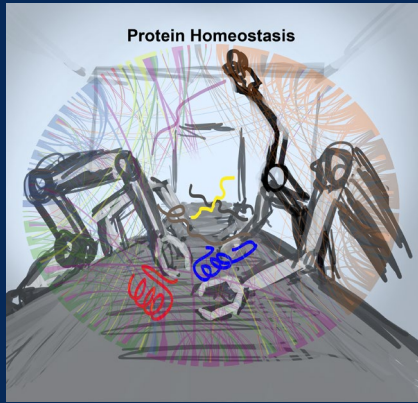


# BCH440

## Protein Homeostasis



Term & Year: Winter 2023

Timetable: TR 9:00 am - 10:00 am

Hours: 24L

Prerequisites:

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

Exclusions: None

Enrolment Limits: 25

Coordinator:

James Rini, MaRS W Tower, Rm 1614

james.rini@utoronto.ca

Tel: 416-978-0557

## COURSE SYLLABUS

*Last updated: 30 November 2022*



## 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 Quizzes: 8%

Term test (2 hrs): 30%

Paper Critique I: 16%

Paper Critique II: 16%

Final Exam (2 hrs): 30%

## Other Important Information

This course is scheduled to be delivered in-person (Tues/Thurs: 9 am to 10 am in HS 108, 155 College Street).

## Course Instructor(s)

Name	E-Mail	Teaching Hours
James Rini	james.rini@utoronto.ca	12 lectures
Walid Houry	walid.houry@utoronto.ca	12 lectures
Enter name	Enter email	#L/#T/#P
Enter name	Enter email	#L/#T/#P

## Guest Speaker(s)/Teaching Assistant(s)

None

## Important Dates

Date—Item
Tuesday January 10, 2023: First class
Thursday February 16, 2023: Paper Critique I due at 4:00 pm via email
Thursday March 2, 2023 (6:00 - 8:00 pm): Term Test, location TBA
Thursday March 30, 2023: Paper Critique II due at 4:00 pm via email
Final Assessment: (Tuesday April 11th to Friday April 28th, 2023), date/location TBA

## 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 are absent from academic participation for any reason (e.g., COVID, cold, flu and other illness or injury, family situation) and who require consideration for missed academic work should report their absence through the online absence declaration. The declaration is available on ACORN under the Profile and Settings menu. Students should also advise the Course Coordinator of the absence.

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## 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.

## 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 10, 2023	Transcription and translation in mammalian cells
Lecture 2	Thursday	Jan 12, 2023	Transcription and translation in mammalian cells
Lecture 3	Tuesday	Jan 17, 2023	Protein folding at the ribosome
Lecture 4	Thursday	Jan 19, 2023	The Hsp70/Hp40 chaperone system I
Lecture 5	Tuesday	Jan 24, 2023	The Hsp70/Hp40 chaperone system II
Lecture 6	Thursday	Jan 26, 2023	The Hsp70/Hp40 chaperone system III
Lecture 7	Tuesday	Jan 31, 2023	The Hsp90 chaperone system I
Lecture 8	Thursday	Feb 2, 2023	The Hsp90 chaperone system II
Lecture 9	Tuesday	Feb 7, 2023	The CCT chaperone system I
Lecture 10	Thursday	Feb 9, 2023	The CCT chaperone system II
Lecture 11	Tuesday	Feb 14, 2023	The CCT chaperone system III
Lecture 12	Thursday	Feb 16, 2023	The Ubiquitin-Proteasome System

Reading Week: Mon Feb 20 - Fri Feb 24, 2023

Lecture 13	Tuesday	Feb 28, 2023	Targeting proteins to the ER
Lecture 14	Thursday	Mar 2, 2023	Protein translocation into the ER
Lecture 15	Tuesday	Mar 7, 2023	Membrane/Secreted proteins and glycosylation
Lecture 16	Thursday	Mar 9, 2023	Proline and Disulphide Isomerases
Lecture 17	Tuesday	Mar 14, 2023	ER Folding Chaperones I
Lecture 18	Thursday	Mar 16, 2023	ER Folding Chaperones II
Lecture 19	Tuesday	Mar 21, 2023	Calnexin/Calreticulin mediated folding
Lecture 20	Thursday	Mar 23, 2023	ER Degradation (ERAD) I
Lecture 21	Tuesday	Mar 28, 2023	ER Degradation (ERAD) II
Lecture 22	Thursday	Mar 30, 2023	ER-phagy and Golgi Quality Control
Lecture 23	Tuesday	Apr 4, 2023	Unfolded Protein Response (UPR) I
Lecture 24	Thursday	Apr 6, 2023	Unfolded Protein Resonse (UPR) II