

Biochemistry & Biomedical Sciences

BIOCHEM 3CB3

Emerging Discovery in Cell Biology

Fall 2024

Instructor Information



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Course Information

Lectures: Monday, Friday, 9:30-10:20 am. Wednesday 10:30 - 11:20 am BSB121

Tutorials: by appointment with TAs via Zoom.

Course Dates: 09/03/2024 - 12/05/2024

Units: 3.00

Course Delivery Mode: In Person

Course Description: Students will critically evaluate and present primary manuscripts in basic cellular biology and cellular biochemistry on theme areas related to the endoplasmic reticulum and ER stress, intracellular protein trafficking, and cytoskeleton actin and tubulin. Three hours (lectures); one term Prerequisite: BIOCHEM 2B03 and 2BB3; or BIOCHEM 2EE3 and 3G03; or ISCI 2A18 A/B Antirequisite(s): BIOCHEM 3EE3

Meeting Details

Classes Monday, Friday, 9:30-10:20 am. Wednesday 10:30 - 11:20 am BSB121

Important Links

- [Mosaic](#)
- [Avenue to Learn](#)
- [Student Accessibility Services - Accommodations](#)
- [McMaster University Library](#)
- [eReserves](#)

Course Learning Outcomes

- understanding scientific publications
- critical assessment of data
- understanding of methods used and all reagents and how they work.
- understanding ethical handling and ethics of publishing
- understanding graph formats, proper use of statistics to define significance.

Required Materials and Texts

Textbook Listing: <https://textbooks.mcmaster.ca>

No textbook used

Class Format

In Person

Flipped instruction, three lecture by groups:

Monday introduction

Wednesday friday results and discussion

Course Evaluation

Manuscript Presentation 30%

Written Paper 25%

Quiz I 15%

Quiz II 15%

Quiz III 15%

3CB3 Written Review marking rubric

This is an max 8 page (2000 word) review for 25 marks, worth 25% of the course. Structure is similar to a TiBS review:

<https://www.cell.com/trends/biochemical-sciences/home>

the following Rubric is used:

Structure and breadth of topic: 5 marks

References: 5 marks

Grammar and writing quality: 5 marks

Figures: 5 marks

Discussion and future applications: 5 marks.

25 marks

For presentations, rubric:

Slide Quality, lack of errors, typos, clarity: 10 marks

knowledge of methods and results presentation: 10 marks

Response to questions: 5 marks

Discussion and impact on the field beyond the manuscript, 5 marks

30 marks in total.

Grading Scale

Grade	Equivalent Grade Point	Equivalent Percentages
A+	12	90-100
A	11	85-89
A-	10	80-84
B+	9	77-79
B	8	73-76
B-	7	70-72
C+	6	67-69
C	5	63-66
C-	4	60-62
D+	3	57-59
D	2	53-56
D-	1	50-52
F	0	0-49

Course Schedule

	Monday	Wednesday	Friday
1		Sept 4 First week -Truant	Sept 6 First week -Truant
2	Sept 9 Group A	Sept 11 Group A	Sept 13 Group A
3	Sept 16 Group B	Sept 18 Group B	Sept 20 Group B
4	Sept 23 Group C	Sept 25 Group C	Sept 27 Group C
5	Sept 30 Section 2 intro -	Oct 2 Quiz1	Oct 4 Quiz1 takeup
6	Oct 7 Group D	Oct 9 Group D	Oct 11 Group D
7	Oct 14 No class	Oct 16 No class	Oct 18 No class
8	Oct 21 Group E	Oct 23 Group E	Oct 25 Group E
9	Oct 28 Group F	Oct 30 Group F	Nov 1 Group F
10	Nov 4 Section 3 intro-Truant	Nov 6 Quiz#2	Nov 8 Quiz #2 takeup
11	Nov 11 Group G	Nov 13 Group G	Nov 15 Group G
12	Nov 18 Group H	Nov 20 Group H	Nov 22 Group H -Papers due
13	Nov 25 Group I	Nov 27 Group I	Nov 29 Group I
14	Dec 2 Quiz #3	Dec 4 Quiz #3 takeup	Dec 6 CALM live tour ABB

