

Syllabus

1. Course Title, style, and credit

'Cerebral circuitry'

Lecture

One credit

2. Appropriate grade level and Eligible Departments

All Departments;

For Department of Physiological Sciences, D1, D2 (obligatory), D3-D5 (optional)

3. Course organizer

Yasuo Kawaguchi

E-mail: yasuo@nips.ac.jp

TEL: 0564-59-5280, FAX: 0564-59-5284

4. Time

[Oral]

10:00~12:00 on Friday

October 7, 14, 21, 28

November 11, 18, 25

December 2

5. Place

Seminar room, 2nd Floor West, 2nd Building, NIPS (Yamate Area)

The lectures will be delivered by the remote lecture system.

6. Prerequisites and Styles

Basic knowledge on microanatomy and neurophysiology help, but is not essential. For the credit, register in the graduate student affairs section.

7. Contents

Subregions of the central nervous system have evolved unique and elaborate local circuits. Above all, the cerebral cortex is highly complicated in its structure, and its operation principle remains to be unraveled. This course will introduce basic structures of the neocortex and cover what is currently known about its neuronal organization, synaptic connectivity/plasticity, connections with the thalamus, and development, along with the structural/functional differences among the cortical areas, and neural circuit modeling. An emphasis is placed on how these structural elements contribute to our understanding of the cortical circuit.

8. Course objectives

1. To understand the basic structures, neural connections and development of the cerebral cortex.

2. To understand circuit organization differences among cortical areas.

9. Schedule

(1) October 7th

Basic structures of forebrain
Yasuo Kawaguchi (NIPS)

(2) October 14th
Neuronal wiring and plasticity in cortical microcircuits
Yoshiyuki Kubota (NIPS)

(3) October 21st
Neural connections between cortex and thalamus
Yasuo Kawaguchi (NIPS)

(4) October 28th
Neural circuits in frontal cortex
Mieko Morishima (NIPS)

(5) November 11th
Structure and function of auditory cortex
Hisayuki Ojima (Tokyo Medical and Dental University)

(6) November 18th
Modeling studies of information processing in cortical circuits
Takeshi Otsuka (NIPS)

(7) November 25th
Neural circuits in visual cortex
Yumiko Yoshimura (NIPS)

(8) December 2nd
Development of cortical excitatory and inhibitory neurons
Yumiko Hatanaka (NIPS)

1 0. Lecture materials and readings

“The Synaptic Organization of the Brain” edited by Gordon Shepherd, Oxford.

1 1. Grades

Students will write a short essay related to the Course Objectives. Essays will be scored based on the quality of the report (100 full points). To receive credit for the course, students must attend at least half of the scheduled lectures and get more than 60 points.

1 2. Notes

Nothing in particular