Fall 9-1-2001

MICB 420.01: Virology

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MICB420: Virology, Fall 2001

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RESOURCES

WEB:

Literature searches:

http://www.ncbi.nlm.nih.gov/PubMed/
http://uncweb.carl.org/reveal/

General virology information:

All the Virology on the WEB.
http://www.tulane.edu/~dmsander/garryfavweb.html

Journals:

Journal of Virology	Science
Journal of General Virology	Nature
Journal of Experimental Medicine	Virology

Proceeding of the National Academy of Science

Text (required): Principles of Virology, Flint, et.al. ASM press, 2000.
References: Field's Virology. On reserve.
Selected course material will be on a UM EREs site. Password is virUS. (case sensitive).

COURSE GOALS

The course provides an introduction to the structure and function of viruses that infect eukaryotic cells. The first part of the semester will focus on the life history strategies of major virus families. Topics in the second half of the semester will address virus-host interactions. It is essential that you have a good understanding of virus replication strategies and molecular interactions between virus and host cells for the second part of the course.

An important aspect of science is accessing information. Virology is a rapidly changing field. Therefore, in this class, you will also gain experience in researching the primary scientific literature. There will be assigned readings of primary articles or review articles. In addition, you will need to research topics for an essay and oral presentation. You will also be responsible for several journal summaries on articles of your choice. The WEB site listed above will help you to access basic information on individual viruses and provide links to more specific resources.

The goals of the course are:

1) To understand strategies of viral replication
2) To compare strategies of virus adaptation to host
3) To relate viral replication strategies to pathogenesis
4) To develop expertise in:
   - Accessing information
   - Reading a scientific paper
   - Effectively communicating ideas

STUDENT OBLIGATIONS

In order to meet the goals for the course, each student will be responsible for all material discussed in class. The text is intended for use as a learning resource. Chapters in the text related to classroom discussion topics are indicated in the syllabus. Students will be responsible for understanding the basic concepts discussed in the text. If there is specific information in an assigned chapter that you should understand in detail, those page numbers are underlined in the syllabus. In-class exercises and one exam will assess expertise on the basic concepts that are discussed in class or are in the text.

An additional objective of the course is for students to develop expertise in accessing and interpreting primary scientific literature. To achieve this goal, each student will write 2 summaries and one review on journal articles that have appeared in the literature in the last year. Reviews and discussion on assigned articles will be conducted to help prepare you for this exercise.

Effective communication of ideas is a final objective for this course. Each student will develop and express ideas on a concept in both an essay (assigned topic) and an oral (student choice) presentation format.

On all assignments, graduate students will be graded on a scale that reflects the enhanced level of performance expected for students in a graduate program.

GRADING

10 in class exercises (8 will count for grade)-20%
1 exam-25%
2 journal summaries- 5%
1 journal review- 10%
Essay-25% (outline=5%, draft 1=10%, final=10%.
Presentation-15% (outline/preparation=5%, presentation=10%)

Students will have one week following return of an exam or assignment to review answers with Dr. Poss. Please make an appointment to review a test.

MAKE UP EXAMS

There will be one make-up exam date scheduled. If you are absent for the exam, arrangements to take a make-up exam must be made prior to the test date and will require verification of illness from a doctor or involvement in a recognized University of Montana activity. There will be no make-up dates for missed in-class exercises.

FINAL GRADES

90%-100%	A
79%-89%	B
68%-78%	C
55%-67%	D
<55%	F

WRITTEN ASSIGNMENTS

Note that NO late assignments will be accepted without prior approval. If you are sick, you can submit a written assignment to me by email. All essays and journal reviews must be typed or produced on a word processor, conform to the page limitation listed below, and have 1.5 spacing and no smaller than 11 font size.

Always give the full reference of the journal article at the top of the summary or review.

