MCB 165: Neurobiology of Disease, Spring 2021
T/Th 1-2pm PT

Instructors

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All office hours times and Zoom links are posted on bCourses

Course description

The goal of this course is to provide students with insights into the cellular mechanisms underlying neurological diseases. The course is divided into three main sections: neurodevelopmental disorders, psychiatric disorders and neurodegeneration. We will explore each of these topics at the molecular and cellular levels, reviewing what is currently known and the areas of active research. In lecture we will refer to figures from research literature, and you will be reading and discussing articles in discussion section each week. Reading articles critically is an important skill for all biologists and a great way to learn how research is conducted. By the end of the course you will have a good background in neurological diseases, but more importantly you will have a better ability to understand primary literature.

Course format

Lectures and discussion sections will take place on Zoom and links will be provided on bCourses. We will post lecture slides before class. We encourage you to attend lectures synchronously. Please keep your mic muted during lecture and use the chat to ask questions. Lectures will be recorded and posted on bCourses, but discussion sections will not be recorded. Exams will take place during lecture time on Gradescope, so you do need to be available during this time.

Prerequisites

MCB 160 is a prerequisite for this class. While we will not check each student for prerequisites, having a strong background in cellular and molecular neurobiology is necessary to succeed in this course. In our lectures, we will assume you have taken MCB 160 (or equivalent) and will not review basic material.

Textbooks

There is no required textbook for this course, but you may want to refer to the following book, which is available as an ebook through the library. You will need to sign in with your CalNet ID or be on a UCB network to have access to the ebook.

Sontheimer, Harald, *Diseases of the Nervous System*. 2015. Elsevier Inc. ISBN: 978-0-12-800244-5 http://www.sciencedirect.com/science/book/9780128002445

In addition, you may need to use Neuroscience textbooks, like *Principles of Neural Science* (Kandel) or *Principles of Neurobiology* (Luo) to review background material you learned in MCB 160.

You are responsible for the material covered in lecture and in the papers for discussion section, not any extra material that is in these textbooks.

Discussion section

Discussion sections will take place on Zoom and the links will be available on bCourses.

Section number	Time	GSI
101	Th 9-10am	Katie
102	Th 3-4pm	Marisa
103	F 9-10am	Marisa
104	F 2-3pm	Katie

Attendance of one discussion section a week is required for this course. Please attend the discussion section you are enrolled in. Discussion sections will not be recorded. If you are in a time zone that prevents you from attending a discussion section, please contact your GSI to arrange for an alternative assignment.

We will assign a research paper to read every week, which will be posted on bCourses along with a reading guide to help you. You are expected to thoroughly read the assigned article **before your discussion section**. In section, we will split you up into groups and assign a figure to each group to discuss in detail. We will randomly call on students to present the figure their group prepared. You will be graded on attendance and participation at discussion section, as well as your informal figure presentations. We encourage you to turn on your videos during discussion section.

Exams

There will be a midterm exam at the end of each of the three main topics, so there are three exams total. Exams will take place during the lecture time, so you will have 60 minutes to complete them. Exam 3 will take place during finals and will be 60 minutes. Expect both fact-based questions and problems involving analysis of figures, similar to what you have seen in discussion section and lecture. There will also be questions related to the papers you discuss in section. The exams will be open-note, but you will not have enough time to look up all the answers. **You should study for the exams as if they were closed-note in-class exams.**

The exams will be available to take through Gradescope, which you can get to through our bCourses page. You will answer the questions directly in Gradescope, typing in your answers. There will be a practice assignment before the first exam so you get a chance to practice using the program.

There are no make-up exams. If you miss an exam for an excusable reason, such as a medical problem, you must provide the instructor with written documentation within seven days of the exam date. You will take an equivalent 30 minutes oral exam over Zoom with the instructor to test your knowledge of the material. It is your responsibility to contact the instructor as soon as

you know you will miss the exam to arrange the oral exam. It is not possible to miss more than one exam, even for an excused reason.