Group A

- Review: Karyopherin-mediated nucleocytoplasmic transport. Wing CE, Fung HYJ, Chook YM. Nat Rev Mol Cell Biol. 2022 May;23(5):307-328. doi: 10.1038/s41580-021-00446-7. Epub 2022 Jan 20. PMID: 35058649
- Rules for nuclear localization sequence recognition by karyopherin beta 2. Lee BJ, Cansizoglu AE, Süel KE, Louis TH, Zhang Z, Chook YM. Cell. 2006 Aug 11;126(3):543-58. doi: 10.1016/j.cell.2006.05.049. PMID: 16901787

Group B

- Review: Förster resonance energy transfer microscopy and spectroscopy for localizing protein-protein interactions in living cells. Sun Y, Rombola C, Jyothikumar V, Periasamy A. Cytometry A. 2013 Sep;83(9):780-93.

doi: 10.1002/cyto.a.22321. Epub 2013 Jun 27. PMID: 23813736

- Analysis of a RanGTP-regulated gradient in mitotic somatic cells. Kaláb P, Pralle A, Isacoff EY, Heald R, Weis K. *Nature*. 2006 Mar 30;440(7084):697-701. doi: 10.1038/nature04589. PMID: 16572176

Group C

- Review: Molecular connections between nuclear and ciliary import processes.
- Kee HL, Verhey KJ. *Cilia*. 2013 Aug 28;2(1):11. doi: 10.1186/2046-2530-2-11. PMID: 23985042A size-exclusion permeability barrier and nucleoporins characterize a ciliary pore complex that regulates transport into cilia. Kee HL, Dishinger JF, Blasius TL, Liu CJ, Margolis B, Verhey KJ. *Nat Cell Biol*. 2012 Mar 4;14(4):431-7. doi: 10.1038/ncb2450. PMID: 22388888

Group D

- Review: Mechanisms, regulation and functions of the unfolded protein response. Hetz C, Zhang K, Kaufman RJ. *Nat Rev Mol Cell Biol*. 2020 Aug;21(8):421-438. doi: 10.1038/s41580-020-0250-z. Epub 2020 May 26. PMID: 32457508
- Heat shock response relieves ER stress. Liu Y, Chang A. *EMBO J*. 2008 Apr 9;27(7):1049-59. doi: 10.1038/emboj.2008.42. Epub 2008 Mar 6. PMID: 18323774

Group E

- Review: Atomic force microscopy on chromosomes, chromatin and DNA: a review. Kalle W, Strappe P. *Micron*. 2012 Dec;43(12):1224-31. doi: 10.1016/j.micron.2012.04.004. Epub 2012 Apr 15. PMID: 22633852
- Post-ER Stress Biogenesis of Golgi Is Governed by Giantin. Frisbie CP, Lushnikov AY, Krasnoslobodtsev AV, Riethoven JM, Clarke JL, Stepchenkova EI, Petrosyan A. *Cells*. 2019 Dec 13;8(12):1631. doi:10.3390/cells8121631. PMID: 31847122

Group F

- Review: Molecular genetics of early-onset Alzheimer's disease revisited. Cacace R, Slegers K, Van Broeckhoven C. *Alzheimers Dement*. 2016 Jun;12(6):733-48. doi: 10.1016/j.jalz.2016.01.012. Epub 2016 Mar 24. PMID: 27016693
- A specific amyloid- β protein assembly in the brain impairs memory. Lesne et al., 2006 *Nature* volume 440, pages352–357 (2006). <https://doi.org/10.1038/nature04533>.

