

IB 139: The Neurobiology of Stress and Resilience

week	lecture	date	topic	reading
1	1	8/24	Homeostasis and Control Systems	
	2	8/29	Stress, stressors, stress Physiology	
2	3	8/31	Neurophysiology - cells, action potential	
	4	9/5	Neurophysiology - synapses, neurotransmission	55-66
3	5	9/7	Neurophysiology – circuits and systems	85-94
	6	9/12	The Endocrine System: hormones and axes	13-17
4	7	9/14	The HPA axis	1-12
	8	9/19	Glucocorticoid receptor	19-29
5	9	9/21	Allostasis, Allostatic load, circadian rhythm and aging	31-42
	10	9/26	Sympathetic Nervous system	43-54
6	11	9/28	Neuroplasticity, memory	95-106
	12	10/3	Midterm 1	
7	13	10/5	Memory, fear	
	14	10/10	Cognitive aspects – appraisal and control	107-130
8	15	10/12	Resilience, The social brain	131-140
	16	10/17	Stress and psychopathologies – depression and anxiety 1	141-160
9	17	10/19	Stress and psychopathologies - depression and anxiety 2	161-169
	18	10/24	Stress and psychopathologies –PTSD	171-191
10	19	10/26	Individual variability and resilience: GxE, biological sensitivity to context	197-211
	20	10/31	Stress, puberty, reproduction	
11	21	11/2	Midterm 2	
	22	11/7	Developmental programming	213-221

12	23	11/9	Guest Lecture: Depression in social withdrawal context	
	24	11/14	Stress and Health Outcomes: SES and stress timing	223-235
13	25	11/16	Transgenerational transmission	
	26	11/21	Interventions 1	
14	27	11/23	THANKS GIVING	
	28	11/28	Interventions 2	
15	29	11/30	Summary	

When/Where:

Lectures: Tues/Thurs 9:30-11:00am, Morgan 101

Discussion Group; 1 hour/week **REQUIRED**

You need to be enrolled and attending in one of the four sessions:

DIS 101 Tu 2:00P-2:59P | 110 Barker Lisa
DIS 102 W 3:00P-3:59P | 54 Barrows Aaron
DIS 103 Th 3:00P-3:59P | 283 Dwinelle Lisa
DIS 104 W 2:00P-2:59P | 587 Barrows Aaron

Instructors:

Professor:

GSI:

Email policy:

Questions on lecture material will be answered in class and during office hours and in discussion sections. Email is reserved for emergency purposes. We encourage you to attend office hours, and engage in conversation with your professor and GSI!

Office Hours

Office hours are the best way to get really good feedback from us. If you have a complicated question, or are struggling to understand something, or want to get into the nitty gritty, come to office hours of the professor or the GSIs.

Course Description/Summary:

The study of stress is necessarily an interdisciplinary endeavor. The Neurobiology of Stress examines various aspects of the stress response from a neuroscience perspective: how neural systems perceive and regulate the response to stress. We adopt a broad-based approach to explore the concepts of stress, health and disease, and connect them to underlying neural mechanisms. We will explore exciting recent approaches to the study of stress which employ genetic, molecular, cellular, behavioral, cognitive and physiological approaches. As well, we will explore how the above processes occur, in a given context, to subsequently affect resilience vs. vulnerability to disease. This course will emphasize the interconnected and multidirectional relationships between neurobiology, behavior and the social environment.

TEXT:

READER: Will be available from Copy Central on Shattuck & University (details to follow in class)

Current research papers will also be used to supplement the text and lectures.

Reading assignments for each lecture will be in the syllabus. Please read the assigned section before class.

Learning Objectives:

1. A mechanistic understanding of the Hypothalamic-Pituitary-Adrenal (HPA) axis.
2. Understand fundamental principals of neurobiology, physiology and anatomy as proximate mechanisms to the effects of stress on the brain and the body.
3. A working knowledge of the differential outcomes of exposure to stress across developmental and life stages.
4. Illustrate the relevancy of basic stress research (from clinical and pre-clinical animal models) to many applied areas of health and well-being (such as clinical psychology, medicine, social welfare, education)
5. Learn to critically read and analyze primary literature
6. Acquire knowledge of current research methods and skills for critical research design
7. Provide a forum in which students from multiple disciplines with an interest in neurobiology, stress, and health care can come together.

Announcements

New assignments and other changes to the course will be announced via the bCourses site.

Prerequisites:

Bio1A (or a comparable class elsewhere) is a prerequisite for this class. You will need a good understanding of the fundamentals of biology to do well in this class.

Lecture slides:

Slides of each lecture's PowerPoint presentation will be posted in pdf format on the class bCourses site AFTER each lecture.

Grading:

The class will have 2 midterm exams (10/3 and 11/2), and one final exam, to be held on Dec 13th, @ 11:30-2:30 pm. Please make sure to mark these dates and make sure you can attend the three exams.

The grades will be constructed of:

Midterm 1	25%
Midterm 2	25%
Discussion	10%
FINAL EXAM	40%
Total:	100

Letter grades:

If your final course score is: Your final letter grade will be:

- ≥ 95% A+
- ≥ 90% A
- ≥ 87% A-
- ≥ 83% B+
- ≥ 80% B
- ≥ 77% B-
- ≥ 73% C+
- ≥ 70% C
- ≥ 67% C-
- ≥ 63% D+
- ≥ 60% D
- <60% F

All exams will be closed book, closed notes. No electronic devices will be necessary or allowed during exams. Information to be tested is a combination of information presented in lectures, sections and the reader. Attending lectures and sections is critical to your success in this course.