Journal summary: A summary is not a critique. The purpose of a journal summary is to succinctly state the key points of a scientific manuscript. You should not quote the authors. It should be one paragraph in length-not longer than one page. Plagiarism is unethical and will result in an automatic failure. Specifically, you should:

1. State the hypothesis
2. State the significance of the hypothesis
3. Give a brief summary of the background literature needed to understand the hypothesis and significance.
4. Describe the methodology used to address the hypothesis. Note that you do NOT need to describe the method. For example it is sufficient to say (e.g.) that the presence of protein expression was determined by flow cytometry. You do not need to describe specifically how the assay was done.
5. Summarize the significant findings.
6. State the conclusion reached.

Questions will be included with the articles that should also be addressed in your report.

Journal Review: One of the most important things that we do as scientists is participate in the peer review process. For the 3th journal assignment, you will practice a full review of a journal article. A review of a scientific manuscript should start with a summary as described above (indicated with a * in the list below). In addition you should include the comments below. The review should be 3 pages or less.

Introduction:

*1) What is the question or hypothesis that the authors are addressing.

*2) What is the significance of the question or hypothesis.

3) Is the background given in the introduction adequate for you to understand the question and its significance. Are there examples. Are references current and accurate. [What additional information do you need? You may need to review articles that are referenced to fully understand a concept in a field other than your own.]

Methods:

4) Are the methods described in sufficient detail for you to reproduce the work.

5) Are the methods used in the paper suitable to answering the question or testing the hypothesis.

6) Is the use of "unconventional" methods justified and adequately described.

Results: You should summarize the results of EVERY graph and table in the article. Do this before you read the authors interpretation of their results in the text.

7) Are the results displayed in a logical, understandable fashion.

8) Are controls adequate and appropriate.

9) Is sufficient data presented so that you can interpret results.

10) Are appropriate statistical methods used to analyze data.

Discussion:
11) Does the discussion clearly summarize the findings.
12) Are results from the paper discussed in relationship to other research on the subject.
13) Are discrepancies in the data discussed.
14) Does the data from the report address the question that was posed.
*15) Was the proposed hypothesis proven or rejected.

Essay: An essay question will be distributed in early November. Note that there is no "right or wrong" answer to the question posed. The purpose of this exercise is for you to research the primary literature and develop arguments to explain a position. The first step will be to search the literature for appropriate references and to develop an outline of your approach to the issues. Your references and outline will be turned in for grading (dates and percentage of grade indicated below). You MUST submit a detailed outline indicating specifically the points that will be made in each paragraph. The references that you will use to support these points should be included although you can add additional references for the written version. An outline does not need to be written in complete sentences, but it does need to be grammatically correct and spell checked. Using the comments from the review of your outline, write the essay. These will be reviewed, graded and returned to you. In the final version of your essay, you MUST address questions and comments from the review. Not that if either the outline or the first draft does not comply with the above requirements, or if they are not written in sufficient detail, you will receive 0 credit. I encourage you to have other students in the class read the outline and the draft before you turn them in.

Final essays should be 4 pages or less. You should clearly state the question that you will address in the first paragraph. The following paragraph should include sufficient background for the reader to understand the significance of the question and your perspective. Subsequent paragraphs should provide PRIMARY data from referred journals that supports (or refutes) your position. Do not forget to reconcile discrepancies in the literature and to summarize your essay in a concluding paragraph. References must be included. You will be graded on the following technical points as well as grammar, style, and general "readability":

Is the premise of the essay clearly stated.
Is the background given sufficient to understand the significance of the question.
Is the supporting data current and accurately represented.
Are references current.
Is the argument presented logically.
Is the essay adequately concluded.

Outline- 5% due Nov 7
Draft-10% due Nov 19
Final –10% due Dec 10.

Class Presentation: Each student will choose a topic to present in class. Topics should integrate into the discussions on virus/host interactions that will make up the second half of the semester. These include:

1. Host immune response to virus infections
2. Viral pathogenesis
3. Viral evolution
4. Emerging viral infections

If you are very interested in a different topic, please see me about including it as a presentation.

Your presentations should concern a topic in virology that is of high significance or controversy. The references must come from the current literature. You may work with 1 other student to prepare your presentation, but each of you should take a unique aspect of the topic. For example, one student might want to present the issue and give the background. One student could present primary research data on the topic. Both students could discuss/debate the results, conclusions and significance of the work. You may also choose to do a presentation on your own. Presenting a primary research article for discussion is permissible for this exercise IF the article is presenting controversial or highly significant new information.

