Molecular Mechanisms of Cancer Course (MICI4027/5025, BIOCH4027, PATH5027)

There are two 1 1/2 hr lectures/seminars per week (Tue and Thur from 1:05 - 2:25 pm) in Room 2005 in the Dentistry Building. The sections include:

Angiogenesis and cancer metastasis (David Waisman) (Jan 10-29);
Oncogenes and Tumor suppressors (Patrick Lee) (Jan 31 - Feb 19);
Cell cycle and DNA repair mechanisms (Graham Dellaire) (Feb 21, Mar 5-21);
Apoptosis, anoikis, autophagy, senescence (Kirill Rosen) (Mar 24 - Apr 9).

There are two major objectives of this course:

1. To give students a good foundation in cancer molecular biology and expose them to the most up-to-date and ground-breaking cancer research.
2. To offer students an opportunity to improve their scientific communication skills.

The course is divided into four sections, each of which deals with a different, but inevitably overlapping subject area. At the start of each section, the faculty coordinator responsible for that section gives a general overview of the subject area in a 1.5 hour lecture. Subsequent sessions involve the oral presentation by students of individual research articles supplied by the faculty.

There is one powerpoint presentation per class which should be carefully planned and should be rehearsed to last approximately 60 min. Handouts of the presentation should be distributed to the audience at the beginning of the presentation. The student presenting the paper should provide a general overview of the paper and relevant background information before presenting the specific results. The objective is to ensure that the class fully appreciates the nature and significance of the research. Presenting students will be evaluated on their comprehension of the paper and on their communication skills (a copy of the evaluation criteria is provided) and will be given written assessments of their presentation immediately after the presentation to aid in their subsequent presentation. Each student will have **two** opportunities for an oral presentation. These presentations are worth **30% each** for undergraduates and **25% each** for graduate students.

In order to improve the level of comprehension of the audience and the discussion (a major goal of the course), all class members are required to read the paper in advance. Students should take note of results they are unclear of and ensure the presenter addresses their concerns. To encourage students to read the papers, and to allow students an opportunity to improve their writing skills, at the start of each class all audience members must hand in a summary of the paper to be presented that day (two page, double-spaced maximum). Guidelines for these concise paper summaries are appended. Students must submit **two** of these summaries from each section (Total **8** summaries). These summaries are worth **30%** of the total grade.

Communication and comprehension are facilitated by a two-way flow of information. As a result, the audience is expected to be familiar with the material to be presented and to contribute to the discussion of the paper. To encourage class discussion and audience participation, **10%** of the final grade is awarded for participation. It is essential that the

audience ensured they understand the results presented and are encouraged to ask for clarification when necessary. It is understood that the presenting student is not an expert in the field and may be unable to supply an answer to all questions posed especially when the question relates to interpretation of the results or their context in the larger subject area. The faculty members are present to serve as facilitators of the discussion and to ensure that students appreciate the significance of the research.

Graduate students are required to submit a brief (5-6 page, double space) section summaries of the two sections in which they do not do oral presentations. The summary should provide an overview of the section, addressing the relevant results from each paper and their impact on the field. The summary should also incorporate some of the issues raised during class discussion, and include a critical analysis of the paper and/or alternate approaches or future direction. What is the state of the field? What questions remain outstanding? From where will the next advancement arise? Summaries will be graded, and returned to the students as soon as possible. These summaries are worth **10%** of the final grade.

