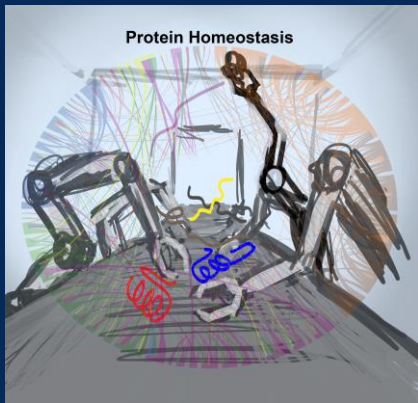


BCH440H1

Protein Homeostasis



Term & Year: Winter 2025

Timetable: Tuesday and Thursday
10:00 am - 11:00 am

Hours: 24L

Prerequisites:

BCH210H1/BCH242Y1; BCH311H1/MG
Y311Y1/CSB349H1/PSL350H1

Exclusions: None

Enrolment Limits: 60

Coordinator:

James Rini, MaRS W Tower, Rm 1614
james.rini@utoronto.ca
Tel: 416-978-0557

COURSE SYLLABUS

Last updated: 17 December 2024



Course Overview & Learning Outcomes

Protein homeostasis is dependent on the coordinated synthesis, folding, localization and degradation of the thousands of proteins in a living cell. This course deals with selected aspects of the process including: i) protein folding in the cytoplasm and secretory pathway, ii) cytoplasmic, ER and mitochondrial chaperones, iii) protein quality control and degradation via the ubiquitin proteasome system, and iv) the unfolded protein response. The course will serve as a foundation for those with an interest in how cellular protein levels and conformations are maintained.

Course Materials

None

Course Evaluation

Take Home Quiz I: 4%

Term test (2 hrs): 30%

Paper Critique I: 16%

Take Home Quiz II: 4%

Paper Critique II: 16%

Final Exam (2 hrs): 30%

Other Important Information

This course is scheduled to be delivered in-person (Tues/Thurs: 10:10 am to 11 am in MS 4171).

Course Instructor(s)

Name	E-Mail	Teaching Hours
James Rini	james.rini@utoronto.ca	12 lectures
Walid Houry	walid.houry@utoronto.ca	12 lectures
x	x	x
x	x	x

Teaching Assistant(s)

None

Important Dates

Date—Item

Tuesday January 7, 2025: First class

Thursday February 13, 2025: Paper Critique I due

Thursday February 27, 2025 (6:00 - 8:00 pm): Term Test - (Room: TBA)

Thursday March 27, 2025: Paper Critique II due

Final Exam: date/location TBA by Arts & Science Exams office

Academic Accommodations

Students with diverse learning styles and needs are welcome in this course. In particular, if you have a disability or health consideration that may require accommodations, please feel free to approach the Course Coordinator and/or the Accessibility Services Office (<http://www.accessibility.utoronto.ca>) as soon as possible. The Accessibility Services staff are available by appointment to assess specific needs, provide referrals and arrange appropriate accommodations. The sooner you let us know your needs, the quicker we can assist you in achieving your learning goals in this course.

Communications

Instructors will utilize the course's Quercus site and UTORONTO e-mail addresses when communicating with students. As a matter of professionalism, students are expected to use their UTORONTO e-mail addresses as well.

Course Policies

Penalty for Late Submission of Coursework:

Late Assignments will be subject to a penalty of 10% per day.

Remarking Policies:

All requests for remarking of coursework must be made directly to the Course Coordinator within two weeks of the return of the marked work.

Missed Term Tests and/or Requests for Coursework Extensions:

Students who miss a deadline/s to submit academic work are required to email the following information to

the Course Coordinator within 48 hours of the missed deadline. Incomplete requests for consideration and/or requests after this time, may not receive a response:

i) Students must report their absence (include start date of absence and end date of absence) through the online absence declaration tool. The declaration is available on ACORN under the Profile and Settings menu.

ii) Students who have already made use of the absence declaration, please provide a Verification of Illness (VOI) and/or appropriate documentation to the Course Coordinator (Dr. Rini).

iii) Email your request for consideration to the Course Coordinator (Dr. Rini) using your UTORONTO email address; include your full name, student # and reason for the request and attach documentation as required.

iv) All assignments/tests must be written/submitted to obtain credit for them. Credit cannot be obtained by redistributing marks (eg. reweighting the final exam will not be permitted).

Academic Integrity

THERE IS ZERO TOLERANCE FOR PLAGIARISM. Please refer to the Arts and Science Calendar for a definition of plagiarism. Please take advantage of the writing services available on campus or speak to your instructor if you need assistance.

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Additional Information

Quizzes: There will be two quizzes (4% each) and they will be assigned at least one class before they are due (via email submission).

Paper Critique: The research papers to be critiqued will be assigned at random. The critique should be a maximum of 2 pages single-spaced and include the following: i) a summary of the research question addressed, ii) the experimental approaches used, iii) the main results obtained, iv) any weaknesses in the paper noted and v) some follow-up questions and experiments.

Course Schedule

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Lecture 1	Tuesday	Jan 7, 2025	Transcription and translation in mammalian cells
Lecture 2	Thursday	Jan 9, 2025	Protein folding at the ribosome
Lecture 3	Tuesday	Jan 14, 2025	The Hsp70/Hp40 chaperone system I
Lecture 4	Thursday	Jan 16, 2025	The Hsp70/Hp40 chaperone system II
Lecture 5	Tuesday	Jan 21, 2025	The Hsp70/Hp40 chaperone system III
Lecture 6	Thursday	Jan 23, 2025	The Hsp90 chaperone system I
Lecture 7	Tuesday	Jan 28, 2025	The Hsp90 chaperone system II
Lecture 8	Thursday	Jan 30, 2025	The Hsp90 chaperone system III
Lecture 9	Tuesday	Feb 4, 2025	The CCT chaperone system I
Lecture 10	Thursday	Feb 6, 2025	The CCT chaperone system II
Lecture 11	Tuesday	Feb 11, 2025	The CCT chaperone system III
Lecture 12	Thursday	Feb 13, 2025	The Ubiquitin-Proteasome System

Reading Week: Mon Feb 17 - Fri Feb 21, 2025

Lecture 13	Tuesday	Feb 25, 2025	Targeting proteins to the ER
Lecture 14	Thursday	Feb 27, 2025	Protein translocation into the ER
Lecture 15	Tuesday	Mar 4, 2025	Membrane/Secreted proteins and glycosylation
Lecture 16	Thursday	Mar 6, 2025	Proline and Disulphide Isomerases
Lecture 17	Tuesday	Mar 11, 2025	ER Folding Chaperones I
Lecture 18	Thursday	Mar 13, 2025	ER Folding Chaperones II
Lecture 19	Tuesday	Mar 18, 2025	Calnexin/Calreticulin mediated folding
Lecture 20	Thursday	Mar 20, 2025	ER Degradation (ERAD) I
Lecture 21	Tuesday	Mar 25, 2025	ER Degradation (ERAD) II
Lecture 22	Thursday	Mar 27, 2025	ER-phagy and Golgi Quality Control
Lecture 23	Tuesday	Apr 1, 2025	Unfolded Protein Response (UPR) I
Lecture 24	Thursday	Apr 3, 2025	Unfolded Protein Resonse (UPR) II