<br>• Anticipates and responds to the needs of the audience (reader-friendly)<br>• Persuasively develops the subject matter; supports conclusions with data and/or evidence from the literature<br>• Is organized logically and clearly (structured to reflect scientific logic and/or reasoning)<br>• Uses carefully focused, emphatic, and concise sentences<br>• Chooses words for their precise meaning<br>• Uses correct grammar, spelling, and punctuation<br>• Follows the conventions of scientific presentation (format, terminology, documentation, referencing, graphics, and so forth) |
| **Quality**<br><br>a B paper... | • Has a specific context and purpose (related to the assignment), but these may be less clearly defined or cover less scope than in an A paper<br>• Responds appropriately to the audience, but may not anticipate their needs<br>• Thoughtfully develops the subject matter, but the evidence may be less persuasive (fewer supporting details)<br>• Is generally organized logically, but the organization may lapse<br>• Uses generally clear sentences, but they may be wordy or lack focus<br>• Uses words accurately, but may have some unnecessary jargon or a few overly general or vague words<br>• Has few problems with grammar, spelling, or punctuation<br>• Generally follows the conventions of scientific presentation |
| **Adequate**<br><br>a C paper... | • Often does not have a clear context for writing; it will generally have a purpose, but the purpose may not be readily apparent or it may be tangential to the assignment; the scope may fall short of the assignment<br>• May have only a vague sense of audience or respond inappropriately for the audience<br>• Is likely to treat the subject matter superficially or contain inaccuracies<br>• Will have some sense of organization, but the organization may be illogical or artificial; transitions are likely to be choppy or weak<br>• Will have generally understandable sentences, but they may be awkward, wordy, or rambling<br>• May contain vague, inappropriate, or overly general words<br>• May have several problems with grammar, spelling, and punctuation, but these general do not prevent understanding<br>• Often does not follow the conventions of scientific presentation |
| **Needs Improvement**<br><br>a D paper… | • Does not address the question; lacks a sense of context or purpose<br>• May show little understanding of the needs of the audience<br>• May show little understanding of the subject matter or may be incomplete<br>• Is likely to be organized illogically or randomly<br>• Is likely to have many problems with sentence structure and coherence that impede understanding<br>• Is likely to use many vague and imprecise words or much inappropriate jargon<br>• May have many problems with grammar, spelling, and punctuation or may have a few problems of such severity that the paper is difficult to understand<br>• May show little awareness of the conventions of scientific presentation |
| **Inadequate**<br><br>An F paper… | • May respond inappropriately to the assignment<br>• May be very brief and underdeveloped or include much irrelevant information<br>• May show little understanding of sentence structure<br>• May use words inappropriately<br>• May have many severe problems with grammar, spelling, and punctuation |