DSP students: please contact the Prof or your GSI at least 2 weeks before the first midterm, so that we can plan the necessary accommodations.

Absence from exams: If you cannot attend an exam due to illness or other circumstances beyond your control, you must contact one of the instructors and explain the circumstances before the exam. You will need to provide documentation of the circumstances (in the case of illness, a doctor's note specifying why you could not attend the exam). There will be no makeup examinations, but we will consider the possibility of shifting the weight of grading under justified and documented circumstances.

Section Format

Section meetings are an integral part of the class, and every student must be enrolled in a section. In section you will work in small groups to analyze case studies and to critically read primary literature. These active learning techniques are possible in small classes, but very challenging in the lecture class.

Section includes group work, reading and discussing current research articles, reviewing and discussing other concepts from the course, and some written assignments. During section you will be called upon to summarize, explain, and/or give your opinion. Therefore, you must complete assigned readings **before** coming to section.

Section Grading

Discussion is mandatory, and will cover new material that will be on your midterms and final.

Section is 10% of your overall grade. Section grade consists of attendance, participation, and occasional written assignments.

Attendance:

You can miss 2 sections for free. These are the days when you get sick, stay up all night, or just can't face the world. Keep them for when you need them. After two absences, 2.5 points will be deducted from your section score for each additional absence (for example, if you miss 3 sections, your maximum possible section score would be 7.5).

Participation: There are many ways to participate. You don't have to be the loudest person in section. Read assignments thoughtfully, think critically about it, and look for ways of engaging that are intellectually meaningful for you.

Section Guidelines:

- A respectful tone in section is crucial. This is a forum to discuss opinions, observations, and ideas about current scientific research with each other.
- Please arrive to section on time. At Berkeley, courses start 10 minutes past the hour. If you do come late, it is your responsibility to make sure that you are marked present at the end of class. You are responsible for any information or directions given during the designated section.
- Participate! Or at least do not distract other students during section (e.g., by checking text messages, answering cell phones, playing computer games, or checking social media websites).

Being an Actual Person

All students are required to abide by the UC Berkeley Code of Conduct of academic integrity and inclusivity. It is posted in your bCourses site. Please see me if you are unclear about the code. Occasionally I run across a student that tries to scam/hustle/cheat their way through a class. If any such fools are taking this class, I urge you to stop making yourself miserable. Learning is one of the rare and fortunate pleasures that we can have in this brief life. I hope that you can find fascinating things in this class that awaken an intellectual passion. If not, don't fake it. Just drop and do something you want to do.

Campus Resources

- **Disabled Students' Program (DSP)** - 260 Cesar Chavez Student Center, 642-0518
<http://dsp.berkeley.edu>
The Disabled Students' Program serves students with disabilities of all kinds, including mobility, visual, or hearing impairments; chronic illnesses such as AIDS, diabetes, and lupus; seizure disorders, head injuries, painful conditions such as back injuries and carpal tunnel syndrome; psychological disabilities such as bipolar disorder and severe anxiety or depression; attention deficit hyperactivity disorder; and learning disabilities. Services are individually designed and based on the specific needs of each student as identified by DSP's Specialists. The Programs official website includes information on DSP staff, UC's disabilities policy, application procedures, campus access guides for most university buildings, and portals for students and faculty.
- **Counseling and Psychological Services**, Tang Center – 2222 Bancroft Way, 642-9494
<http://uhs.berkeley.edu>

The UHS Counseling and Psychological Services staff provides confidential assistance to students managing problems that can emerge from illness such as financial, academic, legal, family concerns, etc. In the realm of sexual harassment, UHS coordinates education programs, crisis counseling, advocacy, and medical care for women and women who have been harassed or assaulted.

- **Student Learning Center** – 642-9494

<http://slc.berkeley.edu>

As the primary academic support service for students at UC Berkeley, the Student Learning Center (SLC) assists students in transitioning to Cal, navigating the academic terrain, creating networks of resources, and achieving academic, personal, and professional goals. Through various services including tutoring, study groups, workshops, and courses, SLC supports students in Biological and Physical Sciences, Business Administration, Computer Science, Economics, Mathematics, Social Sciences, Statistics, Study Strategies, and Writing.

- **Student Life Advising Services (SLAS)** – 642-4257

<http://slas.berkeley.edu>

Student Life Advising Services (SLAS) is an academic counseling/advising service that assists all undergraduate students, with a primary focus on Education Opportunity Program students and students who participated in outreach programs. The SLAS office assists students in developing the skills required to succeed at Berkeley and beyond by taking a comprehensive approach to counseling/advising on academic, personal, and social matters.

- **Ombudsperson for Students** – 102 Sproul Hall, 642-5754

The Ombudsperson for Students provides a confidential service for students involved in a University-related problem (either academic or administrative), acting as a neutral complaint resolver and not as an advocate for any of the parties involved in a dispute. The Ombudsperson can provide information on policies and procedures affecting students, facilitate students' contact with services able to assist in resolving the problem, and assist students in complaints concerning improper application of University policies or procedures. All matters referred to this office are held in strict confidence. The only exceptions, at the sole discretion of the Ombudsperson, are cases where there appears to be imminent threat of serious harm.