Group G

- Review: Schermelleh et al., Super-resolution microscopy demystified *Nat Cell Biol*. 2019 Jan;21(1):72-84. doi: 10.1038/s41556-018-0251-8. Epub 2019 Jan 2.
- Human septins organize as octamer-based filaments and mediate actin-membrane anchoring in cells. Martins et al, 2022. *J. Cell Biol*. <https://doi.org/10.1083/jcb.202203016>

Group H

- Review: The role of the cofilin-actin rod stress response in neurodegenerative diseases uncovers potential new drug targets. Munsie LN, Truant R. *Bioarchitecture*. 2012 Nov-Dec;2(6):204-8. doi: 10.4161/bioa.22549. PMID: 23267414
- Munsie, L.N., Desmond, C.R. and Truant, R., 2012. Cofilin nuclear–cytoplasmic shuttling affects cofilin– actin rod formation during stress. *Journal of cell science*, 125(17), pp.3977-3988.

Group I

- Review: Paola De Magistris and Wolfram Antonin. The Dynamic Nature of the Nuclear Envelope. 2018. <https://doi.org/10.1016/j.cub.2018.01.073>

DNA double-strand break-capturing nuclear envelope tubules drive DNA repair. Shokrollahi et al., 2024. Nature Struct. Mol. Biol. doi: 10.1038/s41594-024-01286-7.

Turnitin.com

Some courses may use a web-based service (Turnitin.com) to reveal authenticity and ownership of student submitted work. For courses using such software, students will be expected to submit their work electronically either directly to Turnitin.com or via an online learning platform (e.g. A2L, etc.) using plagiarism detection (a service supported by Turnitin.com) so it can be checked for academic dishonesty.

Students who do not wish their work to be submitted through the plagiarism detection software must inform the Instructor before the assignment is due. No penalty will be assigned to a student who does not submit work to the plagiarism detection software. All submitted work is subject to normal verification that standards of academic integrity have been upheld (e.g., on-line search, other software, etc.). For more details about McMaster's use of Turnitin.com please go to www.mcmaster.ca/academicintegrity.

Generative AI: Some Use Permitted

Example One

Students may use generative AI in this course in accordance with the guidelines outlined for each assessment, and so long as the use of generative AI is referenced and cited following citation instructions given in the syllabus. Use of generative AI outside assessment guidelines or without citation will constitute academic dishonesty. It is the student's responsibility to be clear on the limitations for use for each assessment and to be clear on the expectations for citation and reference and to do so appropriately.

Example Two

Students may use generative AI for [editing/translating/outlining/brainstorming/revising/etc] their work throughout the course so long as the use of generative AI is referenced and cited following citation instructions given in the syllabus. Use of generative AI outside the stated use of [editing/translating/outlining/brainstorming/revising/etc] without citation will constitute academic dishonesty. It is the student's responsibility to be clear on the limitations for use and to be clear on the expectations for citation and reference and to do so appropriately.

Example Three

Students may freely use generative AI in this course so long as the use of generative AI is referenced and cited following citation instructions given in the syllabus. Use of generative AI outside assessment guidelines or without citation will constitute academic dishonesty. It is the student's responsibility to be clear on the expectations for citation and reference and to do so appropriately.

Students are responsible for factual errors generated by AI.

APPROVED ADVISORY STATEMENTS

Academic Integrity

You are expected to exhibit honesty and use ethical behaviour in all aspects of the learning process. Academic credentials you earn are rooted in principles of honesty and academic integrity. **It is your responsibility to understand what constitutes academic dishonesty.**

Academic dishonesty is to knowingly act or fail to act in a way that results or could result in unearned academic credit or advantage. This behaviour can result in serious consequences, e.g. the grade of zero on an assignment, loss of credit with a notation on the transcript (notation reads: "Grade of F assigned for academic dishonesty"), and/or suspension or expulsion from the university. For information on the various types of academic dishonesty please refer to the [Academic Integrity Policy](#).

