MICROBIOLOGY 404, 2019: Selected Topics in Pathogenesis
INSTRUCTOR: Dr. R.E.W. Hancock
Jan. 2-Apr. 3, 11.00 am -12.00 noon, M-W-F
Location: LSC-1410

COURSE OBJECTIVES

- To give the student experience at reading the scientific literature and summarizing this information in a concise form for presentation to peers.
- To provide information on selected topics in Bacterial Pathogenesis.

ASSESSMENT

- 25% for Major presentation (includes peer assessment)
- 10% for Case study (includes peer assessment)
- 8% for Classroom participation and discussion
- 12% for Peer reviewing (Google Forms method)
- 30% for a Midterm Exam/Critique: i.e. a 4-page written assessment of a paper from the literature (taken from 2018 or 2019 Infection and Immunity - every student must select a different paper and register it with the course instructor) as the mid-term exam. This paper must be different from the papers presented in the lectures. Due Mar. 1.
- 15% for setting exam questions and providing written answers for 2 lectures: 1 assigned student major presentation and 1 instructor presentations selected by the student.

PLEASE NOTE ALL ASSIGNMENTS ARE LISTED AT THE END OF THIS DOCUMENT.

STUDENT LECTURES

Over the course of the semester each student will present one major presentation (25 minutes) and one case presentation (10 min to discuss a recent relevant paper) with the remaining 15 minutes for questions and discussion. Please note that this is not a seminar course so no specific marks will be assigned for seminar presentation per se, but rather you will be assessed based on your ability to summarize a topic (major talk) or paper (case study) in a concise and informative manner.

The two students for any given day must also prepare a joint list of 8 questions that can be asked by the class of the student-lecturers, and must distribute these prior to the class. These should be specific questions as opposed to general questions that require a re-presentation of the lecture to answer. All students will be assigned a grade based on their active participation in classroom discussion during the 15 minutes of each class assigned to discussion.

All presentations will be posted on the internet (http://ubcmicb404.com/). They should be forwarded to Jillian Turner <assistant@hancocklab.com> clearly labeled in the file name with the course, student last name, type of presentation, and date, e.g. **MICB404Hancock25minMar10**.

I am more than happy to look at your presentations in advance <bob@hancocklab.com> and make broad suggestions providing they are sent to me at least one working day before the presentation. Past experience has indicated this is very helpful to student presenters

Major presentation

The major presentation must consist of a **synopsis and discussion of a given topic**, and will be based on specific literature. Overview or key papers on the topic are provided under the topic heading,

but while you can use these to tease out the major points for discussion, the student should read more widely to gather source material (particularly experiments see below). Students can lecture in any manner that will suit their own style (also remember how you like your lecturers to present), and grades will be based on information content and NOT on ability to speak in public (this is not a seminar course). Students are advised to make the presentation using visual aids. As a rule of thumb, no more than 18 visuals per 25 minute lecture should be presented, and students **must present specific experiments to illustrate important points** and include models, pictures, graphs and tables to make the lecture more visually interesting (experimental data should be in at least 50% of your slides**)**. The images section of www.google.ca provides an excellent source of images to liven up presentations.

Case Study

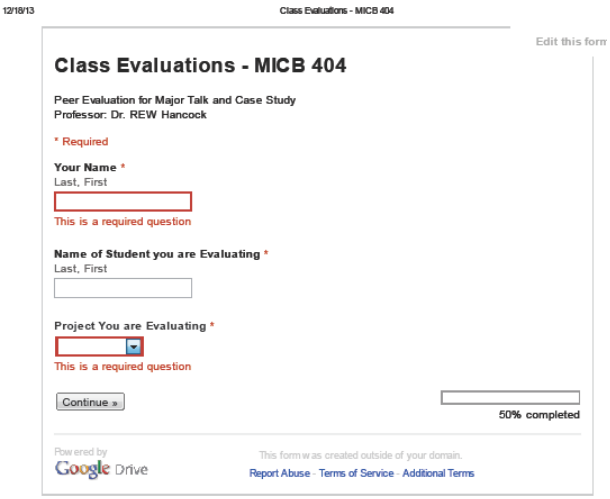
The case presentation shall consist of a single paper (**not** one of the ones under the topic headings). The idea is not to present the entire paper but to choose one or two key experiments that shed light on the topic presented. It is strongly suggested that the 10 minute presentation include no more than 6 visuals which should include one visual with the title, authors and journal details as well as the take home message you wish to present, 4 "data" visuals including methods, results (may include an abridged Table, Figure or scheme), and one visual summarizing the conclusions and how these relate to and shed light on the topic.

Peer Reviewing

A peer review will be performed by 3 students on each student presentation using Google Forms. ***This must be done no later than two weeks after each student presentation.*** The forms are found at https://docs.google.com/a/hancocklab.com/forms/d/1BDMjWM4D929TiKT1Y9d_jJy3kOGkctYpXw_nNb5N2yc/viewform. **For clarity each student will be assigned to do 3 peer reviews.**

This link will be e-mailed to you as it is quite complex. There are two pages. On the first you will identify yourself and the student you are evaluating and the project you are evaluating (Major talk or Case study). On the second you will be asked to provide an overall grade and to score various criteria: namely:

- The talk adequately informed about the topic.
- The presentation was interesting and utilized appropriate graphics.
- The presentation was informative.
- I was able to understand the take home message.
- The talk was well illustrated with experimental examples.
- The class discussion was well handled.