Grading

Discussion section	10% of total grade
Three midterms (30% each)	90%

Grades will be determined using a standard grading scale

A (some form of an A)	100-90%	D (some form of a D)	69-60%
B (some form of a B)	89-80%	F	59-00%
C (some form of a C)	79-70%		

Your letter grade in the course will be determined according to absolute standards of performance. You will not be in competition with your classmates for grades, nor will the class be curved to a predetermined distribution. However, as you all know, letter grades are based upon the points that you EARN (not based upon needs or wants). We strongly recommend that you focus on learning and enjoying the material. If you are enjoying the class and excited about the material we are discussing, the good grades will follow! If you have concerns about your grade, please contact the GSIs and instructors early in the semester as we will be unable to alter grades after they are assigned.

Accommodations

Students who need academic accommodations, should request them from the Disabled Students' Program, 260 César Chávez Center, 642-0518 (voice or TTY), https://dsp.berkeley.edu. DSP is the campus office responsible for verifying disability-related need for academic accommodations, assessing that need, and for planning accommodations in cooperation with students and instructors as needed and consistent with course requirements.

We are committed to fully supporting our students with disabilities, including meeting accommodations listed in a DSP letter. If you would like to discuss your accommodations with an instructor, please reach out to us.

Honor Code

The student community at UC Berkeley has adopted the following Honor Code:
"As a member of the UC Berkeley community, I act with honesty, integrity, and respect for others." The expectation is that you will adhere to this code.

Collaboration and Independence: Reviewing lecture and reading materials and studying for exams can be enjoyable and enriching things to do with fellow students. This is recommended. However, you must complete your own work and may not work with other students during the exam. Gradescope will screen the exam answers for evidence of cheating.

Cheating: A good lifetime strategy is always to act in such a way that no one would ever imagine that you would even consider cheating. Anyone caught cheating on an exam in this course will receive a failing grade in the course and will also be reported to the University Center for Student Conduct. Consulting with another student during an exam is considered cheating.

Academic Integrity and Ethics: Cheating on exams and plagiarism are two common examples of dishonest, unethical behavior. Honesty and integrity are of great importance in all facets of life. They help to build a sense of self-confidence, and are key to building trust within relationships, whether personal or professional. There is no tolerance for dishonesty in the academic world, for it undermines what we are dedicated to doing – furthering knowledge for the benefit of humanity.

Your experience as a student at UC Berkeley is hopefully fueled by passion for learning and replete with fulfilling activities. And we also appreciate that being a student may be stressful. There may be times when there is temptation to engage in some kind of cheating in order to improve a grade or otherwise advance your career. This could be as blatant as having someone else sit for you in an exam, or submitting a written assignment that has been copied from another source. And it could be as subtle as glancing at a fellow student's exam when you are unsure of an answer to a question and are looking for some confirmation. One might do any of these things and potentially not get caught. However, if you cheat, no matter how much you may have learned in this class, you have failed to learn perhaps the most important lesson of all.

Safe, Supportive, and Inclusive Environment

Whenever a faculty member, staff member, post-doc, or GSI is responsible for the supervision of a student, a personal relationship between them of a romantic or sexual nature, even if consensual, is against university policy. Any such relationship jeopardizes the integrity of the educational process.

Although faculty and staff can act as excellent resources for students, you should be aware that they are required to report any violations of this campus policy. If you wish to have a confidential discussion on matters related to this policy, you may contact the Confidential Care Advocates on campus for support related to counseling or sensitive issues. Appointments can be made by calling (510) 642-1988.

The classroom, lab, and work place should be safe and inclusive environments for everyone. The Office for the Prevention of Harassment and Discrimination (OPHD) is responsible for ensuring the University provides an environment for faculty, staff and students that is free from discrimination and harassment on the basis of categories including race, color, national origin, age, sex, gender, gender identity, and sexual orientation. Questions or concerns? Call (510) 643-7985, email ask_ophd@berkeley.edu, or go to http://survivorsupport.berkeley.edu/.

Diversity statement

The University of California considers the diversity of its students, faculty, and staff to be a strength and critical to its educational mission. Our community is enriched and enhanced by diversity along a number of dimensions, including race, ethnicity, national origins, gender, sexuality, class and religion. We welcome all our students in our class and hope that you always feel included. If there are aspects of the instruction within this course that result in barriers to your inclusion, please let us know. Your suggestions are encouraged and appreciated.

