

BIOLOGY 3020.03

ADVANCED CELL BIOLOGY

COURSE INFORMATION

Professor: Patrice Côté



DALHOUSIE UNIVERSITY

Course description

For a cell to function normally, it is crucial that information from the environment be properly integrated. As such, the failure of signalling mechanisms is often responsible for developmental abnormalities and devastating conditions such as cancer and inflammatory diseases. The importance of cell signaling (or signal transduction) has manifested itself in recent years by the explosion in the number of publications in the area and has become unavoidable to anyone willing to pursue work in virtually all the branches of life science. Through a systematic review of structural and functional aspects of signaling pathway components, and by discussing original articles in class, the participants will gain the practical knowledge necessary to decipher and critically analyze current research in this complex field.

Prerequisite

BIOL/BIOC 2020.03 (B or above) or special permission from the instructor.

Since many hours will be spent reading and discussing original research papers, students must possess a fairly strong base in cell biology.

Professor

Patrice Côté, PhD

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If you have questions *please* do not hesitate to see me.

Office hours are whenever I am in my office. However, if you want to save yourself some steps, send me an email and we will arrange a mutually convenient time to meet.

Academic Accommodation Requests

Students may request accommodation as a result of barriers related to disability, religious obligation, or any characteristic under the Nova Scotia Human Rights Act. Students who require academic accommodation for either classroom participation or the writing of tests and exams should make their request to the Advising and Access Services Center (AASC) prior to or at the outset of the regular academic year. Please visit www.dal.ca/access for more information and to obtain the Request for Accommodation -- Form A.

A note taker may be required as part of a student's accommodation. There is an honorarium of \$75/course/term (with some exceptions). If you are interested, please contact AASC at 494-2836 for more information.

Please note that your classroom may contain specialized accessible furniture and equipment. It is important that these items remain in the classroom, untouched, so that students who require their usage will be able to participate in the class.

Communication

Email to your @dal.ca account will be used to relay important course-related information and documents, links, and announcements will be posted on BLS, which is accessible through MyDal. It is your responsibility to check your the BIOL3020 BLS site and you email account often.

Timetable and formatLectures/presentation

1 hour and 20 minute lectures on Tuesday and Thursday.

Unless I specify otherwise, we will have regular lectures on Tuesdays and presentations on Thursdays.

Textbook (available free online at Dal):

Gomperts BD, Kramer IM, and Tatham PER, Signal Transduction, 2nd Ed., ©2009, Elsevier, 880p. ISBN 978-0-12-369441-6 (electronic ISBN, 978-0-08-056877-5).

Online resource

Encyclopedia of life sciences: www.els.net

Lecture Topics

Lecture 1: Introduction

Lecture 2: Cyclic AMP and adenylyl cyclase

Lecture 3: GTP binding proteins

Lecture 4: First messengers and receptors

Lecture 5: Visual transduction

Lecture 6: Calmodulin

Lecture 7: Calcium storage and calcium release by IP3

Lecture 8: Src, Tyr phosphorylation and src-homology domains

Lecture 9: Ras/MAP kinase pathway

Lecture 10: Non-receptor protein tyrosine kinases

Lecture 11: Growth factor receptors

Lecture 12: Nitric oxide

EVALUATION

Evaluation of student performance will be based on four components: 1) Article presentation and discussion, 2) Class attendance, participation and peer evaluation, 3) Wikipedia project, and 4) Final exam. There is no midterm exam.

Article Presentation and Discussion

We will be reviewing one (or two closely related) article that is relevant to the weekly topic at hand. The papers will be classical papers in the field of cell signalling. Teams of 4 or 5 participants will have one week to review the article and will be asked one the Thursday lecture to describe a figure or table from the

paper. The figure(s) or table(s) are assigned to each team on the day of the presentation.

