

Fall 2016 IB 139: The Neurobiology of Stress

lecture	date	topic	reading
1	8/25	Homeostasis and Control Systems-Introduction	
2	8/30	Stress, stressors, stress Physiology	
3	9/1	The Endocrine System: hormones and axes	
4	9/6	The Endocrine System: hormones and axes	
5	9/8	The HPA axis	1-12
6	9/13	Glucocorticoid receptor	13-30
7	9/15	Sympathetic Nervous system	43-54
8	9/20	Allostasis , Allostatic load, circadian rhythm and aging	31-42
9	9/22	Neurophysiology - cells, synapses, neurotransmission	55-66
10	9/27	Neurophysiology - circuits and systems	67-92
11	9/29	Neuroplasticity and adult neurogenesis	101-106
12	10/4	Memory , fear	95-100
13	10/6	Midterm 1	
14	10/11	The Genome and the epigenome	
15	10/13	Stress psychology - appraisal	107-130
16	10/18	The social brain	
17	10/20	Stress and psychopathologies - depression and anxiety	141-170
18	10/25	Stress and psychopathologies -PTSD	171-196
19	10/27	individual variability: controllability and social factors	197-212
20	11/1	individual variability and resilience: GxE, biological sensitivity to context	131-140
21	11/3	Resilience and vulnerability - genetic and epigenetic factors , early life stress	213-222
22	11/8	Prenatal stress: metabolism, epigenetic, reproduction, Transgenerational transmission	
23	11/10	Midterm 2	
24	11/15	Guest Lecture: Depression in social withdrawal context	
25	11/17	Stress and Health Outcomes: SES and stress timing	223-235
26	11/22	Interventions 1	
27	11/24	THANKS GIVING	
28	11/29	Interventions 1	
29	12/1	Summary	

When/Where:

Lectures: Tues/Thurs at the ungodly hour of 8:00-9:30am, Moffitt Library 102

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

You need to be enrolled and attending in one of the three session: M,W, Th 3-4 pm

Instructors:

Professor Daniela Kaufer OFFICE HOURS: Tuesdays 4-5 1st floor LKS

GSI: Kim Long OFFICE HOURS: TBA 1st floor LKS

Emails: Daniela Kaufer danielak@berkeley.edu
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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!

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:

- A mechanistic understanding of the Hypothalamic-Pituitary-Adrenal (HPA) axis.
- Understand fundamentals principals of *neurobiology, physiology and anatomy* as proximate mechanisms to the effects of stress on the brain and the body.

- A working knowledge of the differential outcomes of exposure to stress across developmental and life stages.
- 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)
- Learn to critically read and analyze primary literature
- Acquire knowledge of current research methods and skills for critical research design
- Provide a forum in which students from multiple disciplines with an interest in neurobiology, stress, and health care can come together.

Discussion sessions:

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.

Discussion is mandatory, and will cover new material that will be on your midterms and final. Section grades account for 10% of the overall grade, and are assigned based on quality of participation. You need to attend 10 of the 12 sections. It is a hard cutoff. If you miss more than 2 sections, your discussion grade will be reduced by one letter grade for each additional section missed.

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 bcourse site AFTER each lecture.

Grading:

The class will have 2 midterm exams (10/6 and 11/10), and one final exam, to be held on Dec 14th. 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%
<u>FINAL EXAM</u>	<u>40%</u>

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.

Honor Code: You will be asked to sign an Honor Code statement at each exam, stating that you will not give or receive aid in the examination. We will manifest our confidence in you by refraining proctoring examinations or taking unusual precautions to prevent cheating. The penalty for violating the Honor Code will be failing the course. A complete statement of our Honor Code is available under 'Resources' on the course bspace site.