

MED 6197
Cellular and Molecular Neuroscience, 2017

Time: Tuesdays 1:00 – 4:00 pm

Location: 1M114 (NOTE NEW LOCATION!!!)

Course Objective

This is an advanced graduate course, designed to promote the following:

To build basic knowledge on:

- Cellular and molecular mechanisms of nervous system function
- Experimental approaches for cell and molecular biology in neuroscience

Skill development:

- Reading, understanding and critiquing high-impact published manuscripts
- Leading and participating in group discussions
- Writing

Contents

- Lectures: Various topics relevant to cellular and molecular neuroscience, including commonly-used methodology
- Article discussions in which students take turns facilitating the discussion
- Perspective article writing assignment
- Grant-writing assignment

Evaluation

Facilitation: 10% of the final mark

- Students will be provided with one scientific article one week prior to the date of its discussion
- On the day the article is assigned, one student will be scheduled to act as the facilitator during the first hour of the class the subsequent week. The role of the facilitator is to:
 - i. Provide an introduction to the manuscript (background, introduce the research question being address, what

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- has been done previously, what is the gap in research knowledge that the paper aims to address)
- ii. Call upon other students in the class to discuss the results of the paper, one figure at a time. All students must be prepared to describe any figure within the paper, including the rationale of the figure (what specific aim are they trying to address in the figure), the method(s) used to generate the data, the results presented in the figure and the conclusion(s) drawn from the data.
 - iii. Clarify any important details that may have been missed during the discussion
 - iv. At the end, facilitate a discussion on the pros/cons of the article. Example questions include: Did you enjoy the article? Was it easy to understand? Did it satisfactorily address the research question stated in the introduction? Were the conclusions drawn justified based on the data? Can alternate interpretations be drawn from the data?

Summary of Facilitator role

- Introduce the manuscript
- Call upon students to present/discuss each figure
- Clarify any missed details throughout the discussion
- Discuss pros/cons

- Each student will be responsible for facilitating the discussion of one article.
- The facilitator does not need to prepare a powerpoint (unless he/she thinks it will help streamline the discussion). However, the manuscript PDF must be projected on the smartboard to view the relevant figures during discussions.

Participation: 10% of the final mark

- Students will be regularly called upon by the facilitator to present a section of an article. It is also expected that all students will contribute their overall thoughts on the article, described in point four above. An overall score out of 10 will be given to each student for their overall participation in the group discussions. If you come to class well-prepared to discuss the assigned article, these should be easy marks!

Perspective article: 30% of the final mark (25% for the article, 5% for the presentation). Due Feb. 28th.

- Each student will be assigned a controversial topic in neuroscience on which they will have to write a 5-page perspective article.
- See PMID: 27742076 for an example of a similar type of article on a controversial topic.
- A title and a max 250 word abstract is required
- The 5 pages are free-form, although topic headings and sub-headings are highly recommended. Be sure to introduce the overall importance of the topic, clarify precisely what is controversial, cite evidence supporting both sides of the controversy, identify any outstanding questions, and draw a general conclusion (e.g. do you support one side over the other? If so, why or why not?) Bonus marks will be given if you can incorporate evidence from both sides into a new hypothesis or theory.

- On Feb 28th, each student will give a 5 minute presentation of their topic, touching on the points listed above.

Mock grant: 50% of the final mark

- Students can contact the course coordinators for guidance or general inquiries at any time throughout the grant-writing process. You can discuss your ideas with your supervisor, but they are not permitted to read it for you to give you feedback. The point of the first draft deadline is for everybody to get feedback from the same people (i.e. the course coordinators). You are encouraged to distribute your grant applications amongst yourselves at any point, to get feedback from your classmates.
- Deadlines (all deadlines are to be met via email submission of a single PDF file to both course coordinators)
 - i. Registration (5% of final mark) due Friday February 3rd by the end of the day
 - ii. First Draft (10% of final mark) due Friday March 3rd by the end of the day
 - iii. First draft will be returned with comments by March 10th
 - iv. Final Draft (35% of final mark) due Tuesday April 4th by the end of the day

Mock Grant Details

- Registration (5%)

Many granting agencies require a “registration” phase, in which a short summary of the research proposal is submitted in advance of the grant deadline. The main purpose of the registration is to assign appropriate reviewers. For purposes of this course, the registration forces you to start thinking about your grant early, and allows the coordinators to determine whether a proposal is acceptable or not (see 4th point below). At the registration deadline, provide the following:

- i. Title (max 15 words)
- ii. Lay summary (max 150 words). Describe your research proposal for a lay audience. When a grant is funded, the lay summary is typically posted online.
- iii. Scientific summary (max 500 words). Describe your research proposal for a scientific audience. Be sure to include relevant background, state the knowledge gap and the approaches you will take to fill that gap. Specific aims should be listed here as well as a brief overview of the methods that will be used.
- iv. A short description (250 words or less) of how your proposed grant topic/methods differs from your thesis project. Some degree of overlap will be acceptable, although we encourage students to learn about techniques they are not using in the lab and/or propose research outside of their area of expertise. Proposals that overlap both conceptually and methodologically with the student’s thesis will not be accepted, and the student will have one additional week to submit a revised registration. If you are unsure of whether a particular topic/method is acceptable, feel free to ask Dr. Moore or Parsons at any point before the registration deadline.

- Research Proposal (first draft = 10%; final draft = 35%)

Title, lay summary and scientific summary (as described for the registration) must be included when submitting your research proposal. Minor changes to these sections between registration and submission are permitted.

Your grants should be feasible within a four year period, and will be marked according to CIHR project scheme guidelines as follows:

(The following sections are copied, with minor adjustments, from the CIHR Project Scheme found at <http://www.cihr-irsc.gc.ca/e/49560.html#b3>)

“Criterion 1: Significance and Impact of the Research (50%)

- a. Is the project idea creative?
 - The project idea is among the best formulated ideas in its field, stemming from new, incremental, innovative, and/or high-risk lines of inquiry; new or adapted research and knowledge translation/commercialization approaches/methodologies; and opportunities to apply research findings nationally and internationally.
- b. Is the rationale of the project idea sound?
 - The project rationale is based on a logical integration of concepts.
- c. Are the overall goals and objectives of the project well-defined?
 - The overall goal and objectives of the project are well-defined and clear.
 - The goal states the purpose of the project, and what the project is ultimately expected to achieve.
 - The objectives clearly define the proposed lines of inquiry and/or activities required to meet the goal.
 - The proposed project outputs (i.e., the anticipated results of the Project) are clearly described and aligned to the objectives.
- d. Are the anticipated project contributions likely to advance health-related knowledge (which includes basic science, model organisms, and other discovery research), health care, health systems and/or health outcomes?
 - The context and needs (issues and/or gaps) of the project are clearly described.
 - The anticipated contribution(s) (e.g. publishing in peer-reviewed journals) are clearly described, and should be substantive and relevant in relation to the context of the issues or gaps.
 - The anticipated contribution(s) are realistic, i.e., directly stemming from the project outputs, as opposed to marginally related.

EVALUATION SUMMARY

- Facilitation of manuscript discussion (10%)
- Participation in manuscript discussions (10%)
- Perspective (30%)
 - Feb 28th (date for presentation and submission of article)
- Mock grant
 - Feb 3rd Registration (5%)
 - Mar 3rd First draft (10%)
 - Apr 4th Final draft (35%)

Criterion 2: Approaches and Methods (50%)

- a. Are the approaches and methods appropriate to deliver the proposed output(s) and achieve the proposed contribution(s) to advancing health-related knowledge, health care, health systems, and/or health outcomes?
 - o The research and/or knowledge translation/commercialization approaches, methods and/or strategies are well-defined and justified in terms of being appropriate to accomplish the objectives of the project.
 - o Opportunities to maximize project contributions to advance health-related knowledge, health care, health systems and/or health outcomes should be proactively sought and planned for, but may also arise unexpectedly.
- b. Are the timelines and related deliverables of the project realistic?
 - o Timelines for the project should be appropriate in relation to the proposed project activities. Key milestones and deliverables should be aligned with the objectives of the project, and be feasible given the duration of the project.
- c. Does the proposal identify potential challenges and appropriate mitigation strategies?
 - o Critical scientific, technical, or organizational challenges should be identified, and a realistic plan to tackle these potential risks should be described. An exhaustive list is not expected.”

A maximum of 5 pages will be dedicated to the research proposal (this does not include the lay and scientific summaries). Any figures, figure legends or tables are included in this 5-page limit. There is no limit to the number of references, and your reference list should be attached directly after the 5th page of your research proposal. There is no mandatory reference style, although sufficient detail must be provided for the reader to easily retrieve the reference, and formatting must be consistent throughout.

Your proposal must follow the attachments guidelines set out by the CIHR. These can be found here: (<http://www.cihr-irsc.gc.ca/e/29300.html>) under the section “requirements for attachments.”