The following illustrates only three forms of academic dishonesty:

- plagiarism, e.g. the submission of work that is not one's own or for which other credit has been obtained.
- improper collaboration in group work.
- copying or using unauthorized aids in tests and examinations.

Authenticity / Plagiarism

Some courses may use a web-based service (Turnitin.com) to reveal authenticity and ownership of student submitted work. For courses using such software, students will be expected to submit their work electronically either directly to Turnitin.com or via an online learning platform (e.g. Avenue to Learn, etc.) using plagiarism detection (a service supported by Turnitin.com) so it can be checked for academic dishonesty.

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Courses with an On-line Element

Some courses may use on-line elements (e.g. e-mail, Avenue to Learn, LearnLink, web pages, capa, Moodle, ThinkingCap, etc.). Students should be aware that, when they access the electronic components of a course using these elements, private information such as first and last names, user names for the McMaster e-mail accounts, and program affiliation may become apparent to all other students in the same course. The available information is dependent on the technology used. Continuation in a course that uses on-line elements will be deemed consent to this disclosure. If you have any questions or concerns about such disclosure please discuss this with the course instructor.

Online Proctoring

Some courses may use online proctoring software for tests and exams. This software may require students to turn on their video camera, present identification, monitor and record their computer activities, and/or lock/restrict their browser or other applications/software during tests or exams. This software may be required to be installed before the test/exam begins.

Conduct Expectations

As a McMaster student, you have the right to experience, and the responsibility to demonstrate, respectful and dignified interactions within all of our living, learning and working communities. These expectations are described in the [Code of Student Rights & Responsibilities](#) (the “Code”). All students share the responsibility of maintaining a positive environment for the academic and personal growth of all McMaster community members, **whether in person or online.**

It is essential that students be mindful of their interactions online, as the Code remains in effect in virtual learning environments. The Code applies to any interactions that adversely affect, disrupt, or interfere with reasonable participation in University activities. Student disruptions or behaviours that interfere with university functions on online platforms (e.g. use of Avenue 2 Learn, WebEx or Zoom for delivery), will be taken very seriously and will be investigated. Outcomes may include restriction or removal of the involved students’ access to these platforms.

Academic Accommodation of Students with Disabilities

Students with disabilities who require academic accommodation must contact [Student Accessibility Services](#) (SAS) at 905-525-9140 ext. 28652 or sas@mcmaster.ca to make arrangements with a Program Coordinator. For further information, consult McMaster University’s [Academic Accommodation of Students with Disabilities](#) policy.

Requests for Relief for Missed Academic Term Work

In the event of an absence for medical or other reasons, students should review and follow the [Policy on Requests for Relief for Missed Academic Term Work](#).

Academic Accommodation for Religious, Indigenous, or Spiritual Observances (RISO)

Students requiring academic accommodation based on religious, indigenous or spiritual observances should follow the procedures set out in the [RISO](#) policy. Students should submit their request to their Faculty Office **normally within 10 working days** of the beginning of term in which they anticipate a need for accommodation or to the Registrar’s Office prior to their examinations. Students should also contact their instructors as soon as possible to make alternative arrangements for classes, assignments, and tests.

Copyright and Recording

Students are advised that lectures, demonstrations, performances, and any other course material provided by an instructor include copyright protected works. The Copyright Act and copyright law protect every original literary,

dramatic, musical and artistic work, **including lectures** by University instructors.

The recording of lectures, tutorials, or other methods of instruction may occur during a course. Recording may be done by either the instructor for the purpose of authorized distribution, or by a student for the purpose of personal study. Students should be aware that their voice and/or image may be recorded by others during the class. Please speak with the instructor if this is a concern for you.

Extreme Circumstances

The University reserves the right to change the dates and deadlines for any or all courses in extreme circumstances (e.g., severe weather, labour disruptions, etc.). Changes will be communicated through regular McMaster communication channels, such as McMaster Daily News, Avenue to Learn and/or McMaster email.