

Course Syllabus

BIPN 154 Neurobiology of Stress and Mental Disorder

Justification: This course will provide a basic neurobiological mechanism of stress-induced behavioral changes. Several current neurobiology courses will cover cellular & molecular neurobiology, systems neurobiology, and neuronal circuitry for sensory processing and learning. However, no course will provide information on changes in circuits and neuromodulatory mechanisms induced by environmental stresses, which are highly associated with depression, drug addiction, and other neuropsychiatric diseases.

This course will cover various aspects of the stress response from a neurobiological perspective: What is the neural signal perceives and regulates the response to stress? The concept of stress, stress-induced neural adaptation and related diseases will be discussed in this course. Recent advances in genetic, molecular, behavioral, and physiological approaches will also be discussed, thus will be an upper-division course with few prerequisites, including *BIPN 140*.

Course Goals: The goal of this course is to provide students a fundamental understanding of the molecular and circuit mechanisms in brain mediating stress induced behavioral changes. This course will not only describe the experimental idea of using animal models to understand the change in brain circuitry in response to environmental stress, but also provide the information on the stress-induced changes in human brain.

Course title description for catalog:

Neurobiology of Stress and Mental Disorder

This course will focus on the neurobiological mechanisms that mediate stress-induced behavioral change in animal models and humans in health and disease. Topics will range from the effects of stress hormones on brain function, to modern techniques for examining and treating stress-induced long lasting mental disorders, such as depression and anxiety.

Prerequisites: BIPN 140 is required to take this class. This will ensure that students have a basic understanding of cellular and molecular neurobiology.

Logistics: This will be an upper division, a 4-unit course meant for a Neurobiology major, but accessible to other Biology majors who have taken BIPN 140. Familiarity with basic concepts in Neurobiology is essential, it will not be cross-linked with other departments.

The lecture format will be (3 hours lecture, 1 hour discussion with 8 hour prep/homework per week). Class time will consist mainly lectures, but primary papers will be discussed in some lectures. Homework will include mainly reading assignments.

Grades will be based on performance on the midterm and final exams as well as a take-home writing assignment. I plan to offer the course annually in the winter quarter. The course will require the standard resources as other upper division biology courses (classroom with standard projection or screen technology and Instructional Assistants).

Instructor:

Byungkook Lim

Biological Sciences, Neurobiology

6104 TATA hall

Lecture Location and time:

3201 TATA hall

9:30 AM to 10:50 AM

Tuesday and Thursday

Office Hour:

12:30 PM to 1:30 PM Wednesday

Location TATA hall 6104.

TA

Chen, Qiyu [qic050@ucsd.edu \(mailto:qic050@ucsd.edu\)](mailto:qic050@ucsd.edu)

Zheng, Qingyun [qizheng@ucsd.edu \(mailto:qizheng@ucsd.edu\)](mailto:qizheng@ucsd.edu)

Discussion Zoom Link: <https://ucsd.zoom.us/j/92389268750> (<https://ucsd.zoom.us/j/92389268750>)
(4pm-4:50pm, Wed.)

SCHEDULE

Jan. 9 - Introduction

Jan. 11 - Stress Response and HPA axis I

Jan. 16 - Stress Response and HPA axis II

Jan. 18 – Dopamine and Serotonin

Jan. 23 - Neural Circuitry of Stress Response

Jan. 25 - REVIEW I

Jan. 30 - MIDTERM I

Feb. 1 - Neural Circuitry of Anxiety and Fear

Feb. 6 - Dopamine and Depression I

Feb. 8 - Dopamine and Depression II

Feb. 13 - Neural Circuitry of Panic Disorder (Dr. Sung Han)

Feb. 15 - Neural Circuitry of Depression

Feb. 20 - No class

Feb. 22 - MIDTERM II

Feb. 27 - History of Antidepressant

Mar. 1 - Stress and Feeding (Guest Lecturer)

Mar. 6 - Early life stress and social behaviors

Mar. 8 – Early life stress, binge eating, drug addiction

Mar. 12 – Circuit mechanism of drug addiction

Mar. 14 - REVIEW

FINAL: 3/19/2024 (8 AM – 11 AM)

Course Summary:

Date	Details	Due
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