Mental Health and Wellness

All students – regardless of background or identity – may experience a range of issues that can become barriers to learning. These issues include, but are not limited to, strained relationships, anxiety, depression, alcohol and other drug problems, difficulties with concentration, sleep, and

eating, and/or lack of motivation. Such mental health concerns can diminish both academic performance and the capacity to participate in daily activities.

In the event that you need mental health support, or are concerned about a friend, UC Berkeley offers many services, such as free short-term counseling at University Health Services. A list of resources can be found here: https://uhs.berkeley.edu/sites/default/files/mhresources.pdf
A campus website having links to many resources is: https://recalibrate.berkeley.edu/
Remember that seeking help is a good and courageous thing to do – both for yourself and for those who care about you.

Services for Students Encountering Food and Housing Insecurity
If you are in a situation where you are facing challenges in gaining access to nutritious, affordable food during the semester, you can find help by going to the UC Berkeley basic needs program at http://basicneeds.berkeley.edu/ or the UC Berkeley Food Pantry at https://pantry.berkeley.edu/. You may be eligible for the CalFresh program as well.

Technology support for remote instruction
Resources for remote learning: https://studenttech.berkeley.edu/remoteresources
This includes information about how to connect to the UC Berkeley libraries remotely, so you can access journal articles. Make sure you have updated your licensed Zoom account. If you need to borrow a laptop, WiFi hotspot or other technology, apply right away for the Student Equity Program: https://technology.berkeley.edu/STEP

Lecture Schedule (subject to change)

HB = taught by Helen Bateup, SL = taught by Stephan Lammel, RB = taught by Robin Ball
"None" in Discussion column means that there is no section that week

Lec	Date	Prof	Topic	Discussion
Introduction and neurodevelopmental disorders				
1	Tu 1/19	HB	Introduction to diseases of the nervous system	Intro
2	Th 1/21	HB	Disease models	Intro
3	Tu 1/26	HB	Neuropharmacology and drug discovery	Paper 1
4	Th 1/28	HB	Genetic and environmental risk factors	Paper 1
5	Tu 2/2	HB	Autism spectrum disorder	Paper 2
6	Th 2/4	HB	Syndromic developmental disorders	Paper 2
7	Tu 2/9	HB	Epilepsy 1	Paper 3
8	Th 2/11	HB	Epilepsy 2	Paper 3
Tuesday 2/16, 1-2pm, EXAM 1 (Lec 1-8 and Papers 1-3)				
Psychiatric disorders				
9	Th 2/18	SL	Introduction to mesolimbic/reward pathways	None
10	Tu 2/23	SL	Drug addiction 1	Paper 4
11	Th 2/25	SL	Drug addiction 2	Paper 4
12	Tu 3/2	SL	Depression and bipolar disorder	Paper 5
13	Th 3/4	SL	Anxiety and PTSD	Paper 5
14	Tu 3/9	SL	Schizophrenia 1	Paper 6
15	Th 3/11	SL	Schizophrenia 2	Paper 6
16	Tu 3/16	SL	ADHD, OCD, Tourette syndrome	None
Thursday 3/18, 1-2pm, EXAM 2 (Lec 9-16 and Papers 4-6)				
3/22-3/26 SPRING BREAK				
Neurodegeneration				
17	Tu 3/30	RB	Aging and neurodegeneration	None
18	Th 4/1	RB	Huntington disease	None
19	Tu 4/6	RB	Alzheimer disease 1	Paper 7
20	Th 4/8	RB	Alzheimer disease 2	Paper 7
21	Tu 4/13	RB	Parkinson disease	Paper 8
22	Th 4/15	RB	Multiple sclerosis	Paper 8
23	Tu 4/20	RB	Traumatic brain injury	Paper 9
24	Th 4/22	RB	Spinal cord injury	Paper 9
25	Tu 4/27	RB	Neurogenesis and stem cell treatments	None
26	Th 4/29	RB	Stem cell treatments 2 (or review)	None
	5/3-5/7		RRR week	
	Th 5/13		**3-4pm: EXAM 3 (Lec 17-26 and Papers 7-9)**	