Submit your presentation proposal by September 26. The proposal must include the topic, why you think it is significant, what points you will make and how you intend to support them (e.g. give references), and how you intend to organize the discussion (e.g. are you presenting with someone else, will you base the discussion on a primary article and provide background and discussion points for the class). All topics must be approved by October 8. A complete, detailed outline of your talk is due 2 weeks prior to the presentation. These will be returned with comments that you must incorporate into your presentation. You are responsible for distributing any written information or articles to the class one week before the presentation. Presentations will be 15 min with 5 minutes for class discussion and evaluation. Presentations will be given in November and December.

COURSE OUTLINE

[The first half of the course is discussed in Section II of the text]

1) Sept 5 Introduction [Ch 1]

2) Sept 7 NO CLASS. See syllabus for assignment.

3) Sept 10 NO CLASS. Review eukaryotic replication, transcription, translation [Ch. 8, Ch.9 315-320, Ch 10, Ch 11, 371-384, 391-398].

4) Sept 12 Overview of virus classification. [Ch 3, 87-96].

Turn in background and interest information.

Turn in assignment on literature search

5) Sept 14 Life history strategies-overview. [Ch 4, 106-114, Ch 5, Ch 12, 431-434, Ch. 13, 463-474]
The amazing and creative repertoire of viral replication strategies [Ch 6-8, 261-263, 274-276, Ch. 9, , Ch. 10, 331-340, 351-353, 358-366, Ch 11. 384-391]

Journal article #1 distributed

6) Sept 17 Generating diversity, maintaining resiliency. [Ch. 6, 190-195, Ch 9, 323-327, Ch. 20, 717-729]

7) Sept 19 Papovaviruses -Polyomaviruses

Journal article #1 summary due

8) Sept 21 Papovaviruses - Papillomaviruses/Discussion of journal summaries

9) Sept 24 Adenoviruses/Mechanisms of viral transformation

10) Sept 26 Herpesviruses

presentation proposals due.

11) Sept 28 Pox viruses and parvoviruses

Journal article #2 distributed

12) Oct 1 Hepadnaviruses

revised presentation proposals due

13) Oct 3 Positive strand RNA viruses: Picornaviruses

14) Oct 5 Togaviruses and flaviviruses

Journal article #2 due

15) Oct 8 Coronaviruses

Presentation topics must be approved

16) Oct 10 Retroviruses

17) Oct 12 Retroviruses

Journal article for review distributed

18) Oct 15 Negative strand RNA viruses: Paramyxoviruses & Rhabdoviruses

19) Oct 17 Negative-strand segmented viruses: Orthomyxoviruses

20) Oct 19 Arenaviruses & Bunyaviruses

Journal review due.

21) Oct 22 Review

22) Oct 24 **Midterm**

[The second half of the course is addressed in Section III of the text]

23) Oct 26 Viral pathogenesis/discussion of journal review [Ch. 15]

24) Oct 29 Viral pathogenesis

25) Oct 31 Viral pathogenesis

Essay question distributed

26) Nov 3 **Presentations**

27) Nov 5 Viral latency/persistence

28) Nov 7 **Presentations**

Outline and references for essay due

29) Nov 9 Viral induced proliferative diseases [Ch. 16]

30) Nov 12 Holiday

31) Nov 14 Host responses

32) Nov 16 Host responses

33) Nov 19 **Presentations**

First draft of essay due

34) Nov 26 **Presentations**

35) Nov 28 Viral evolution

36) Nov 30 Viral evolution [Ch. 20]

37) Dec 3 Emerging viral diseases [Handouts]

38) Dec 5 **Presentations**

39) Dec 7 Retroviral pathogenesis [Ch. 18, handouts]

40) Dec 10 **Presentations**

Final essay due

41) Dec 12 Retroviral pathogenesis

42) Dec 14 Retroviral pathogenesis