

Syllabus

Academic Year; 2017

Class starts at; 1st semester

Period; One semester

Course number; -----

(Subject code)

Course title; Cellular Function

School / Department / Interdepartmental program; Department of Physiological Sciences

Credit; 1

Course category; Advanced

Field of subject; Neurophysiology

Type; Lectures

Course description; It is elucidated that brain functions dramatically change during development. They arise from the functional remodeling of neural circuits in immature periods. Alternatively, the expression of diseases or recovery from brain disorders are also thought to be caused by the functional remodeling of neural circuits. In this course, we will firstly introduce the organization of excitatory/inhibitory circuits. Next, we will focus on long-term plasticity of neural circuits from the perspective of circuit connectivity, synapse and ion channel which underlie the dynamic changes of brain functions. Furthermore, we will also discuss the advanced techniques for long-term *in vivo* imaging and optogenetic/chemogenetic manipulation of neural circuits.

Course purpose; 1. To understand plasticity of neural circuits.
2. To understand remodeling of neural circuits during development or diseases.

Expected learning outcome and objectives; To understand plasticity of neural circuits and the most advanced techniques for neurophysiology.

Course content;

1. October 20

Introduction to excitatory circuits

Junichi Nabekura (NIPS)

2. October 27

Introduction to inhibitory circuits

Junichi Nabekura (NIPS)

3. November 10

Signaling pathway in synapse

Hideji Murakoshi (NIPS)

4. November 17

Advanced technique for imaging neural circuits

Masakazu Agetsuma (NIPS)

5. November 24

Advanced technique for manipulating neural circuits

Akihiro Yamanaka (Nagoya University/Research Institute of Environmental Medicine)

6. December 1

Development of neural circuits and their remodeling during recovery period

Madoka Narushima (NIPS)

7. December 8

Neural circuits during brain disorders

Kei Eto (NIPS)

8. December 15

Neural circuits of memory

Naoki Matsuo (Osaka University)

*December 22 (An optional extra day)

Assignment and homework; Not necessary. Please submit the “Course Registration Form” to Student Affairs Section to register this course.

Language used in the classroom; English

Grading policy and criteria; Students are requested to have higher than 50% of attendance rate and to submit a report on the issue based on the purpose above. To get 60 points of 100 of the report will be required.

Related course, pre-requisites; For Department of Physiological Sciences, D1, D2 (obligatory), D3-D5 (optional)

Schedule; October 20, 27, November 10, 17, 24, December 1, 8, 15 (22 for occasional date) (all Friday)
Time; 10:00~12:00

Classroom location; Lecture room, 1st Floor, NIPS (Myodaiji Area). Remote lecture will be held.

Textbooks and required readings; None

Keywords; Neural circuits, Plasticity

To whom the class is open; Open to SOKENDAI students

Course coordinator; Junichi Nabekura

Assistant for course coordinator; Madoka Narushima

Instructor; Junichi Nabekura