Summaries and Audience Guidelines

Individual Paper Summaries:

- the introduction of a scientific paper serves as two purposes: (1) to concisely present the relevant background literature, and (2) to identify unanswered questions in the field.
- This latter point usually serves to set up the rationale for the current paper (Why was this study performed? What specific issue(s) were they trying to address? How would answering these issues advance the field?)
- Recommend that you read the paper in the following order: introduction, abstract, discussion, then results
- The paper summaries should be double-spaced (to allow for editorial comments from faculty coordinators) and a maximum of two pages (to force you to try and write concisely)
- Summarize the background information (2-3 sentences) and identify the rationale(s) for the paper (what are the "holes" in the field at the moment)
- identify the objective of the paper (usually part of the last paragraph of the introduction; what specific issues will be addresses)
- when reading the paper, try to identify the main objective of each figure and the conclusion of that figure (frequently part of the title of the figure)
- briefly summarize the approaches used, the results obtained (the observations), and the conclusions that can be drawn from these results (conclusions are not the same thing as the observations)
- most scientific papers are only making one or two significant overall conclusions, frequently indicated in the title of the paper. Finish your summary with 1-2 sentences that provide an overall summary conclusion of the paper
- make sure you separately jot down questions you have about figures (what method is being used? what do the results mean?) or the paper itself and make sure the presenter answers these questions for you. These questions can serve to promote class discussion

Section Summaries:

- 5-6 pages, typed, double-spaced (independent of figures)
- briefly summarize the relevant background for the field before getting in to discussion the rationales for the papers presented, their objectives and approaches, and the significant observations and major conclusions of the paper
- ensure that the reader is left with a sense the state of the field, and how these papers contributed to this understanding or development
- discuss problems or issues identified during the presentation and during class discussions, and provide any appropriate critiques of the papers
- outline or hint at future research directions and the outstanding issues in the field
- work on writing clearly and concisely while having your summary “flow” from one point into the next

Presentation Guidelines

Format:

- ☐ aim for 60-70 min. and rehearse ahead of time
- ☐ powerpoint presentation
- ☐ on rare occasions use the chalkboard for material you will need to refer to repeatedly
- ☐ use large, well labeled slides with a minimum of text (don't write whole sentences, use brief point form notation as visual cue for what you want to discuss)
- ☐ remove the figure legend, blow up the figure, add your own labels to clarify cryptic labels typical of scientific papers (lane 1,2,3 etc doesn't tell anybody anything)
- ☐ sometimes helpful to actually summarize the conclusion of the experiment on the overhead in a couple of words

Introduction:

- ☐ Briefly summarize "the big picture" to set the terms of reference for the paper (what is happening in the field being discussed?)
- ☐ What is the rationale behind this paper? (why were these studies conducted?)
- ☐ If you can tie this paper to previous presentations, do so
- ☐ What are the major objectives of the study?
- ☐ Briefly state the major conclusions of the paper (why was this paper published?)

Results:

- ☐ outline the specifics of the system being discussed
- ☐ Highlight (bars, lanes in figures) areas of significance that you wish to emphasize
- ☐ provide an overview of the methods/approaches to be used (you and the audience cannot understand a figure if you do not appreciate the method. You don't need to dwell on basic methods but you should summarize important methodologies)
- ☐ <u>each figure in a paper has a purpose and a major conclusion</u> – make certain that you and the audience understand what issue was being addressed by the data in a particular figure and the conclusion. Focus on making sure that when the overhead is removed the audience will remember the major "take home message"
- ☐ posing and answering questions is frequently a useful presentation strategy
- ☐ make sure that each result/figure "flows" into the next experiment
- ☐ a good idea is to state the objective and the conclusion of a figure at the start, then discuss the figure, then restate the conclusion as a lead-in to the next figure (eg. "The authors wanted to determine…" "The results indicated that…". [discuss the data/figure] "Having shown that …., the authors next wanted to determine…")

- ☐ try to tie each result back to the major objective(s)
- ☐ it may not be necessary to show all figures, some can just be summarized to save time for the key figures or those that are complex
- ☐ if you show a figure, make sure you describe it fully and direct the audience's attention to the key features. Focus on the major results of an experiment and quickly summarize repetitive data in the figure.

Summary:

- ☐ summarize the main point(s) of the paper
- ☐ how was the paper altered our perception of the field?
- ☐ what are the implications of this study?
- ☐ What is left unanswered?