Class attendance, participation and peer evaluation

It is essential in an interactive class such as BIOL3020 that you be present in class. Attendance will be taken on presentation days and an absence with no valid reason* will cost you 2 points (out of a maximum of 4 points – arriving more than 20 minutes after the start of class will be considered an absence). Being physically present, however, is only part of the requirement and 3 points are allocated for attentiveness during presentations and respectful participation in discussions. This class is meant to be very interactive and is heavily team-centered. It is therefore essential that everyone contribute to all aspects of the team activities including article preparation in your regular teams and within 'jigsaw' groups. To encourage everyone's participation, your peers will have the opportunity to grade your participation, just as *you* will have the opportunity to grade your peers and yourself. A 'peer evaluation form' will be provided and you will be required to provide a mark out of '2' for each member of your regular team and for the members of the jigsaw group that you interacted with. I will require three of these forms to be turned in at various dates during the term. Failure to turn in the form will impact on your participation mark.

Attendance:	4
Participation:	3
Peer Evaluation (Regular Team component):	4
Peer Evaluation ('Jigsaw' component):	4
TOTAL:	15

*A 'valid reason' includes reasons that would be acceptable for missing an exam such as a medical reason (a doctor's note dated on the day that was missed is required), a wedding/death in the family (documented proof will be required), or another reasonable excuse such as an important appointment or meeting that cannot be moved (in this case it is essential that you let me know in advance).

Feedback

In addition to providing a basic understanding of cell signalling, the ultimate goal of this course is to give participants the necessary tools to understand cell biology articles, to critically assess the findings reported in these papers and to communicate your interpretation of these findings. Timely and constructive feedback is essential in order for one to improve his/her abilities in this regard and you will benefit from two types of feedback.

1) Presentation feedback from instructor

Following each presentation, I will email each team with the group marks for each assigned figure or table and I will provide a brief comment on the quality of the presentation.

2) Peer feedback

The peer evaluation form provides space for you to write a brief comment (less than 30 words) regarding your colleague's performance. It is not required that you write something unless you have given the person a mark of '0'. Comments must be *respectful* and positive comments are encouraged. If you are commenting on an aspect of the performance that can stand for improvement, it is essential that the comments be *constructive* and provide your peer with the information necessary to improve. Peer feedback will be anonymous: comments will be typed, compiled and sent by email 3 times during the term (early February, March, and April). I reserve the right to edit or delete comments if I find anything abusive or inappropriate.

Wikipedia article

As a team, you will write an article relating to Cell Signaling in a format appropriate for publication in the open content web-based encyclopedia Wikipedia.

- The article can be on a gene and/or protein, a pathway, a process, a disease, or a person. As long as the topic has a strong relationship to cell signaling
- The article must either be on a completely unpublished topic or must expand a short "stub" (initially less than 200 words). Simple editing of an existing full length article is not acceptable.
- The finished article must be at least 1500 words in length, not including references and Infobox data
- The article must adhere to the writing style and formatting dictated by Wikipedia, and more specifically, it should comply with the formatting recommendations of the Molecular and Cellular Biology WikiProject.- Before publication, you will submit the text in print (formatted for Wikipedia) and provide the text in Word format. The article will also be verified for originality using Turnitin.com.

Marking of Wikipedia paper: Text content (7 points), formatting and references (3 points)

Please note: Wikipedia is an open source project. As such, all submitted material becomes part of the public domain with absolutely no authorship rights for the authors. The authors must also understand that the published text can be edited mercilessly by anyone.

Important dates (exact dates TBA):

End of first month of the term: Submit topic

Middle of the second month: Submit detailed point-form outline with references

Last day of class: Final text submitted for grading (in Wikipedia format).

Final ExamMaterial subject to examination:

1. The entire content of the lectures is subject to examination unless otherwise indicated. Slides that are meant as additional material and not subject to examination will be marked "FYI".
2. Only the lecture material is subject to exam. NOT the articles!

	Marks (% of Final)
LECTURE COMPONENT	
Final	40
ARTICLE/WIKIPEDIA COMPONENT	
Team presentations	35
Wikipedia project	10
Attendance/participation/peer evaluations	15
TOTAL	100

Dalhousie Common Grade Scale (Effective September 2014)

Grade in %	Equivalent letter
90 – 100	A+
85 – 89*	A
80 – 84	A-
77 – 79	B+
73 – 76	B
70 – 72	B-
65 – 69	C+
60 – 64	C
55 – 59	C-
50 – 54	D
0 – 49	F

* Rounding up will be done within 0.5 of the letter grades, eg. 85.5 = A+, 85.4 = A