There is also a comments box provided that you must fill in that states: "In the comment box below please discuss general impressions about the presentations mentioning what was found especially good and what could be improved". Please provide **in a non-confrontational manner** feedback to the presenter describing what you felt were the good points and areas for improvement (concentrating on content rather than oral presentation ability).

All comments must be provided within 2 weeks of presentations. The student grading will be considered in the assigning of a mark for the presentation and the quality of the peer reviewing, and your ability to perform this reviewing in a timely manner, will be assessed as 12% of the total grade for the class.

MIDTERM CRITIQUE

You will need to choose a paper for the midterm by January 31st, which is due on Froday, March 1st. The instructions are: You are required to write a 4-page written assessment (spacing is your choice of 1, 1.5, or 2 line spacing) of a paper from the literature (taken from 2018-19 issues of the journal Infection and Immunity - every student must select a different paper and register it with my assistant; assistant@hancocklab.com) as their mid-term exam. I am looking for students to write a critique that clearly defines what the paper is about (the Take Home Message), why the study was done (Background and Rationale), the major findings (with reference to actual experiments, keeping methods descriptions to a minimum), and a critical appraisal of the paper (what is good and bad about the paper, did they in your opinion succeed in proving what they set out to do, what remains to be done, what it contributes to the field and knowledge in general, etc). It is useful to actually create headings for each of these topics to ensure you have covered them. I do not want you to reiterate the paper. You do not need to reproduce the Figures and Tables although you can choose a subset of the information (e.g. part of a Table to illustrate your points). Please append a copy of the paper and you can refer directly to the Figures and Tables therein.

FINALS

There will be no formal sit-down exam for this course. Your final exam will comprise a take home exam due to me at latest Mondat April 1st. You will be assigned one student topic and asked to address a second lecturer topic of your choice. For these two topics you will be asked to provide two exam questions (one for each of the two topics) that you believe would suitably test a student's knowledge in these topics. In addition you must provide a 1-2 page, 1.5 line spaced answer to each question.

You can draw on your experience at UBC to provide the type of question you might consider optimal for testing knowledge. I am happy to examine questions (but not answers) in advance and comment on their suitability. They would need to be sent to me by Wednesday March 27th.

Examples of questions might be:

1. Discuss the following with reference to at least two specific examples of new approaches towards the therapy of infections (these can come from any lecture). “Antibiotic resistance is decreasing the effectiveness of current antibiotic and new approaches are greatly needed.”

2. **Tuberculosis Vaccines:** With the current BCG vaccine being insufficient to prevent adult cases of tuberculosis infection or reactivation, what is the best combination of vaccine and adjuvant (immune response specific effects rather than constituent names) would be the best choice to replace the BCG vaccine? Please explain your choice.

Lecture Outline

1. Planning and Initial Lecture. Antibiotic mode of action and resistance.
2. Antibiotic mode of action and resistance.
3. Antibiotic mode of action and resistance; Adaptive resistance,
4. Antimicrobial peptides:
5. Antibiofilm peptides:
6. Alternatives to antibiotics.
7. Innate Immunity and Host Defence Peptides.
8. Host Responses and immunity. Systems Biology of Innate Immunity.
9. Immunomodulatory peptides as novel therapeutics.
10. Immunomodulatory peptides as novel therapeutics. (cont).
11. Anti-inflammatory peptides
12. Student Topic Lecture 1. New antibiotic drug discovery.
13. Student Topic Lecture 2: Alternatives to Antibiotics.
14. Student Topic Lecture 3.
15. Student Topic Lecture 4:
16. Student Topic Lecture 5. Flagellin and epithelial cells in innate immunity.
17. Student Topic Lecture 6. Vaccine Adjuvants.
18. Student Topic Lecture 7. Nod receptors in immunity.
19. Student Topic Lecture 8. Exploiting host cell signalling.
20. Student topic lecture 9. Bacterial pathogens and autophagy.
21. Feb 25: The danger hypothesis and innate immunity.
22. Communication, Motility, and Virulence in the *Vibrionaceae*.
23. Student Topic Lecture 10. Neutrophil traps.
24. Peptide transporters.
25. Student Topic Lecture 11. Type VI secretion. R
26. Neglected global diseases. What can we do about them?
27. Student Topic Lecture 12. Developing a new vaccine for TB. Kaufmann,
28. Student topic lecture 13. Vaccines against major developing country diseases (Malaria, HIV).
29. Student Topic Lecture 14. ID and validation of novel drug targets for tuberculosis therapy.
30. Student Topic lecture 15. Value of metagenomics in understanding host defences and disease.
31. SHIP blocks mucosal autoinflammation.
32. Student Topic Lecture 16. Probiotics.
33. Student Topic Lecture 17. Student Topic Lecture: Biofilms.
34. Bacterial Bioinformatics.