

# CBPH 850 MODERN CONCEPTS IN CELL BIOLOGY Fall 2021 v2021 08 05

**Tuesday and Thursday 3:00-5:00 PM, 4 credit hours**

To register, contact Janice Warfford ([Janice.Warfford@med.unc.edu](mailto:Janice.Warfford@med.unc.edu))

Course director: Sarah Cohen ([sarahcoh@med.unc.edu](mailto:sarahcoh@med.unc.edu))

## **Exploiting microscopy to reveal subcellular organelle localization, dynamics, and function (Sarah Cohen, Rick Baker, Stephanie Gupton, Wes Legant)**

- Thu Aug 19 Intro to electron microscopy: TEM and SEM (Cohen)
- Tue Aug 24 Cryo-EM for protein structure (Baker)
- Thu Aug 26 Intro to light and fluorescence microscopy for cell biological research (Gupton)
- Tue Aug 31 Live-cell and TIRF microscopy (Gupton)
- Thu Sept 2 Superresolution microscopy (Cohen)
- Tue Sept 7 Light sheet and expansion microscopy (Legant)

## **Genetic approaches in cell biology**

**(Pat Brennwald, Amy Gladfelter, Jay Brenman, Kacy Gordon, Rob Downen)**

- Thu Sept 9 Intro to yeast genetics and the secretory pathway (Brennwald)
- Tue Sept 14 Classical genetics and epistatic analysis of transport (Brennwald)
- Thu Sept 16 Molecular genetics: cloning the first rab GTPase (Brennwald)
- Tue Sept 21 Advanced yeast genetics (Brennwald & Gladfelter)
- Thu Sept 23 Introduction to fly genetics (Brenman)
- Tue Sept 28 Modern fly genetics (Brenman)
- Thu Sept 30 *C. elegans* as a model system for cell biology (Gordon)  
Midterm exam posted at end of class

## **Midterm due Monday, Oct 4 at 5:00 PM**

- Tue Oct 5 Functional genomics in *C. elegans* (Downen)
- Thu Oct 7 *C. elegans* genetics: mechanisms of aging (Downen)

## **Protein quality control and proteostasis**

**(Doug Cyr, Laura Herring)**

- Tue Oct 12 Quality control and chaperones (Cyr)
- Thu Oct 14 ER quality control (Cyr)
- Tue Oct 19 Quality control and human disease (Cyr)
- Thu Oct 21 Proteomics to study post-translational regulation (Herring)

## **Discoveries & controversies in membrane trafficking**

**(Amy Gladfelter, Stephanie Gupton, Patrick Brennwald, Jimena Giudice, Sarah Cohen)**

- Tue Oct 26 Phase separation as an emerging mechanism of cell organization (Gladfelter)
- Thu Oct 28 An interGolgi assay and the directionality of transport
- Tue Nov 2 Coat proteins and vesicle production
- Thu Nov 4 Fusogenic factors from yeast to man & the SNARE hypothesis
- Tue Nov 9 Resolutions & ongoing controversies in membrane trafficking
- Thu Nov 11 No class: preparation for exam

**Tue Nov 16 Final exam presentations I**

**Thu Nov 18 Final exam presentations II**

## **Time & Place**

Class will meet Tuesdays and Thursdays 3:00-5:00 PM in MBRB rm 6200 unless noted otherwise.

## **Face Masks**

All enrolled students are required to wear a mask covering your mouth and nose in our classroom. This requirement is to protect our educational community as we learn together. If you choose not to wear a mask, or wear it improperly, you will be asked to leave immediately. A report will be submitted to the [Office of Student](#)

[Conduct](#), and you will be disenrolled from the course. Students who have an authorized accommodation from Accessibility Resources and Service have an exception. For additional information, see [Carolina Together](#).

### Format

Classes generally begin with a faculty member discussing the key ideas and points in a given area. The second half of each class is usually reserved for a student led discussion of papers from the primary literature. Because the course is driven by discussions of the primary literature, it provides excellent experience both in cell biology and in the analysis of scientific papers. Active participation of all students in presentations and discussions is a key part of the course.

### Course Website

Course materials such as reading assignments and discussion papers will be posted to the course website on [Sakai](#) under "Resources".

### Student Assignments

For most of the classes, groups of students will be assigned to present and lead discussion on research papers. One group member should present a few minutes of introduction and background information to "set the stage" for discussing the paper. The student(s) who are presenting a paper are expected to lead the discussion, but **everyone is expected to have read the paper and contribute to the discussion.**

**While reading the papers, consider the following questions for each figure:**

- 1) What experiment are they doing?
- 2) Why did they do this experiment?
- 3) What did they find?
- 4) How well are the conclusions supported and do you agree?
- 5) What is the next step?

### Grading

Paper Presentations:	~ 25%
Class Participation:	~ 25%
Midterm exam:	~ 25%
*Final exam:	~ 25%

\*The final exam will consist of a group presentation and individual graphical abstract describing the key findings of a paper of the students' choice.

Students are also required to complete an anonymous course evaluation at the end of the semester.

### UNC Honor Code

Students are expected to conduct all academic work within spirit of the UNC [Honor Code](#): avoiding plagiarism and maintaining the confidentiality of examinations. Presentations will be prepared as a group, with all members expected to contribute meaningfully. The midterm exam must be completed individually. The final exam will consist of a group presentation and a graphical abstract that must be completed individually.

### Additional Resources

Although the reading materials for the course such as review articles and research papers will be posted to the Sakai website, those who want or need to strengthen their background in a given area will benefit from reading the relevant chapters in Alberts *et al.*, *Molecular Biology of the Cell*. Alberts is an excellent text that provides a systematic coverage of cell biology.