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)
\textbf{Assignment and homework:} Not necessary. Please submit the “Course Registration Form” to Student Affairs Section to register this course.

\textbf{Language used in the classroom:} English

\textbf{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.

\textbf{Related course, pre-requisites:} For Department of Physiological Sciences, D1, D2 (obligatory), D3–D5 (optional)

\textbf{Schedule:} October 20, 27, November 10, 17, 24, December 1, 8, 15 (22 for occasional date) (all Friday)
\textbf{Time:} 10:00–12:00

\textbf{Classroom location:} Lecture room, 1st Floor, NIPS (Myodaiji Area). Remote lecture will be held.

\textbf{Textbooks and required readings:} None

\textbf{Keywords:} Neural circuits, Plasticity

\textbf{To whom the class is open:} Open to SOKENDAI students

\textbf{Course coordinator:} Junichi Nabekura
\textbf{Assistant for course coordinator:} Madoka Narushima
\textbf{Instructor:} Junichi Nabekura